INSTITUTE OF ADVANCED STUDIES IN EDUCATION

(DEEMED TO BE UNIVERSITY)

OF

GANDHI VIDYA MANDIR, SARDARSHAHR

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SYLLABUS

SCHEME OF EXAMINATION AND COURSE OF STUDY

FACULTY OF EDUCATION

B.Sc.B.Ed.(FOUR YEAR INTEGRATED COURSE)

Session: 2022-26

B.Sc. B.Ed.(FOUR YEAR COURSE)

The course of study shall extend over a period of four years as an integrated course in Science, Education, General Hindi,General English andEnvironmental Education leading to the composite degree of B.Sc.B.Ed.

A. Eligibility

Candidates who have passed Senior Secondary 10+2 examination or any other examination recognized board with at least 50% marks in the aggregate are eligible for admission to the course.

<div align="center">Or</div>

The Institute will regulate admission tHRough selection on the basis of marks in the qualifying examination and/or in the entrance examination or any other selection process as per the policy of the state or NCTE and the University and in accordance with the state quota as decided.

Candidate will be eligible for admission to Physical Science (PCM) Group if she/he has qualified qualifying examination with Physics,Chemistry and Mathematics or Statistics and for admission to Biological Science (CBZ) Group if she/he has qualified qualifying examination with Physics,Chemistry and Biology or Biotechnology.

B. Reservation - Reservation of seats for SC/ST/OBC and Handicapped will be as per existing Rajasthan Govt. /Central Govt. /University rules.

C. Admission Procedure for BSCBED- Admission shall be made on merit on the basis of marks obtained in the qualifying Examination and/or in the entrance examination or any other selection process as per policy of the State Government and the University.

D. Duration and Working Days - **Duration** TheB.Sc.B.Ed.Programme shall be of duration of four Academic Years,which can be completed in a Maximum of five Years from the date of the admission to the programme.

Working Days

- There shall be at least two hundrade fifty (250) working days each year exclusive of the period of examination and admission.
- Institution shall work for a minimum of thirty-six hours(36) a week,during which physical presence in the institution of all the teachers and student teachers is necessary to ensure their availability for advice,guidance,dialogue and consultation as and when needed.
- The minimum attendance of student-teachers shall have to be 80% for all course work and practicum,and 90% for school internship.

E. Objectives of B.Sc.B.Ed.

- The objectives of this programme is to prepare teachers from upper primary to middle level (Classes VI-VIII) & Secondary Level (Classes IX-X) pre-service teacher education program are to enable the prospective teacher to –
- Understand nature of education and pedagogic processes tHRough enriched experiences. Contribute to fillup the gap between theory and practice by dovetailing both appropriately.
- Interactive processes wherein group reflection,critical thinking and meaning making will be encouraged.
- Understand various educational issues in the context of diverse socio-cultural & Multilingual Indian Society.
- Enable them to face the challenging of social,political and technological issues.
- Understand the nature,purpose,influencing factors and problems of secondary education in contemporary issues.
- Describe teaching learning process in the classroom and various factors that influence it.
- Understand various level learners,their needs,and interest and peculiar problems and motivate them for learning.
- Conduct Pedagogical content analysis in subject areas and use it for facilitating learning in the classroom.
- Develop and select tests,evaluate and keep records of student's progress-cognitive as well as non-cognitive.
- Adopt and develop enrichment learning& instructional material in subject areas.
- To develop problem solving ability through action research.
- Foster skills and attitude for involving the Community as an educational partner and use society resources in education.
- Become self-regulated learners, develop professional commitment and work as responsible professionals.
- Become aware about human values and gender,school and society.
- To prepare the students to further their education in graduate school and/or directly pursue productive professional careers in the private,state,federal,or educational sectors.
- Enable the students to demonstrate possession and application of higher-level learning skills in critical thinking and problem solving as applied to science issues.
- To enable the students to effectively apply the scientific method.
- Enable to work both on cross-disciplinary teams and function independently as specialists in a science or technical field.
- Demonstrate broad knowledge and technical skills in at least one area of science,and a basic understanding of science disciplines.
- Develop,apply,integrate and generate scientific knowledge in professional contexts to analyse challenges and to develop effective solutions
- Demonstrate understanding of the importance of science to the human endeavour.
- Work and learn both independently and collaboratively to encompass diverse abilities and perspectives,exercise personal,professional and social responsibility as a global citizen.

Programme Outcomes:

- Competence to teach effectively two school subjects at the Elementary & secondary levels.
- Ability to translate objectives of secondary education in terms of specific Programmes and activities in relation to the curriculum.
- Ability to understand children's needs, motives, growth pattern and the process of learning to stimulate learning and creative thinking to faster growth and development.
- Ability to use-
  1. Individualized instruction.
  2. Dynamic methods in large classes.
- Ability to examine pupil's progress and effectiveness of their own teaching tHRough the use of proper evaluation techniques.
- Equipment for diagnosing pupil progress and effectiveness of their own teachings tHRough the use of proper evaluation techniques.
- Readiness to spot talented and gifted children and capacity to meet their needs.
- Ability to organize various school programmes, activities for pupils.
- Developing guidance point of view in educational, personal and vocational matters.
- Ability to access the all-round development of pupils and to maintain a cumulative record.
- Developing certain practical skill such as:
  1. Black board work
  2. Preparing improvised apparatus
  3. Preparing teaching aids and ICT.
- Interest and competence in the development of the teaching profession and education. Readiness to participate in activities of professional organizations.

Programme Specific outcomes:

Students will be able to:

- Understand basic concepts and ideas of educational theory.
- Build understanding and perspective on the nature of the learner, diversity and learning.
- Comprehend the role of the systems of governance and structural – functional provisions that support school education.
- Develop understanding about teaching, pedagogy, school management and community involvement.
- Critically examine key universal constructs in developmental psychology and educational psychology.
- Develop a knowledge setup of content, contexts and circumstances of society.
- Build skills and abilities of communication, self-expression and ICT.
- Develop the potential for perspective building located in the Indian socio-cultural context.
- Analyse the structure of knowledge as reflected in disciplinary streams and subjects
- Develop an understanding of the concept of assessment and its practices.

The syllabus of this course comprises of the following –

F. Course Design: The syllabus of this course comprises of the following –

(a) Perspectives in Education – Course
- Course - Childhood,Growing Up & Learning.
- Course - Educations in Contemporary India.
- Course - Teaching and Learning.
- Course - Gender,School and Society
- Course - Knowledge and Curriculum
- Course - Creating an Inclusive School

(b) Curriculum and Pedagogic Studies –
- Course - Yoga for Holistic Health
- Course - Pedagogy of School Subject (I&II)
- Course - Assessment for Learning

(c) Engagement with the Field– the Self,the Child,Community and School -Task and assessment that run tHRough all the courses as indicated in the year wise distribution of the syllabus.
- School Internship

(d) Specilization courses will be offered in areas such as given below or an additional pedagogy course (In another course at the secondary level or the same course at the high secondary level):-
- Health & Physical Education
- Educational aspects of The Geeta
- Environmental Studies
- Chetna Vikas Moolya Shiksha

(e) Core Courses
- Physics
- Chemistry
- Botany
- Zoology
- Mathematics

(f) Compulsory Course
- GeneralEnglish
- GeneralHindi
- ICT in Education
- Environmental Studies

G. COURSES OF STUDY AND SCHEME OF EVALUATION
FIRST YEAR

Course Code	Title of the Course	EVALUATION			
		External	Internal	Practical	Total
BSCBED110	Genral English(compulsory)*	70	30	-	100
BSCBED-151	Childhood, Growing up & Learning	70	30	-	100
BSCBED-152	Education in Contemporary India	70	30	-	100
BSCBED-153	Yoga for Holistic Health	35	15	-	50
BSCBED-154	Chetna Vikas Mulya Shiksha (Specialization)	35	15	-	50
BSCBED-155	**Content: (PCB & PCM)**				
BSCBED-155 a I	1. Physics I	40	10	50	150
BSCBED-155 a II	2. Physics II	40	10		
BSCBED-155 b I	3. Chemistry I	40	10	50	150
BSCBED-155b II	4. Chemistry II	40	10		
BSCBED-155 c I	5. Zoology I	40	10	50	150
BSCBED-155 c II	6. Zoology II	40	10		
BSCBED-155 d I	7. Botany I	40	10	50	150
BSCBED-155 d II	8. Botany II	40	10		
BSCBED-155 e I	9. Mathematics I	60	15		150
BSCBED-155 e II	10. Mathematics II	60	15		
CCA					25
Prayer, Yoga, Meditation & Festival etc					25
Total					**800**

*Marks of compulsory subject shall notbe added inthe total marks.

SECOND YEAR

Course Code	Title of the course	EVALUATION			
		External	**Internal**	**Practical**	Total
BSCBED-210	Gen. Hindi(Compulsory)*	**70**	**30**	**-**	**100**
BSCBED-251	Knowledge & Curriculum	**70**	**30**	**-**	**100**
BSCBED-252	Teaching & Learning	**70**	**30**	**-**	**100**
BSCBED-253	Health & Physical Education	**35**	**15**		**50**
BSCBED-254	**Content: (BCZ& PCM)**				
BSCBED-254 a I	1. Physics I	**40**	**10**		
BSCBED-254 a II	2. Physics II	**40**	**10**	**50**	**200**
BSCBED-254 a III	3. Physics III	**40**	**10**		
BSCBED-254 b I	4. Chemistry I	**40**	**10**		
BSCBED-254 b II	5. Chemistry II	**40**	**10**	**50**	**200**
BSCBED-254 b III	6. Chemistry III	**40**	**10**		
BSCBED 250 c I	7. Zoology I	**40**	**10**		
BSCBED 250 c II	8. Zoology II	**40**	**10**	**50**	**200**
BSCBED-254 c III	9. Zoology III	**40**	**10**		
BSCBED-254 d I	10. Botany I	**40**	**10**		
BSCBED-254 d II	11. Botany II	**40**	**10**	**50**	**200**
BSCBED-254 d III	12. Botany III	**40**	**10**		
BSCBED-254 e I	13. Mathematics I	**60**	**7**		
BSCBED-254 e II	14. Mathematics II	**60**	**7**		**200**
BSCBED-254 e III	15. Mathematics III	**60**	**6**		
CCA					25
Prayer, Yoga, Meditation & Festival etc					25
Total					900

***Marks of compulsory subject shall notbe added inthe total marks.**

THIRD YEAR

Course code	Title of the course	EVALUATION			
		External	**Internal**	**Practical**	Total
BSCBED-350	ICT in Education*	**70**	**30**		**100**
BSCBED-351	Gender. School & Society	**35**	**15**		**50**
BSCBED-352	Creating an Inclusive School	**35**	**15**		**50**
BSCBED-353	Educational aspects of Geeta	**35**	**15**		**50**
BSCBED-354	**Pedagogy of School Subject-I**				
BSCBED-354-I	1. Mathematics	**35**	**15**		**50**
BSCBED-354-II	2. General Science	**35**	**15**		**50**
BSCBED-354-III	3. Chemistry	**35**	**15**		**50**
BSCBED-354-IV	4. Biology	**35**	**15**		**50**
BSCBED-354-V	5. Physics	**35**	**15**		**50**
BSCBED-355	**Content: (BCZ& PCM)**				
BSCBED-355 a I	1. Physics I	**40**	**10**	**50**	**150**
BSCBED-355 a II	2. Physics II	**40**	**10**		
BSCBED-355 b I	3. Chemistry I	**40**	**10**	**50**	**150**
BSCBED-355b II	4. Chemistry II	**40**	**10**		
BSCBED-355 c I	5. Zoology I	**40**	**10**	**50**	**150**
BSCBED-355 c II	6. Zoology II	**40**	**10**		
BSCBED-355 d I	7. Botany I	**40**	**10**	**50**	**150**
BSCBED-355 d II	8. Botany II	**40**	**10**		
BSCBED-355 e I	9. Mathematics I	**60**	**15**		**150**
BSCBED-355e II	10. Mathematics II	**60**	**15**		
CCA					25
Prayer, Yoga, Meditation & Festival etc					25
Internship (4 Weeks)					50
Total					750

*Marks of compulsory subject shall notbe added inthe total marks.

Internship (4 weeks) included in total marks.

FOURTH YEAR

Course code	Title of the course	EVALUATION			
		External	**Internal**	**Practical**	Total
BSCBED-450	Environmental Studies*	**70**	**30**	**-**	**100**
BSCBED-451	Assessment for Learning	**70**	**30**	**-**	**100**
BSCBED-452	Agriculture	**35**	**15**	**-**	**50**
BSCBED-453	**Pedagogy of school subject-II**				
BSCBED-453 I	1. Mathematics	**35**	**15**	**-**	**50**
BSCBED-453 II	2. General Science	**35**	**15**	**-**	**50**
BSCBED-453 III	3. Chemistry	**35**	**15**	**-**	**50**
BSCBED-453 IV	4. Biology	**35**	**15**	**-**	**50**
BSCBED-453 V	5. Physics	**35**	**15**	**-**	**50**
BSCBED-454	**Content: (BCZ& PCM)**				
BSCBED-454 a I	1. Physics I	40	10	50	100
BSCBED- 454 b I	2. Chemistry I	40	10	50	100
BSCBED- 454 c I	3. Zoology I	40	10	50	100
BSCBED- 454 d I	4. Botany I	40	10	50	100
BSCBED- 454 e I	5. Mathematics I	80	20	-	100
CCA					25
Prayer, Yoga, Meditation & Festival etc					25
BSCBED- 455	**Internship (16 weeks)**				200
Total					750

*Marks of compulsory subject shall notbe added inthe total marks.
Internship (16weeks) included in total marks.

SCHOOL INTERNSHIP

As the title suggestsin this component of the programme,the student- teachers are actually placed in a school for duration of four and sixteen weeks,in two time slots. Initially,they will be attached to particular School for four weeks as 'school attachment'.

This shorter period is to provide them adequate exposure to have a 'feel' of dealing with teaching- Learning.

A time gap after this school attachment will provide opportunity to student-teachers to share experiences,reflect,clarify several things with teacher educators and internalize them.

After about four weeks,they will go for 'school placement' of sixteen weeks. During this period,their role in the school is something like an 'apprentice' and its specific contours need to be worked out by course faculty.

They will be engaged in the school functioning in all its aspects.

MAIN OBJECTIVE

- Student teacher will be enabled to reflect on their practice,and learn to adapt and modify their visualisation/implementation towards betterment of student learning; involve in various school activities and processes in order to gain a 'feel' of the multiple roles of a teacher.

- Develop understanding of the 'school culture'; and learn to reflect upon,consolidate and share their school experiences; and to recognize one's own development as a teacher.

- To provide multiple components of field learning getting to know the school,observing children,observing teaching and learning in real classroom contexts & practicing teaching.

- To developing capacities to think with educational theories and applying concept in concrete teaching – learning situations,managing classroom learning,evaluating learners and providing feedback,learning to work with colleagues,reflecting on one's own professional practice are drawn upon to provide appropriate learning experiences for the student teacher that is critical to the education of teachers.

- To undertake responsibility for planning and implementation of learning situations for specific units of studyin the context of their school.

INSTRUCTION

Student teacher with supervision of their teacher educator must actively engaged in all the school activities at least their internship,(from school management,PTM (MNC) to classroommanagement)

Phase-I internship of third year	= 50 marks
Phase-II internship of fourth year	= 200 marks
Total Marks of Internship	= 250 marks

Phase-I: Internship (4 weeks)

	Assessment is based on the following activities –	
Planning	Content Analysis and mode of transaction (Assignment in teaching subject)	**5**
	Creating and maintaining teaching learning material for the school (which can become valuable resource for the regular teachers of the school). a) TLM in any teaching subject	**5+5=10**
	Make lesson plan using 10- different methods in which 5 must involve,student could develop their own method (fusion based) with the help on teacher educator.	**5**
Planning & Execution	Identify a problem of action research and draft proposal on it.	**5**
	*Innovative Micro Teaching (5 Skills) (Teaching Subjects at secondary to senior secondary level)	5
Execution	One-week,regular observation of regular teacher (at the beginning of practice teaching.)	**5**
	Delivery of Four lessons based on model of teaching. (After each lesson of practice teaching student teacher need to discuss with subject teacher on their pedagogy and new practices it must be seconded.)	5
Assessment & Evaluation	Draft a report based on: - continuously and comprehensively evaluating students' learning for feedback into curriculum and pedagogic practice.	5
Regularity and involvement in different school activities	Observation of day-to-day * school activities and report of an in- depth study of four activities.	5
	TOTAL MARKS	**50**

* Note: Any of the above activity may be replaced as per the need of the course

SUGGESTED SCHOOL ACTIVITIES: -
Select any one activity from each group given below: -
A Group: -
- Organization of cultural activities,
- Organization of literary activities
- Organization of games/sports.
- Framing of time table.
- Water resource management tHRough traditional methods.
- Prepare a report after interview of effective/good teachers.

B Group-
- Attending and organizing morning assembly
- Maintenance of classroom discipline
- Review of School Records
- Guidance and Counseling
- Gardening

CGroup -
- Organizing science fair,exhibition,science club,nature study
- Maintenance of School library
- Maintenance of School laboratories.
- Health and hygiene.
- Study on role of community for school improvement
- School mapping

D Group-
- Sensitization for environmental problems.
- Cleaning campaigning in school.
- School climate/Environment (any one aspect)
- Voluntary services.
- Mass awareness of social evils and taboos.
- Any other activity/s decided by the institute.

Internship (16 weeks)
TEACHING PRACTICE AND PRACTICAL WORK

Planning & Execution	Preparation,administration& analysis of diagnostic test (s) followed by remedial teaching any selected lesson.	**10**
Execution	Execution of action research project	**10**
	Observation and preparation of report	**10**
	Working with community project of social welfare. (submission of report)	**10**
	Exhibition of TLM in school prepared by student teacher	**10**
	Regular classroom teaching delivery of 70 lessons	**5+5=10**
Assessment & Evaluation	Two Criticism Lesson in teaching subject	**10+10=20**
	5 Lessons to be observe by teacher educator.	**5+5=10**
	Final Lesson (External evaluation)	**50**
Regularity & involvement in different school activities	Student teachers function in liaison with the regular teachers in the school in all day-to-day functioning along with teaching-learning by mentor teachers	**05**
	Participating in various 'out of classroom activities' in school Organizing events	**5**
	Participation in any two co-curricular activity and preparation of report	**10**
	Study (and preparation) of school calendar,time table,assessment schedule,library and laboratory.	**5**

	Portfolio,including detailing of teaching-learning plans,resources used,assessment tools,student observations and records.	10
	observations of work done by the students during the internship programme.(Seeking reactions of students,headmasters/ principals/ cooperating teachers and supervisors)	05
	Preparation and maintenances of feedback diary	10
	A journal by student teacher in which he/she records one's experiences,observations,and reflections.	10
	TOTAL MARKS	**200**

Examination &Evaluation:

S. No.	Course	Distribution of Marks
1	Perspectives in Education	650
2	Curriculum and Pedagogic Studies (50+50)	100
3	Specialization	200
4	CCA & Prayer Yoga	200
5	Engagement with the Field – Internship	250
6	Core Courses	1800
7	Compulsory course	--
	GRAND TOTAL	**3200**

Marks Distribution of yearwise	
Year	**Total Marks**
I Year	800
II Year	900
III Year	750
IV Year	750
Grand Total	3200

Marks Distribution	Year of Study			
Areas of Marks	I Year	II Year	III Year	IV Year
Content Subjects	450	600	450	300
Perspective in Edu.	250	200	100	100
Specialization	50	50	50	50
Pedagogy Subject			50	50
CCA	25	25	25	25
Prayer & Yoga	25	25	25	25
Internship			50	200
Total	**800**	**900**	**750**	**750**
		Grand Total		3200

Successful candidates will be awarded division on the basis of the aggregate marks of all the Core Courses, Pedagogy Courses and perspective Courses

	As per the following:	
I.	First Division	60% or more
II.	Second Division	50% or more (but less than 60%)
III.	Third Division	40% or more in theory (but less than 50%)

Note-

The minimum pass marks in each year examination shall be 40% for each theory paper & practicum and 50% for internship in teaching separately.

Candidates can apply for Re-evaluation in any of the theory courses as per rules stipulated by the University for BSCBEDdegree. Changes in Statutes/ Ordinances/ Rules/ Regulations/ Syllabi and books may from time to time be made by amendment or remaking and a candidate shall,except in so far as the University determines otherwise,comply with any change that applies to years she/he has not completed at the time of change.

Notes

There shall be a University examination at the end of each year as per details of the scheme of examination.

A candidate will be permitted to appear in the TERM END EXAMINATION only if he/she has pursued a regular course of study and attended at least 80% of the classes for all the course work and practicum and 90% for school internship.

A candidate shall be admitted to the next higher class only if s/he passes his/her Part I/ Part II / Part III Examination as per rules mentioned herein after.

In order to qualify for B.Sc. B.Ed. degree a candidate should obtain a minimum of 40% marks in theory and practical and 50% for internship in teaching separately,wherever applicable in each subject in each year of the course and 40% marks in Pre-Internship in III Year and also in Internship in Teaching in the Fourth Year.

In Part I,there will be two core courses; compulsory course is General Hindi/ General English,ICT in Education and Environmental Education. In order to pass,a candidate must secure atleast 40% marks in each Compulsay course. However,the marks obtained in these papers will not be taken into account for awarding the division. In case a candidate fails in the compulsory course,she/he has to clear the same in consequent year.

The minimum pass marks in the supplementary examination shall be the same as prescribed for the main examination for internship may pass % shall be 50% separately for internship. i.e. (250)

Rules &Regulation: -

- Final examination is dividing in to two parts external and internal in all the courses, except the courses having practical exams. Internal assignment will be included two tests (7.5 marks each) and any two assignments in course having 100 marks and one assignment of 5 marks in the course having 50 marks along with two tests. In all the core course internal marks will be given by two tests.

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- The candidate who has passed any year of B.Sc.B.Ed. Programme after taking supplementary examination will be awarded minimum pass marks in the concerned subject irrespective of marks actually obtained in the supplementary examination.
- A candidate who fails in 50% courses or less than 50% courses in first year of the programme will be eligible to take admission in second year and give the supplementary examination in the course(s) in which s/he fails along with subsequent examination and get two more chances for clearing this course. In second year,if a candidate is failed,she/he has only one more chance to qualify the exam. Non-appearance or absence from the examination of this paper will be counted as a chance.
- If a student is failed more than 50% courses in first year,he/she has to appear as ex-student in next subsequent year.
- A candidate who fails in one or two courses inany year of the programme will be eligible to take the supplementary examination in the course(s) in which s/he fails and get two more chances for clearing this course either along with the supplementary examination in next subsequent year. Non-appearance or absence from the examination of this paper will be counted as a chance.
- In case the candidate is not able to pass supplementary examination in two subsequent years,s/he can appear only as an ex-student in all courses again at the main examination of the next subsequent year. she/he will not be required to appear in practical(s) if she/he has already cleared the same and have to pay extra one third fee as ex-student. A candidate shall be deemed to be an ex-student if s/he completed a regular course of study at the Institute and fulfilled the required attendance and appeared in University examination but failed or did not take the examination.
- A candidate who fails in the practical/theory/field work of a course at the main examination shall be required to appear only in the corresponding practical/ theory of the supplementary examination.
- A candidate who appears for the supplementary examination may take provisional admission to the next higher class at his/her own risk. Such a candidate will,however,be allowed to appear in the University examination of the next higher-class course to his/her passing the supplementary examination,fulfilling the attendance requirement as a regular candidate and completion of courses of study as per scheme of examination. If a candidate getting supplementary does not take provisional admission to the next higher class by the notified last date of admission and passes the supplementary examination at a later stage,she/he will not be admitted to the next higher class. However,such a candidate may take admission to the next higher class in the next academic session.
- A candidate who fails in more than two courses (except General Hindi/General English/ Environmental studies and ICT in Education) in any year of the course shall be declared failed and will not be promoted to the next class. Such a candidate will be permitted to appear at the main examination of the subsequent year in all the courses only as an ex-student.
- Candidate who fails in more than two courses but passes in practical he/she will be required to appear again in all the courses (theory) except practical only as an ex-student.
- A candidate will be given a maximum of tHRee chances at the main examination and the corresponding supplementary examination in any year of the course. If he/she does not

pass the examination even thereafter,she/he will not be eligible for readmission to any year of the programme.

Pedagogical course – Learning to function as a teacher will be conducted in two phases. Phase I (Pre internship) of 50 marks and phase II (Internship in Teaching) of 200 marks will be conducted in B.Sc.B.Ed. Programme in Part III and IV respectively.

If a candidate fails in the Learning to function as a teacher (Pre-Intern - ship/Internship in Teaching) or is unable to complete Pre-Internship/Internship in teaching but passes in all other subjects he/she will be required to repeat the complete Pre-Internship/ ‗Internship in Teaching' in the next academic session along with regular candidates. Division will be awarded to the successful candidates only after the Part IV examination and on the basis of cumulative total of marks obtained in all the four years of the course in all the subjects including Internship in Teaching but excluding the core subjects i.e.,General Hindi/General English,and Environmental studies.

FIRST YEAR

Course code	Title of the course	EVALUATION			
		External	**Internal**	**Practical**	**Total**
BSCBED110	Gen. English(compulsory)*	70	30	-	100
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BSCBED-155 e II	10. Mathematics II	60	15		
	CCA				25
Prayer, Yoga, Meditation & Festival etc					25
Total					**800**

*Marks of compulsory subject shall not be added in the total marks.

B.Sc.B.Ed. - I YEAR			
COURSE CODE:	BSCBED-110	COURSE TYPE : COMPULOSRY	
COURSE TITLE :	**GENERAL ENGLISH**		
MAX.MARKS:	100	MIN. PASS MARKS:	40
THEORY EXAMINATION	70	MIN. PASS MARKS:	28
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	30	MIN. PASS MARKS:	12
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR		
EXAMINATION	TERM END EXAMINATION		MONTHLY TEST
	03 HR		1 HR

Objectives :
- To Develop proficiency in English
- To Develop Listening abilities and skills.
- To Develop Reading abilities and skills.
- To Develop writing abilities and skills.
- To Develop basic skills in grammar, enriching their vocabulary.

Learning outcomes:
After completion of the course, student-teachers will be able to-
- Develop proficiency in English
- Understand the demands of audience, course, situation and purpose and the use of language for effective communication.
- Annalise language in context to gain an understanding of grammar, vocabulary, spelling, punctuation and speech.
- Learn authentic literary and non-literary texts
- Develop insight and appreciation.
- Sharpen writing abilities and skills.
- Make students read English poetry & prose with a view to enhancing their comprehension of the language and encourage them to develop reading habits. Develop basic skills in grammar, enriching their vocabulary and enabling them to write simple and correct English.

UNIT-1 TEACHING HOURS (20)	- Subject verb agreement - Transforming an Affirmative sentence into Negative and Interrogative sentence - Passive voice - Direct /Indirect Speech - Auxiliaries - Conditional sentences - PHRasal verbs - Joining sentences - Transformation - Simple sentence into compound and complex sentences - Other varied transformations - Degree (Positive/ comparative/superlative degree) - Phonetic Transcription and word stress - common idioms and pHRases - Tenses - English sound & phonetic symbols - Preposition

UNIT-2 TEACHING HOURS (20)	• Reading Comprehension and types of text • Questions based on a passage from the prescribed text to test the candidate's comprehension and vocabular • Questions based on an unseen passage to test the candidate's comprehension and vocabulary • Synonyms and antonyms
UNIT-3 TEACHING HOURS (20)	• John Milton- On his blindness • William Blake- To the evening star • Alfred Lord Tennyson- break,break,break •Charls Lamb- A bachelor's complaint against the behaviour of married people • J.B Priestly-On getting off to sleep
UNIT-4 TEACHING HOURS(20)	• Summary writing • Précise writing • Letter/Application writing • Report Writing
UNIT-5 TEACHING HOURS(20)	• Advertisement • Notice • Invitation • E-mail
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**

CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	Details of Continuous and Comprehensive Assessment (CCA) are as follows:

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	Monthly Test	10X6 Test = 60
2	Presentation	10
3	Group Discussion	10
4	Debate	10
5	Participation and Presentation in Seminar	10
6	Report Writing	10
7	Viva Voce	10
8	Attendance*	10
9	Co-curricular Activity	10
10	Team Teaching	10

EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):
CCA will be reduced to 30 marks or 15 marks (as per course weightage).
Formula: Marks obtained/Total marksX30
For example: 60»160X30 =11.25
PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.
PROVISO-II: Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course.
*Attendance in Lectures and Practical

Percentage	Marks Allotted
75% to 80%	02
81% to 85%	04
86% to 90%	06
91% to 95%	08
Above 96%	10

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	1. **Annual** 2. **However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• Abrams, M. H. (2005). A Glossary Of Literary Terms. NewDelhi: Macmilan. • Abrams, M. H., & Harpham, G. G. (2018). A Glossary OfLiterary Terms (Eleventh Ed.). New Delhi: Cengage LearningIndia Pvt.Ltd. • Birch, D. (2009). The Oxford Companion English Litrature (7Ed., Vol. 7). (D. Birch, Ed.) New York, United States: OxfordUniversity Press Inc. • Baldick, C. (2015). The Oxford Dictionary Of LiteraryTerms.United Kingdom: Oxford University Press. • Bate, &Jonathan. (2010).English Literary:-A Very ShortIntroduction. New Delhi: Oxford University Press. • Deplit, L.D. (1988). The Silenced Dialogue: Power AndPedagogy In Educating Other People's Children. HarvardEducational Review. 58(3). • Daiches, D. (2010). A Critical History Of English Literary(Vols. 1,2). New Delhi:

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- Thwaite, A. &Rivalland, J. (2009) How Can Analysis OfClassroom Task Help Teachers Reflect On Their Practices?Australian Journal Of Language And Literacy. 32(1).
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B.Sc.B.Ed. 1 Year				
COURSE CODE:	**BSCBED-151**		**COURSE TYPE: CORE**	
COURSE TITLE:	**Childhood, Growing up and Learning**			
MAX.MARKS:	**100**		**MIN. PASS MARKS:**	**40**
THEORY EXAMINATION	70		**MIN. PASS MARKS:**	28
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	30		**MIN. PASS MARKS:**	12
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**			
EXAMINATION	**TERM END EXAMINATION**		**MONTHLY TEST**	
DURATION	**03 HR**		**01 HR**	

Objectives:

- Understand the meaning, nature and characteristics of growth & development.
- Understand the principles and theories of development.
- Acquire knowledge on different stages of development with its multi-dimensional aspects.
- Analyze the characteristics of development of children from different psycho-sociological and cultural background.
- Examine the impact of urbanization, virtualization, social and economic change on the development of adolescents.
- Critically analyze the impact of different agencies on child development.
- Understand the significance of gender, caste, social class and their influence on children.

Learning Outcomes: After completion of the course, student-teachers will be able to :-

- Understand children of different ages by interacting & observing them in diverse social, economic and cultural context rather than tHRough an exclusive focus on child development.
- Study of childhood, child development and adolescence.
- Understand learning as divergent process.
- Make aware about the importance of healthy liking and preventing diseases.
- Introduce psychological traits of learners.
- Become health aware & sensitize children about mental and physical health.
- Understand the role of the family and the school in the child's development.

UNIT-1 **TEACHING HOURS (24)**	**Childhood and Child Development** • Education Psychology- its meaning, scope and implications for teacher in classroom situation. Various psychologists and their contributions in education. • Importance of psychology for teacher and learner. • Childhood: Meaning, Concept and Characteristics. • Concept of Growth and Development, • Dimensions and Principles of Development. • Factors affecting Development (especially in the context of family and school) and their relationship with learning. • Childhood and child Development implication in teaching and learning • Role of Heredity and Environment. **Assignment:** • Organize creative activities for children of diverse socio-cultural background with aim to learn to communicate and relate with them. • Create child based new activity to learn to listen to children with attention and empathy. • Creating and applying appropriate tools to measure the growth and development of children in school.

UNIT-2 **TEACHING HOURS (24)**	**Adolescent Development & Personality Factors** • Adolescent: Meaning, Concept and Characteristics. • Adolescent Development implication for teachers, teaching and learning. • Cognitive, Physical, Social, Emotional and Moral Development patterns and characteristics of Adolescent's Learner. • Personality: Meaning, concept, types of personality and affecting factors. Theories and Assessment, Adjustment and its Mechanism, Maladjustment. • Individual Differences: Meaning, Types and Factors Affecting Individual differences. • Piaget, Kohlberg and Vygotsky: constructs and critical perspectives. Addressing the Talented, Creative, especially abled-Learners. **Assignment:** • Identifying the adolescence's problem, a sound of discussion with parents will be held. Suggest the remedial majors to being about positive change. • Seminar or workshop for student teacher to observe, interact with and study adolescents of different ages in and outside the school, in diverge social-economic, cultural, linguistic and regional contexts. • Organizing seminars for the psycho-development of children outside the school.
UNIT-3 **TEACHING HOURS (24)**	**Learning & Learning Difficulties** • Learning: Meaning, Concept, Types and Nature of Learning, factors influencing Learning, theories of Learning, Learning implication for teachers. • Learning process. Cognition and Emotions, Motivation and Learning • Factors contributing to learning– Personal and Environmental. • Domains of learning, Cognitive, Affective and Psychomotor. • Understanding diverse learners: Backward, Mentally Retarded, Gifted, Creative, disadvantaged-deprived, CWSN, Children with learning disabilities. • Motivation: meaning, concept and its Implications for Learning and Achievement. **Assignment:** • The pupil teacher will prepare at least two lessons based on computer assisted instruction and study its effectiveness. • Observe two learners, in natural setting to study and write a report on their domain of learning, the report present class in the presence of teacher education. • To study children of diverse, economic and societal & cultural context for understanding learners' thinking and learning and prepare a report.
UNIT-4 **TEACHING HOURS (22)**	**Mental Health & Hygiene** • Mental Health & Hygiene: Meaning, Concept and its affecting factors • Development of good Mental Health. • Personal and Environmental Hygiene. • Physical & Mental Hygiene for teachers and learners. • Adjustment: Concept and ways of Adjustment and its Mechanism, Maladjustment. Role of Teacher in the Adjustment. **Assignment:** • Examine the personal, domestic and physical hygiene of school-student. • Organize prayer meetings, yoga and meditation camps by the trainees for the healthy personality development of the students. • Conduct a study of psychological variables such as stress, mental health, conflict, anxiety, depression, self-esteem among school students. • Organizing seminar/symposia in the community with students for awareness about cleanliness and health.

UNIT-5 **TEACHING HOURS (22)**	**Development and Implications in Education** • Self-concept, Social Skills of Learner. • Intelligence: Concept, Theories and its Measurement. • Multiple-Intelligence: Meaning, definitions, concept and theories. • Multi-Dimensional Intelligence, Critical perspective of the construct of Intelligence and its implication. • Creativity: Meaning, definitions, concept and theories. **Assignment:** • Collecting and analyzing comparative data on the development of students at different levels of the school. • Find out the IQ of the students in different subjects by the trainees. • Organize thematic activities to ascertain the thematic originality/creativity of the students. • Apply any two psychological tests on two students and on the basis of the conclusion, make a comprehensive profile at least ten students for each test.
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**

	Details of Continuous and Comprehensive Assessment (CCA) are as follows:	
CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)		

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	**Monthly Test**	**10X6 Test = 60**
2	**Presentation**	**10**
3	**Group Discussion**	**10**
4	**Debate**	**10**
5	**Participation and Presentation in Seminar**	**10**
6	**Report Writing**	**10**
7	**Viva Voce**	**10**
8	**Attendance***	**10**
9	**Co-curricular Activity**	**10**
10	**Team Teaching**	**10**

EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):

CCA will be reduced to 30 marks or 15 marks (as per course weightage).

Formula: Marks obtained/Total marksX30

For example: $60 \div 160 X30 = 11.25$

PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.

PROVISO-II: Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course.

*Attendance in Lectures and Practical

Percentage	Marks Allotted
75% to 80%	02
81% to 85%	04
86% to 90%	06
91% to 95%	08
Above 96%	10

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	1. Annual 2. However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.
SELECTED READINGS	- Shrivastav, D.N. and Verma, P. (2007). Child Development and Child Psychology. Vinod Pustak Mandir: Agra. - Pareek, M. (2002). Child Development and Family Relationship. Research Publication: Jaipur. - Mangal, S.K. and Mangal,S. (2005). Child Development. Arya Book Depot: New Delhi.Sharma, R.K. and Saharma, - H.S.(2006). Psychological Foundation of Child Development. Radha Prakashan Mandir: Agra. - Singh, D.P. and Talang Prakash (2002). Psycho-Social basis of learning and development. Research Publication: Jaipur. - SHRivastva. D.N. Verma, P. (2010). Modern Experimental Psychology and Teshing. SHRi Vinod Pustak Mandir: Agra. - Mathur, S.S. (2007-08). Development of Learner and Teaching Learning Process. Agrawal Publication: Agra. - MisHRa, R.C. (2010). Child Psychoplogy. A.P.H Publishing Corporation: New Delhi

B.Sc.B.Ed. 1 Year			
COURSE CODE:	**BSCBED-152**	**COURSE TYPE:**	**CORE**
COURSE TITLE:	**Education in Contemporary India**		
MAX.MARKS:	**100**	**MIN. PASS MARKS:**	**40**
THEORY EXAMINATION	70	MIN. PASS MARKS:	28
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	30	MIN. PASS MARKS:	12
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives:
- To learn the concepts of social Change and social transformation in relation to education.
- Acquire knowledge of the concept of Educational Administration and Management.
- Understand the role of center, state and local agencies in managing education.
- Develop an understanding of the main issues related to Indian educational system.
- To develop understanding about the social realities of Indian society and its impact on education.
- To identify the contemporary issues in education and its educational implications.
- To know the different values ensHRined in the constitution of India and its impact on education.

Learning Outcomes: After completion of the course, students will be able to:
- Contextualize contemporary India with development of education.
- Understand the Classroom as a social context.
- Appreciate diverse perspectives of social, cultural, economic and political issues.
- Critically analyses human and child rights.
- Equips the teacher with proactive perspective and sense of agency.
- Engage with concepts which are drawn from a diverse set of disciplines.
- Learn about policy debates overtime the implementation of policies and actual shaping of school education.

UNIT-1 **TEACHING HOURS (24)**	**Diversity in contemporary Indian Society & Education** - Indigenous Meaning, Concept & Characteristics. - Education: Meaning, Concept and Nature. - Social and Cultural Diversity: Meaning, Concept and their impact on Education. - Social, Cultural, Economic and Political and Technological perspective of Society and Education. - The role of Educational Institution for creating new social orders. - Classroom as a social context. **Assignment:** • Prepare a report on role of Educational Institution for creating new social order in your area. • Prepare a report on Parents and teacher experiences about their and others' culture and diversity.

UNIT-2 **TEACHING HOURS (24)**	**Educational Management** • Concept and functions of Education Management, Education Management in Rajasthan, School as a Unit of Decentralized planning, Educational Management Information System (EMIS), Institutional Planning, School Mapping, Block Resource Centre (BRC), School Management Committee (SMC), District Information System for Education (DISE), Samagra Shiksha Abhiyan (SMSA). • National integration and National security. **Assignment:** • Prepare a report after studying School Management Committee (SMC) in nearby school. • Make a presentation on Education Management Information system.
UNIT-3 **TEACHING HOURS (24)**	**Constitutional Provision as the guideline to Education** • Constitutional provisions related to Education. • Constitutional provisions on Human and Child Right, Values & Education. • Role of NCPCR (National Commission on Protection of Child Right). • Constitution direction for Issues & Problems in Education. **Assignment:** • Conduct an awareness programme on Child Rights with students, parents and community. • Organise a seminar on Constitutional provisions related to Education.
UNIT-4 **TEACHING HOURS (22)**	**Emerging Indian Concerns and their Educational Implications** • Meaning, Concept and Impact on Education of Liberalization, Globalization, Govermintization, Privatization. • Stratification of Education: Concept and Process. • Nationalist critique of Colonial Education and Experiments with a Alternatives • Education for Marginalized group like Women, Dalits and Tribal people on personal family and Community Hygiene. **Assignment:** • Oragnize a group disscussion on Education for Marginalized group. • Oragnize a debate on Govermintization v/s Privatization of education.
UNIT-5 **TEACHINGHOURS (22)**	**Organization of Educational Setup** • Organization of Educational Setup at Primary and Secondary • Functions of RIE, SIERT, SBER, CTE, DIET. • Educational Initiative: Balika Shiksha Foundation, Kasturba Gandhi Balika Vidalaya, Rajasthan Text Book Board, Bharat Scouts and Guides. RastHRiya Military School, Sainik School, Model School, E-Mitra, E-Governance, Rajshiksha, Edu sat, Gyandarshan, Gyanvani. • Right to Education, SSA, Policies for UEE, Nayee Taleem. **Assignment:** • Examine Policy & Constitutional provision on equality and Right to Education. • Train students in any five Handicrafts on the basis of the Nayee Taleem (such as paper Meshi, Mithi Kutti, Handloom etc) and other related to cottage industries and organize an exhibition on handicraft material.
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review

	6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**
CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	**Monthly Test**	**10X6 Test = 60**
2	**Presentation**	**10**
3	**Group Discussion**	**10**
4	**Debate**	**10**
5	**Participation and Presentation in Seminar**	**10**
6	**Report Writing**	**10**
7	**Viva Voce**	**10**
8	**Attendance***	**10**
9	**Co-curricular Activity**	**10**
10	**Team Teaching**	**10**

EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):
CCA will be reduced to 30 marks or 15 marks (as per course weightage).
Formula: Marks obtained/Total marksX30
For example: $60 \div 160X30 = 11.25$
PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.
PROVISO-II: Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course.
*Attendance in Lectures and Practical

Percentage	Marks Allotted
75% to 80%	02
81% to 85%	04
86% to 90%	06
91% to 95%	08
Above 96%	10

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	1. **Annual** 2. **However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• सिंह, एम.के. (2009). शिक्षा के दार्शनिक व सामाजिक आधार. इंटरनेशनल पब्लिशिंग हाऊसः मेरठ. • रूहेला, एस.पी. (2009). शिक्षा के दार्शनिक व समाजशास्त्रीय आधार. अग्रवाल पब्लिकेशन्सः आगरा. • चौबे, सरयूप्रसाद. (2009). शिक्षा के दार्शनिक, ऐतिहासिक व समाजशास्त्रीय आधार.

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- Sexena, N.R. (2001). Principles of Education. International Publishing House: Meerut (UP)

B.Sc.B.Ed. 1st Year			
COURSE CODE:	BSCBED-153	**COURSE TYPE: CORE**	
COURSE TITLE:	**Yoga for Holistic Health**		
MAX.MARKS:	**50**	MIN. PASS MARKS:	**20**
THEORY EXAMINATION	35	MIN. PASS MARKS:	14
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15	MIN. PASS MARKS:	6
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives:
- To develop the understanding of the Fundamentals of holistic health.
- To develop the understanding of Metaphysical Bases of Yoga.
- To develop the understanding of Philosophy of Yoga Education.
- To know Different Yoga Systems and Characteristics of Yoga Practitioner.
- To develop Awareness of COVID -19.
- To develop the understanding of selected instruments of yoga and their effective uses.

Learning Outcomes:
After completion of the course, students will be able to:
- Understanding about the concept, scope & need of Holistic Health.
- Apply their Knowledge about yoga and fundamentals of holistic health in daily life.
- To compare the Education of holistic health between Indian & Western Context.
- Conceptualize Metaphysical Bases of Yoga.
- Integrate yoga & meditation in their daily life.
- Examine Different Yoga Systems and Characteristics of Yoga Practitioner.
- Able to perfectly select instrument of yoga and their effective uses.

UNIT-1 TEACHING HOURS (12)	**Fundamentals of holistic health** • Concept of Holistic Health. • Need & scope of education for Holistic Health. • The Indian context and Western context of Education for Holistic Health. • Dimensions of development of Holistic Health. **Assignment:** • Comparative study of the concept of holistic health in Indian context & Western context. • Oraganize an Institutional programme for development of Holistic Health tHRough yoga.
UNIT-2 TEACHING HOURS (12)	**Metaphysical Bases of Yoga** • Concept of Purush and Prakriti as Basic Component of Cosmic Reality. • Concept of Antahkaran Man, Budhdhi, Chitt, Ahankar. **Assignment:** • Oraganize workshop on Metaphysical Bases of Yoga. • Oraganize awareness programme on Manviya Prakriti in school.

UNIT-3 TEACHING HOURS (12)	**Philosophy of Yoga Education** • The meaning and definition of yoga. • Needs, importance and scope of yoga education. • Yoga as a way of healthy and integrated living. • Yoga as a way of socio-moral upliftment of man. • Yoga as a way of spiritual Enlightment, Atmanubhuti, Pratyakshanubhuti. **Assignment:** • Practice any five yogasana in school with involvement of parents for socio-moral and physical health upliftment of student. • Orientation programme of school level students for integration of yoga in their daily life.
UNIT-4 TEACHING HOURS (11)	**Different Yoga Systems and Characteristics of Yoga Practitioner** • Ashtang yoga of Pantajali (Yam,Niyam,Asan,Pranayama-Pratyahar-Dharna-Dhyana, Samadhi). • Gyan-Bhakti-Karma yoga of Bhagvadgita. • Integral yoga of Aurbindo and modern school of yoga. • Characteristics of a yoga practitioner. **Assignment:** • Discuss characteristics of a yogi purush with student and make routine for student. • Oraganize a training camp for school student on Ashtang yoga of Pantajali
UNIT-5 TEACHING HOURS (11)	**Instrument of Yoga** • Different Asanas and Pranayam to promote a sound Physical and mental health. • Dhyan and its therapeutic value. • Selected ways of Dhyana. • Awarness of COVID - 19: Mechanism during Quarantine and Home Isolation. **Assignment:** • Practice dhyana for five minutes to students before teaching and learning anlyse its impact on their performance. • Conduct a Mechanism strategy of Yoga for Quarantine and Isolate people and prepare a Report of Yoga Aasana special for Isolate people.
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**

CONTINUOUS &COMPREHENSIVE ASSESSMENT (CCA)	Details of Continuous and Comprehensive Assessment (CCA) are as follows:

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	Monthly Test	10X6 Test = 60
2	Presentation	10
3	Group Discussion	10
4	Debate	10
5	Participation and Presentation in Seminar	10
6	Report Writing	10
7	Viva Voce	10
8	Attendance*	10
9	Co-curricular Activity	10
10	Team Teaching	10

EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):
CCA will be reduced to 30 marks or 15 marks (as per course weightage).
Formula: Marks obtained/Total marksX30
For example: 60÷160X30 =11.25
PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.
PROVISO-II: Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course.
*Attendance in Lectures and Practical

Percentage	Marks Allotted
75% to 80%	02
81% to 85%	04
86% to 90%	06
91% to 95%	08
Above 96%	10

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	1. Annual 2. However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.
SELECTED READINGS	• प्रतिभा, रानी (2016). योगप्रतिभा. आगरा: राधा प्रकाशन . • किशनलाल (2016).योगासन एवं ध्यान क्रियाएं. दिल्ली: राजा पॉकेट बुक्स. • रंजन, राजकुमार (2016).योग शिक्षा. आगरा: राखीप्रकाशन. • दुबे एवं शर्मा (2016). योगशिक्षा. आगरा: राधा प्रकाशन. • Ganesh, Shankar (2002). Classical and Modern approaches to Yoga.New Delhi: Pratibha Prakashan. • Goel, A. (2007). Yoga education: Philosophy and practice. New Delhi: Deep and Deep Publications. • Kumar, K. (2012). Yoga Education. New Delhi: Shipra Publication.

- Paraddi, Kasuma Mallapa and Ganesh, Shankar (2006). Ashtanga Yoga in relation to Holistic Health. New Delhi: Satyam Publication.
- Singhal. J.C. (2009).Yoga Perecived, Practised. Saga of India.New Delhi: AbhishekPrakashan.
- Swami, A. P. & Mukerjee (2008).Yoga lessons for developing spiritual consciousness. New Delhi: Cosmo Publication.
- Yadav, S. & Kumar, S. (2014). To Study the Effectiveness of Yoga Education on Holistic Development of Teacher Trainees. International Journal of Innovative Research & Development. 3(1).

B.Sc.B.Ed. I Year			
COURSE CODE:	BSCBED-154	**COURSE TYPE:**	**CORE**
COURSE TITLE:	Chetna Vikas Moolya Shiksha		
MAX.MARKS:	50	**MIN. PASS MARKS:**	**20**
THEORY EXAMINATION	35	**MIN. PASS MARKS:**	14
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15	**MIN. PASS MARKS:**	6
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives:

- To develop human moral values, peace and harmony of pupil teachers.
- To devlop Human relationship, Spirituality and Social development of pupil-teachers.
- Develop an ability in the pupil teachers to distinguish between good and bad.
- To develop humanity in human beings.

Learning outcome: After completion of the course, student-teachers will be able -

- Life and values pertaining to Individual, Family and Society.
- Harmony in Environment, Nature and Existence.
- Humanity, Human Mindset, Humane Conduct and Universal Order in Nature and Existence.
- Evaluating and understanding the difference between Animal and Human consciousness.
- To ensure sustainable happiness and prosperity, which are the core aspirations of all human beings?
- To facilitate the development of a holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the human reality and the rest of existence.

UNIT-1 TEACHING HOURS (12)	**Understanding of Human Being and Human Values and Humane Conduct** • Understanding the harmony in self and Body. • Understanding Human being and Human Goal. • Humane Character and Morality. • Relationships and Justice (Nyaya) within Family & Society. • Relationship of Human being with Nature (Environment). • Human Behavior, Humane Instincts and Personality.
UNIT-2 TEACHING HOURS 12)	**Significance of Value Education** • Problems faced by the Humanity related to Human Value. • Social and Family disintegration. • Stress and conflict in Individuals. • Significance of Value Educations for solving the human problems.
UNIT-3 TEACHING HOURS (12)	**Understanding the Values** • Eternal Values: Trust, Respect, Affection, Care, Guidance, Reverence, Glory, Gratitude, Love. • Behavioral Values: Complementariness, Compliance, Ease, Commitment, Unanimity, Self-Restraint, Obedience, Spontaneity, Generosity. • Human Values Self (Jeevan) Values: Happiness, Peace, Satisfaction, and Continuous Happiness Material Values.

UNIT-4 TEACHING HOURS (11)	**Understanding Existence and Co-existence and the Interrelationships in Nature** • Understanding the Existence & Co-existence /Nature. • Understanding the Order, Co-existence and Interrelationships, Mutual Fulfillment and Cyclicity (Avartansheelata) in Nature. • Problems faced by the Humanity. • Ecological and Environmental imbalances.
UNIT-5 TEACHING HOURS (11)	**Harmony and Values in Family** • Family and Relationships: Meaning, Need, Importance and Purpose. • Human relation: types and purpose. • Meaning and purpose of fulfillment in relationships and Justice in relationships. • Understanding Values in family-relations, Importance of ethics and character. • Family-work and Goal (Living with resolution and a feeling of prosperity, and participation in society). • Reasons for breaking up of Families and Relationships. • Purpose and need of Marriage (vivaah sambandh) and a study of reasons and tendencies for breaking up of marriages. • Comparative study of concept of a family and a family-based village governance order.
TUTORIALS	**One tutorial class once a week (12)**
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**
CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

Details of Continuous and Comprehensive Assessment (CCA) are as follows:

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	Monthly Test	10X6 Test = 60
2	Presentation	10
3	Group Discussion	10
4	Debate	10
5	Participation and Presentation in Seminar	10
6	Report Writing	10
7	Viva Voce	10
8	Attendance*	10
9	Co-curricular Activity	10
10	Team Teaching	10

	EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA): CCA will be reduced to 30 marks or 15 marks (as per course weightage). Formula: Marks obtained/Total marksX30 For example: 60÷160X30 =11.25 **PROVISO-I:** Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course. **PROVISO-II:** Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course. ***Attendance in Lectures and Practical** <table><tr><th>Percentage</th><th>Marks Allotted</th></tr><tr><td>75% to 80%</td><td>02</td></tr><tr><td>81% to 85%</td><td>04</td></tr><tr><td>86% to 90%</td><td>06</td></tr><tr><td>91% to 95%</td><td>08</td></tr><tr><td>Above 96%</td><td>10</td></tr></table>
EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	**1. ANNUAL** **2. However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• Gaur, R.R. & Sangal,R. Bagaria,G.P. (2009). A Foundation Course in Human Values and Professional Ethics. Excel Books: New Delhi. • Nagraj, A. (1998). Jeevan Vidya Ek Parichay. Divya Path Sansthan: Amarkantak. • Dhar, P.L. and R.R. Gaur (1990). Science and Humanism. Common Wealth Publisher. • Tripathi, A.N (2003). Human Values. New Age International Publishers. • Banerjee, B.P. (2005). Foundation of Ethics and Managem

	B.Sc. B.Ed. I Year				
COURSE CODE:	BSCBED-155 a I			COURSE TYPE : CORE	
COURSE TITLE :	**Paper-I: Relativity, Mechanics, Oscillations and Waves**				
MAX.MARKS:	50		MIN.PASS MARKS		20
THEORY EXAMINATION:	40		MIN.PASS MARKS		16
CONTINUOUS AND COMPREHENSIVE ASSESSMENT (CCA)	10		MIN.PASS MARKS		4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR				
EXAMINATION	**TERM END EXAMINATION**			**MONTHLY TEST**	
DURATION	**03 HR**			**01 HR**	

OBJECTIVE:

• The aim and objective of this course on Relativity, Mechanics, Oscillations and Waves to give the students fundamental ideas on special theory of relativity, conservation laws, dynamics of rigid bodies, oscillations and waves. This course will act as a strong background if he/she chooses to pursue higher studies in physics.

Learning Outcome: After completion of the course, student-teachers will be able to-

• Understand Newtonian mechanics, special theory of relativity.
• Apply Newton's laws to explain natural physical phenomena.
• Discuss on the simple harmonic motion and its equation.
• Differentiate between damped oscillator and driven oscillator.
• Identify the coupled oscillator and some electrically coupled oscillators.
• Explain acoustics and waves in media.

UNIT-1 TEACHING HOURS(12)	• **Relativity:** Reference systems, inertial and non-inertial frames, law of motion, Galilean transformation, Galilean invariance and conservation laws, propagation of light, **Michelson-Morley experiment**. Postulates of the special theory of relativity, **Lorentz transformations**, **length contraction**, **time dilation**, *addition of relativistic velocities*, *Doppler effect*, variation of mass with velocity, **mass-energy equivalence**, particle with a zero-rest mass, *simple application to a decay process. Four dimensional momentum vector*, *Covariance of equation of physics*.
UNIT-2 TEACHIGN HOURS(14)	• **Mechanics:Motion under a central force**, **Conservation of angular momentum**, **Kepler's laws**, Gravitational law and field, **Potential due to a spherical body**, **Gauss and Poisson equations** for gravitational potential, **gravitational self-energy**. **Rigid body motion**, Rotational motion, *Degree of Freedom*, Moment of inertia and their products, *theorem of parallel and perpendicular axes*, principal moments and axes, **Euler's theorem**, *equation of motion for rotation*, *Molecular rotations*; *Di and tri-atomic molecules, Precessional motion, top, gyroscope*. System of particles, **Centre of mass**, *angular momentum*, **equation of motion**, single stage and multistage rocket, **Conservation theorems for energy**, **momentum and angular momentum**, **Elastic and inelastic collisions**.

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UNIT-3 **TEACHING HOURS(12)**	• **Oscillations:** Potential well and periodic oscillations, cases of Harmonic oscillations, different equations and its solutions, kinetic and potential energy, Simple Harmonic Oscillations in spring and mass system, simple and compound pendulum, Torsional pendulum, Bifilar oscillations, Helmholtz resonator, LC circuits, Vibration of a magnet, Oscillation of two masses connected by a spring, superposition of two simple harmonic motions of same frequency along the same line, Interference, Superposition of two mutually perpendicular simple harmonic vibrations of same frequency, Lissajou's figures, cases of different frequency.
UNIT-4 **TEACHING HOURS (10)**	• **Coupled oscillations:Damped harmonic oscillators**, Power dissipation, Quality factor, **Driven harmonic oscillator & Resonance**, transient and steady state, power absorption, **resonance** in system with many degrees of freedom, Two coupled oscillators, Normal modes, N-coupled oscillators, Electrically coupled circuits, Frequency response
UNIT-5 **TEACHING HOURS(12)**	• **Waves in media:** Speed of transverse waves on a uniform string, speed of longitudinal waves in a fluid, energy density and energy transmission in waves, waves over liquid surfaces, gravity waves and ripples, **group velocity and phase velocity**, superposition of waves, linear homogeneous equations and the superposition principle, nonlinear superposition and consequences. • **Acoustics:** Noise and Music, the human ear and its responses, limits of human audibility, intensity and loudness, Bel and decibel. Production and detection of ultrasonic and infrasonic waves and applications
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The teaching and learning strategies may be change as per requirement of the students and their capabilities.**

CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)

Details of Continuous and Comprehensive Assessment (CCA) are as follows:

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10

	Total 160 marks equivalent reduced to CCA original marks 30.
EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISE OF SYLLABUS	1. **ANNUAL** 2. **HOWEVER, THE UNIVERSITYmay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• Resnick, R. (1971). Introduction to special relativity.(Wiley India Pvt. Ltd.,2005) Charles Kittel, Berkeley Physics Course vol.-1, Mechanics (Mc Graw-Hill,1965) • Stephani, H. (2004). Relativity: An introduction to special and general relativity. Cambridge university press. • Feynman, R. P., Leighton, R. B., & Sands, M. (1965). The Feynman lectures on physics; vol. 1. American Journal of Physics, 33(9), 750-752. • Feynman, R. (2018). Feynman lectures on gravitation. CRC Press. • Bajaj, N. K. (1988). The physics of waves and oscillations. Tata McGraw-Hill Education. • Gambir, R.S. (2006) Mechanics (CBS Publishers, New Delhi. • Ghosh, R. K. (1975). The mathematics of waves and vibrations, (MC Milan, 1975) • Frank, S. Crawford J. R., Berkely (1968). Physics course: vol.3, waves (Mc Graw-Hill book company, 1968)

B.Sc. B.Ed. I Year			
COURSE CODE:	**BSCBED-155 a II**		COURSE TYPE : CORE
COURSE TITLE :	**Paper-II: Mathematical Background, Properties of Matter and Electromagnetic Waves**		
MAX.MARKS:	50	MIN.PASS MARKS	20
THEORY EXAMINATION:	40	MIN.PASS MARKS	16
CONTINUOUS &COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS	4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR		
EXAMINATION	**TERM END EXAMINATION**		**MONTHLY TEST**
DURATION	**03 HR**		**01 HR**

Objective:

- This course will enable the students to develop the knowledge and understanding of the mathematical methods to solve problems in a number of elementary branches of Physics like Classical mechanics, Electromagnetic theory, Statistical Physics, Thermal Physics etc.

Learning outcomes: After completion of the course, student-teachers will be able to:-

- Know the mathematical background, properties of matter and electromagnetic waves.
- Get familiar with concepts of scalars and vectors.
- Apply the principles of Kinematics of moving fluids and Electromagnetic induction in real situations.
- Learn the Electromagnetic wave and Electromagnetic field and Energy density.

UNIT-1 TEACHING HOURS(15)	• **Scalars and Vectors:** Dot products, triple vector product, gradient of scalar field and its geometrical interpretation, divergence and curl of a vector field, line, surface and volume integral, Flux of a vector field, Gauss divergence theorem, Green's theorem and Stokes theorem. Functions of two and tHRee variables, Partial derivatives, geometrical interpretation of total differential of a function of two and tHRee variables, higher order derivatives and their applications.
UNIT-2 TEACHING HOURS(8)	• **Elasticity: Hook's Law**, Small deformations, Young's modulus, Bulk modulus and Modulus of rigidity for an isotropic solid, Poisson's ratio, **relation among elastic constants**, Theory of bending of beams and cantilever, Torsion of a cylinder, Bending moments and Shearing forces.
UNIT-3 TEACHING HOURS(13)	• **Kinematics:** Kinematics of moving fluids, Equation of continuity, Euler's equation, **Bernoulli's principle**, viscous fluids, **Streamline and turbulent flow**, **Poiseuille's law**, Capillary tube flow, Reynold's number, **Stokes law and applications**, surface tension and surface energy, molecular interpretation of surface tension, Pressure on a curved liquid surface, Wetting.
UNIT-4 TEACHING HOURS(12)	• **Electromagnetic induction**, **Faraday's law** (its integral and differential form), **Lenz's law**, Mutual and Self-inductance, **Transformers,** Energy in a static magnetic field, Measurement of self-inductance by Rayleigh's method, Maxwell's displacement current, **Maxwell's equations**, Electromagnetic field and Energy density.

UNIT-5 TEACHING HOURS(12)	• **Electromagnetic Waves:** Plane electromagnetic wave in vacuum, Wave equation for E and B of linearly, **Circularly and elliptically polarized electromagnetic waves**, **Poynting vector**, **Reflection and Refraction at a plane boundary of dielectrics**, **Polarization by Reflection and total internal Reflection**, Faraday effect, Wave in conducting medium, Reflection and Refraction by the ionosphere.
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The teaching and learning strategies may be change as per requirement of the students and their capabilities.**
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10
Total 160 marks equivalent reduced to CCA original marks 30.		

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. However, the Unviersitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• Zil'berman, G. E. (1970). Electricity and magnetism. Elma. • Bleaney, B. I., Bleaney, B. I., & Bleaney, B. (2013). Electricity and Magnetism, Volume 2(Vol. 2). Oxford University Press. • Resnick, R., Walker, J., & Halliday, D. (1988). Fundamentals of physics (Vol. 1). Hoboken: John Wiley. • Blatt, F. J., (1989). Principles of physics. Boston, London: Allyn and Bacon. • Griffiths, D. J. (2005). Introduction to electrodynamics. Prentice

	Hall of India. • Sarwate, V. V., (1993). Electromagnetic fields and waves. Bohem press. • Ghosh, S. N., (2002). Electromagnetic theory and wave propagation. CRC Press. • Kakani and Hemrajani (2008). Electromagnetism theory and Problems, New Delhi: CBS Publishers.

PHYSICS PRACTICALS-I

Duration: 4 HR	MAX.MARKS: 50	Min. Marks: 20

Total number of experiments to be performed by the students during the session should be 16, selecting any eight from each section. In examination two experiments are to be performed taking at least one from each section.

The distribution of marks in the practical examination will be as follows:

(i) Two experiments   30 Marks

For each experiment, distribution of marks will be as follows:

Figure:	2
Formula/Theory:	2
Observation:	7
Calculation and Result:	3
Precautions:	1
(ii) Viva voce	10
(iii) Records	10
Total	50 Marks

LIST OF EXPERIMENTS

Section A

- Study of conservation of momentum in two dimensional oscillations.
- Study of a compound pendulum.
- Study of damping of a bar pendulum under various mechanics.
- Study of oscillations of a mass under different combinations of springs.
- Study of bending of a cantilever or a beam
- Study of torsion of a wire (static and dynamic methods.)
- Study of flow of liquids tHRough capillaries.
- Determination of surface tension of a liquid by different methods.
- Study of viscosity of a fluid by different methods.
- To find M.I. of an irregular body by inertia table.
- To study the random decay and determine the decay constant by statistical method.
- Determine Y by Searle's apparatus.

Section B

- Study of magnetic field due to a current
- Conversion of galvanometer into an ammeter
- Conversion of galvanometer into voltmeter.
- To determine the internal resistance of primary cell using potentiometer.
- Measurement of low resistance by Carey-Foster Bridge.
- Measurement of inductance using impedance at different frequencies.
- Measurement of capacitance using impedance at different frequencies.
- I-V characteristics of a P-N junction diode
- Determine unknown resistor by post office box.
- To determine Poisson's ratio of rubber tube.
- To determine the frequency of A.C mains.

B.Sc. B.Ed. I Year			
COURSE CODE:	**BSCBED-155 b I**	COURSE TYPE : CORE	
COURSE TITLE :	**Paper I-Inorganic Chemistry**		
MAX.MARKS:	50	MIN.PASS MARKS	20
THEORY EXAMINATION:	40	MIN.PASS MARKS	16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS	4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE SESSION		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

OBJECTIVE :

- The aim and objective of this course is to teach the fundamental concepts of chemistry of Atomic Structure and Bonding , main group elements , Ionic solids, Acids and Bases, transition metals and their magnetic behavior and Environmental chemistry to the students.

Course Learning outcomes : After completion of the course,student-teachers will be able to:-

- Understanding of principles of Atomic structure and Chemical Bonding.
- Get familiar with chemistry of main group elements.
- Apply the principles of Acids and Bases in real life situation.
- Determinethe crystal structure of NaCl, KCl and CaCl (Laue's method and powder method).
- Define the characteristics of different type of bond.
- Define the Basic properties of main group elements&Transition Elements.

UNIT-1 **TEACHIGN HOURS (15)**	**Atomic Structure and Bonding** • **Atomic Structure**: Fundamental particles atomic models and their limitations.Idea of de-Broglie matter waves, Heisenberg uncertainty principle, atomic orbitals, Schrodinger wave equation, significance of φ and φ^2, quantum numbers, abfbau principale, Pauli's exclusion principle. Hund's rule, (n+1) rule, Electronic configuration of elements. Atomic mass. Molecular mass. Equivalent mass. Mole concept. Symbols. Ions. Radicals. Type of formulas empirical formula, molecular formula, shapes of s, p, d, orbitals. • **Structure and Bonding**: Ionic bond, Covalent Bond, coordinate bond, general properties of ionec and covalent bond Valence bond theory and itslimitations,directional characteristics of covalent bond,various types of hybridization and shapes of simple inorganic molecules and ions,valence shall electron pair repulsion (VSEPR) theory to NH_3,H_3O^+,SF_4,CIF_3,ICl_2^- and H_2O,MO theory,homonuclear and heteronuclear (CO and NO) diatomic molecules,multicenter bonding in electron deficient molecules,bond strength and bond energy, polarisation,fajion's rule ,concept of resonance

UNIT-2 **TEACHIGN HOURS (15)**	**Chemistry of main group elements** • **S-Block Elements**: Comparative study, diagonal relationship, salient features of hydrides, solvation and complexation tendencies including their function in bio-systems, an introduction to alkyls and aryls. • **P-Block Elements**: Comparative study (including diagonal relationship) ofgroups 13-17 elements, compounds like hydrides, oxides, oxy acids and halides of group 13-16,hydrides of boron-diborane and higher boranes,borazine,borohydrides,fullerenes,carbides,fluorocarbons,silicates (structural principle), tetrasulphur tetra nitride, basic properties of halogens,interhalogens and polyhalides. • **Chemistry of Noble Gasses**: Chemical properties of the noble gases, chemistry of xenon,structure and bonding in xenon compounds.
UNIT-3 **TEACHING HOURS (14)**	**Ionic compounds: Bonding and Structure** • **Ionic solids: solid state –classification of solids**Ionic structures,radius ratio effect and coordination number,limitation of radius ratio rule,lattice defects,semiconductors,lattice energyand Born-Haber cycle,solvation energy and solubility of ionic solids,polarizing power and polarisability of ions,Fajan's rule,Metallic bond-free electron,valence bond and band theories. • **Structure of Ionic solids**: Definition of space lattice, unit cell, Laws of crystallography (i) Law of constancy of interfacial angles(ii) Law of rationality of indices (iii) Law of symmetry,Symmetry elements in crystals. X-ray diffraction by crystals,Derivation of Bragg equation,Determination of crystal structure of NaCl,KCl and CsCl (Laue's method and powder method). **Weak Interactions**- Hydrogen bonding,van der Waals forces.
UNIT-4 **TEACHING HOURS(15)**	**Acids and Bases** • **Theories of Acids and Bases**: Arrhenius, Bronsted- Lowry, the Lux-Flood, solvent system and Lewis concept of acids and bases. • **Concept of Hard and Soft Acids and Bases (HSAB):** Classification ofacids and bases as hard and soft,Pearson's HSAB concept,acid-base strength and hardness and softness,Symbiosis,theoretical basis of hardness and softness,electro negativity and hardness and softness. • **Solvent Systems**: Physical properties of a solvent, types of solvents and their general characteristics reactions in non-aqueous solvents with reference to liquid NH3 and liquid SO2

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UNIT-5 **TEACHING HOURS (16)**	**Chemistry of Transition Elements** • **Chemistry of Elements of First Transition Series:** Characteristic properties of d block elements, properties of the elements of the first transition series ,their binary compounds (hydrides, carbides and oxides) and complexes with respect to relative stability of their oxidation states, coordination number and geometry. • **Chemistry of Elements of Second and Third Transition Series:** General characteristics ,comparative treatment of Zr/Hf ,Nb/Ta, Mo/W in respect of ionic radii,oxidation states ,magnetic behaviour, • Elimentary M.O. approach for metallic bond and bond order. Conducters, insulaters ,semiconductors and super conducters • **Environmental chemistry :-** air , water, and soil pollution ,affects of depletion of ozone layer,green house effect and global warming , stratigy for control of environmental pollution
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The teaching and learning strategies may be change as per requirement of the students and their capabilities.**

CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**	
	S. No.	CCA- Components	Max. Marks Allocation
	1.	Monthly test	20*3 Test=60
	2.	Quizzes and Assignments	10
	3.	Viva-voce	10
	4.	Seminar/Symposia	10
	5.	Report writing	10
	6.	Workshop	10
	7.	Review of literature	10
	8.	Creativity/Innovation	10
	9.	Experimental Skill	10
	10.	Co-curricular activity	10
	11.	Attendance	10
	Total 160 marks equivalent reduced to CCA original marks 30.		

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISE OF SYLLABUS	1. **ANNUAL** 2. **However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**

SELECTED READINGS	• Lee, J.D. Concise Inorganic Chemistry, ELBS.
	• Douglas,B.E. and Mc Daniel,D.H.,Concepts & Models of Inorganic Chemistry
	• Day, M.C. and Selbin,J. Theoretical Inorganic Chemistry,ACS Publications.
	• SHRiver and Atkins Inorganic Chemistry,W. H. Freeman and Company
	• James Huheey, Inorganic chemistry: Principles of Structure and Reactivity, Pearson Education India.
	• B.N. Figgis, J. E Huheey,P.W. Atkins Inorganic Chemistry,Pearson Education.
	• Duward SHRiver, Inorganic Chemistry, W. H. Freeman.
	• Gary Wulfsberg, Inorganic Chemistry, University Science Books.
	• A. R. West, Solid State Chemistry and its Applications, Wiley.

B.Sc. B.Ed. I Year			
COURSE CODE:	**BSCBED- 155 b II**	COURSE TYPE : CORE	
COURSE TITLE :	**Paper II: Physical Chemistry**		
MAX.MARKS:	50	MIN.PASS MARKS	20
THEORY EXAMINATION:	40	MIN.PASS MARKS	16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS	4
ATTENDANCE ELIGIBILITY	80PERCENT IN RESPECTIVE SESSION		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

OBJECTIVES:

The aim and objective of this course is to teach the Basic concepts of chemistry of NuclearChemistry, behaviorof gases and liquid and colloidal States , Solutions , and Chemical Equilibrium to the student-teachers .

Course Learning outcomes -After completion of the course ,student-teachers will be able to:-

- Understand of Nuclear chemistry, behavior of gases and liquid and colloidal States.
- Get familiar with Solutions, Dilute Solutions and Colligative Properties.
- Apply the principles of concept of Equilibrium in real life situation.
- Determine the liquid crystal, solid and liquid, Classification, structure of nematic
  And cholestric phases.

UNIT-1 TEACHING HOURS (15)	**Nuclear Chemistry** • Radioactive decay–decay law,disintegration constant,half-life and average life alpha and beta disintegration reactions ,group displacement law, nuclear reactions fission,fusion,artificial radioactivity, applications of radioactivity,nuclear power, carbon dating,biological effects of various types of radiations,nuclear chemistry for peace, Nuclear chemistry in Medicine and diagnostic techniques.
UNIT-2 TEACHIGN HOURS (25)	**Behaviour of Gases** • **Gaseous States:** gas laws, ideal gas equation, Dalton's law of partial pressure Postulates of kinetic theory of gases, deviation from ideal behavior,and Vander Waals equation of state. • **Critical Phenomena:** PV isotherms of real gases, continuity of states, the isotherms of vander Waals equation, critical temperature and its importance. Relationship between critical constants and vander Waals constants, the law of corresponding statesreduced equation of state. • **Molecular velocities:** Root mean square, average and most probable velocities, Qualitative discussion of the Maxwell's distribution of molecular velocities,collision number, mean free path and collision diameter, Liquification of gases (based on Joule – Thomson effect).

UNIT-3 **TEACHING HOURS(22)**	**Liquid and Colloidal States** • **Liquid State:** Kelvin equation, surface tension and surface energy,wetting and contact angle ,interfacial tension and capillary action. Intermolecular forces,structure of liquids (a qualitativedescription).Structural differences between solids,liquids and gases,Liquid crystals: Difference between liquid crystal,solid and liquid, vapoure pressure,surface tension and viscosity coefficient and its application Classification,structure of nematic and cholestric phases,Thermography and seven segment cells. • **Colloidal States:** Definition of colloids,classification of colloids, Solids in liquids (sols): properties kinetic, optical and electrical, stability of colloids,protective action,Hardy-Schulze law,gold number. Liquids in liquids (emulsions): types of emulsions,preparation,Emulsifier,Liquids in solids (gels): classification,preparation and properties,inhibition,general application of colloids,colloidal electrolytes.
UNIT-4 **TEACHING HOURS (25)**	**Solutions ,Dilute Solutions and Colligative Properties** • Ideal and no-ideal solutions,methods of expressing concentrations of solutions,activity and coefficient.Dilute solutions, colligative properties,Raoult's law relative lowering of vapour pressure,molecular weight determination. Osmosis,law of osmotic pressure and its measurement,determination of molecular weight from osmotic pressure. Elevation of boiling point and depression of freezing point. Thermodynamic derivation of relation between molecular weight and elevation in boiling point and depression in freezing point. Experimental methods for determining various colligative properties.
UNIT-5 **TEACHING HOURS (33)**	**Chemical Equilibrium** • Equilibrium constant and free energy. Thermodynamic derivation of law of mass action. Le Chatelier's principle andits application to physical and chemical system, factors affecting chemical eqilibria. Reaction isotherm and reaction isochore, Clapeyron equation and Clausius-Clapeyron equation,applications. • **Equilibrium:** statement and meaning of the terms–phase,componentand degree of freedom,derivation of Gibbs phase rule,phase equilibria of one component system-water,CO_2 and S systems.Phase equilibria of two component system – solid – liquid equillibria, Solid solutions-compound formation with congruent melting point (Mg-Zn) and incongruent melting point,(NaCl-H_2O),(FeCl$_3$-H_2O) system. Freezing mixtures,acetone-dry ice. Liquid-liquid mixtures-Ideal liquid mixtures,Raoult's and Henry's law. Non-ideal system-azeotropes- HCl-H_2O and ethanol-water systems.Partially miscible liquids.

TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The teaching and learning strategies may be change as per requirement of the students and their capabilities.**
CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10

Total 160 marks equivalent reduced to CCA original marks 30.

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISE OF SYLLABUS	1. **ANNUAL** 2. **However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• Bajpai,D. N. (1998). Advanced physical chemistry. S. Chand. • CHRistmann, K. (2013). Introduction to surface physical chemistry(Vol. 1). Springer Science & Business Media. • Donnan,F. G. (1916). A System of Physical Chemistry. Nature,98(2446). • Engel,T.Drobny,G., & Reid,P. J. (2008). Physical chemistry for the life sciences. Prentice Hall. • Lewis,D.,& Glasstone,S. (1960). Elements of physical chemistry. Macmillan. • Lingafelter. E. C. (1960). Elements of Physical Chemistry (Glasstone,Samuel). • White,M. A. (2018). Physical properties of materials. CRC press.

CHEMISTRY PRACTICALS- I	
Duration:5 HR MAX.MARKS: 50 Min. Marks: 20	
Inorganic Chemistry	
Ex.1 Separation and identification of 3 cations and 3 anions in the mixture	15
Organic Chemistry	
Ex.2 Laboratory Techniques	03
Ex.3 Qualitative Analysis Detection of elements and detection of functional group	10
Physical Chemistry	
Ex.4 Perform one of the experiments mentioned in the syllabus.	12
Ex.5 Vive-Voce	05
Ex.6 Practical-Record	05
Total	*50*
Marks	

LIST OF EXPERIMENTS

A. Inorganic Chemistry

Semi micro analysis: Detection of the presence of tHRee cations and tHRee anions (including interfering) in a given mixture qualitatively.

B.Organic Chemistry

Laboratory techniques

Calibration of Thermometer

Naphthalene (80-82°C),Acetanilide (113.5-114°C),Urea (132.5-133°C),Distilled Water (100°C)

Distillation:

Simple distillation of ethanol-water mixture using water condenser

- Distillation of nitrobenzene and aniline using air condenser
- Crystallization
- Concept of induction of crystallization
- Phthalic acid from hot water (using fluted filter paper and stem less funnel)
- Acetanilide from boiling water
- Naphthalene from ethanol
- Benzoic acid from water
- Decolourisation and crystallization using charcoal
- Decolourisation of brown sugar (sucrose) with animal charcoal using gravity filtration
- Crystallization and decolorisation of impure naphthalene (100g of naphthalene mixed with 0.3g of Congo Red using 1g decolorizing carbon) using ethanol

Sublimation (simple and Vacuum):

- Camphor,Naphthalene,phthalic acid and Succinic acid.

Determination of melting point:

- Naphthalene,Benzoic   acid,Urea,Succinicacid,Cinnamicacid,Salicylicacid,Acetanilide,m-Dinitrobenzene, p-chlorobenzene, Aspirin.

Determination of boiling points: Ethanol, Cyclohexane, Toluene,Anilineand Nitrobenzene.

C. Physical Chemistry

Chemical Kinetics:

To determine the specific reaction rate of the hydrolysis of methyl acetate/ethyl acetate catalyzed by hydrogen ions at room temperature.

To study the effect of acid strength on the hydrolysis of an ester.

To compare the strength of HCI and H_2SO_4 by studying the kinetics of hydrolysis of ethyl acetate.

To study kinetically the reaction rate of decomposition of iodide by H_2O_2

Colloids:

To prepare arsenious sulphide sol and compare the precipitating power of mono -,bi- and trivalent anions.

Viscosity: To determine the percentage composition of a given mixture (non interacting systems) by

viscosity method.

To determine the percentage composition of a given binary mixture by viscosity method.(acetone & ethyl

Surface Tension:

To determine the surface tension of amyl alcohol in water at different concentrations and calculate the excess viscosity of these solutions.

To determine the percentage composition of a given binary mixture by surface tension method (acetone &ethyl methyl ketone).

B.Sc.B.Ed. I Year			
COURSE CODE:	**BSCBED-155 c I**	COURSE TYPE : CORE	
COURSE TITLE :	**Non-Chordata**		
MAX.MARKS:	50	MIN.PASS MARKS	20
THEORY EXAMINATION:	40	MIN.PASS MARKS	16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN. PASS MARKS:	4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR		
EXAMINATION	TERM END EXAMINATION	MONTHLY TEST	
DURATION	**03 HR**	**01 HR**	

Objective :

- To learn about the invertebrates, the organizational hierarchies and complexities, the evolutionary trends in external morphology and internal structure; identification and classification with examples, to enable them to understand various modes of adaptations in animals.
- To learn about the get familiar with various kind of nonchordata Amoeba to Asterias.
- To learn about the apply the General principles of taxonomy and classification in real life situation and further studies.

Learning Outcomes: This course will enable the students to:

- Understand invertebrates, the organizational hierarchies and complexities, the evolutionary trends in external morphology and internal structure; identification and classification with examples, to enable them to understand various modes of adaptations in animals.
- Get familiar with various kind of nonchordata Amoeba to Asterias.
- Apply the General principles of taxonomy and classification in real life situation and further studies.

UNIT-1 **TEACHINGHOURS (15)**	• General principles of taxonomy and classification.**Concept of five kingdom scheme, Basis ofclassification of non-chordata: symmetry,coelom,segmentation,embryogeny**. Outline classification of Protozoa up to order. • General Structural organization of Amoeba, Euglena. • Habit and habitat, structure, nutrition, osmoregulation and reproduction of Paramecium • Locomotion in Protozoans- pseudopodial, ciliary and flagellar. • Nutrition in Protozoa • Reproduction in Protozoa. • **Protozoan'sparasites:distribustion,habit and habitat, structure, life cycle and diseases caused by selected pathogenic protozoan's parasites of man.Trypanosoma gambiens,Leishmania donovani and Plasmodium vivax.**

UNIT-2 TEACHING HOURS (15)	• Outline classification of Porifera and Coelenterata up to order. • Habit and habitat, morphology, internal structure, reproducation of Sycon • Canal system and skeleton in Sponges • Habit, habitat, morphology, internal structure, nutrition and reproducation of Obelia • Polymorphism in coelenterates, coral reefs
UNIT-3 TEACHING HOURS (15)	• Outline classification of Platyhelminthes and Nematheminthes up to order. • Habit and habitat, morphology, internal structure, reproduction and life – cycle of Fasciola, and Ascaris • Parasitic adaptations in Helminthes
UNIT-4 TEACHING HOURS (15)	• Outline classification of Annelida and ArtHRopoda up to order. • Habit and habitat, structure, nutrition, respiration, circulation, excretion, nervous system and reproduction of Hirudinaria *Palaemon* • Peripatus: structure and affinities • Mouth parts and feeding habits of Insects. • **Larval form of crustacean.** • **Drosophila-structure and life history.**
UNIT-5 TEACHING HOURS (15)	• Outline classification of Mollusca and Echinodermata up to order • Habit and habitat, structure, nutrition, respiration, blood vascular system, excretion, nervous system and reproduction of Pila • Torsion in Gastropoda. • Habit and habitat, structure, nutrition, respiration, blood vascular system, excretion, nervous system and reproduction of Asterias. • Larval forms of Echinoderms.
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The Teaching and Learning Strategies may be change as per requirement of the students and their capabilities.**
CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:** <table><tr><td>S. No.</td><td>CCA- Components</td><td>Max. Marks Allocation</td></tr><tr><td>1.</td><td>Monthly test</td><td>20*3 Test=60</td></tr><tr><td>2.</td><td>Quizzes and Assignments</td><td>10</td></tr><tr><td>3.</td><td>Viva-voce</td><td>10</td></tr></table>

	4.	Seminar/Symposia	10
	5.	Report writing	10
	6.	Workshop	10
	7.	Review of literature	10
	8.	Creativity/Innovation	10
	9.	Experimental Skill	10
	10.	Co-curricular activity	10
	11.	Attendance	10
	Total 160 marks equivalent reduced to CCA original marks 30.		
EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.		
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. HOWEVER, THE UNIVERSITYmay revise the syllabus at any time during the running year after giving a notice for a period one month.**		
SELECTED READINGS	• Barnes, R. D. (1987). Invertebrate zoology (No. Ed. 5). WB Saunders Company. • Brooks, W. K. (1882). Handbook of invertebrate zoology: for laboratories and seaside work. SE Cassino. • Brooks, W. K. (1882). Handbook of invertebrate zoology: for laboratories and seaside work. SE Cassino. • Curtis, W. C., GutHRie, M. J., & Jeffers, K. R. (1938). Textbook of general zoology. Wiley. • Hegner, R. W., & Engemann, J. G. (1968). Invertebrate zoology(No. QL362 H4 1968). Macmillan. • Hyman, L. H. (1940). The invertebrates: mollusca I (Vol. 6). McGraw-Hill. • Jordan, E. L., & Verma, P. S. (1996). Invertebrate Zoology sixth revised and enlarged edition. S. Chand and Company, Ltd. 857pp. • Jordan, E. L., & Verma, P. S. (2009). Invertebrate zoology. S. Chand & Company. • Light, S. F. (1941). Laboratory and field text in invertebrate zoology. Associated Students Store, University of California. • McEdward, L. (2020). Ecology of marine invertebrate larvae. CRC press. • Parker, T. J., & Haswell, W. A. (1967). Textbook of zoology. Macmillan International Higher Education. • Scott-Ram, N. R., & Scott-Ram, N. R. (1990). Transformed cladistics, taxonomy and evolution. Cambridge University Press. • Sedgwick, A. (1905). A Student's Text-book of Zoology (Vol. 2). Allen & Unwin. • Verma, P. S. (2001). Invertibrate Zoology. S. Chand Publishing. • Willmer, P. (1990). Invertebrate relationships: patterns in animal evolution. Cambridge University Press. • Zoology, I. by EL Jordan and PS Verma, Publisher: S. Chand And Company.		

B.Sc. B.Ed. I Year				
COURSE CODE:	BSCBED-155 c II		COURSE TYPE : CORE	
COURSE TITLE :	**Animal Cell Biology and Genetics**			
MAX.MARKS:	50		MIN. PASS MARKS:	20
THEORY EXAMINATION:	40		MIN.PASS MARKS:	16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10		MIN. PASS MARKS:	4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR			
EXAMINATION	**TERM END EXAMINATION**		**MONTHLY TEST**	
DURATION	**03 HR**		**01 HR**	

Objective:
- To learn about the appreciate the role and significance of cell in human welfare and environment.
- To learn about the Comprehend the modern concepts and applied aspects of Cell Biology and modern concepts of Genetics and to create awareness regarding inheritance.

Learning Out Come : After completion of the course, student-teachers will be able:
- Comprehend the modern concepts and applied aspects of Cell Biology and modern concepts of Genetics and to create awareness regarding inheritance.

- To appreciate the role and significance of cell in human welfare and environment.

UNIT-1 TEACHING HOURS (15)	• **Introduction of cell:** Discovery, characteristics of prokaryotic (bacterial) and eukaryotic cells (plant and animal cells), cell theory, viruses and viroids. • **Cell membrane:** Ultra structure, chemical composition, models, unit membrane concept, fluidity, glycocalyx and functions of cell membrane. Modifications (specializations) of plasma membrane. Transport across cell membrane: Passive transport (osmosis, diffusion), facilitated (mediated) diffusion; active transport (primary and secondary) and Endocytosis and Exocytosis. • **Mitochondria:** Morphology, ultra structure, chemical composition, functions, origin, electron transport chain and generation of ATP molecules.
UNIT-2 TEACHIG N HOURS (15)	• **Ultrastructure, types, chemical composition, origin and functions of:** Endoplasmic reticuium,Golgi-complex, Lysosome,Ribosome ,Centriole, Cilia, flagella and microtubules.

UNIT-3 **TEACHING HOURS (15)**	• **Nucleus:** occurrence, number, shape, size and structure (nuclear envelopes, nuclear matrix and nucleolus) • **CHRomosomes:** Introduction, discovery morphology, structure (cHRomatids, primary and secondary constrictions, nucleolar organizer and telomeres) types. Chemical composition and functions. CHRomosomal organizations: EucHRomatin, heterocHRomatin, nucleosome concept. • **Cell reproduction:** Cell cycle, phases, process and significances of mitosis and meiosis. • **CHRomosomal mutations-** Variation in cHRomosome number (aneuploidy and euploidy) Structural changes in cHRomosomes (delection, duplication, inversion and translocation).
UNIT-4 **TEACHING HOURS (15)**	• **Mendelian principles of inheritance-** monohybrid and dihybrid cross, back cross and test cross. • **Deviation of Mendelism–** incomplete dominance, codominance and lethal genes, modification of 3: 1 and 9: 3: 3: 1 with examples and problems. • **Gene interactions:** Epistasis, complementary, supplementary, duplicate genes with cumulative effects and collaborator genes. • **Multiple alleles:** Characters, examples, pseudoalleles, inheritance of A, B, AB, O and Rh blood groups (antibody reactions)
UNIT-5 **TEACHING HOURS (15)**	• **Sex-determination:** Genetic (sex cHRomosome, genic balance and haplo-diploidy mechanisms), hormonal and environmental control of sex determinations with examples. • **Sex-linked inheritance:** white eye color in Drosophila, colour blindness and hemophilia in man. • **Linkage:** Definition difference between linkage and independent assortment, cHRomosomal theory of linkage, kinds, linkage groups and significances. • **Crossing over:** Definition, mechanism, theories, kinds, frequency, factors affecting crossing over and significances.
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**

CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)

Details of Continuous and Comprehensive Assessment (CCA) are as follows:

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10

	3.	Viva-voce	10
	4.	Seminar/Symposia	10
	5.	Report writing	10
	6.	Workshop	10
	7.	Review of literature	10
	8.	Creativity/Innovation	10
	9.	Experimental Skill	10
	10.	Co-curricular activity	10
	11.	Attendance	10
	Total 160 marks equivalent reduced to CCA original marks 30.		

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. HOWEVER, THE UNIVERSITYmay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	- Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., & Walter, P. (2015). *Molecular biology of the cell*. Garland Science. *New York*, 1227-1242. - Blomquist, G. J., & Bagnères, A. G. (Eds.). (2010). *Insect hydrocarbons: biology, biochemistry, and chemical ecology*. Cambridge University Press. - Conklin, K. F., Doerfler, W., Grafstron, R. H., Groudine, M., Hamilton, D. L., Jaenisch, R., & Langner, K. D. (2012). *DNA methylation: biochemistry and biological significance*. Springer Science & Business Media. - Gupta, P. K. (2005). *Cell and molecular biology*. Rastogi Publications. - Karp, G. (2007). *Cell and Molecular Biology*. John Wiley & Sons Incorporated. - Karp, G. (2009). *Cell and molecular biology: concepts and experiments*. John Wiley & Sons. - Kotpal, R. L. (1967). *Annelida*. Rastogi Publications. - Lodish, H., Berk, A., Kaiser, C. A., Krieger, M., Scott, M. P., Bretscher, A., & Matsudaira, P. (2008). *Molecular cell biology*. Macmillan. - Rosen, F. S., Steiner, L., & Unanue, E. (1989). *Macmillan dictionary of immunology*. - Tripathi, G. (2010). *Cellular and Biochemical Science*. IK International Pvt Ltd. - Wilson, E. B. K., & Walker, J. (2005). Biochemistry and Molecular biology. *Kuudes painos*.

<div align="center">**PRACTICAL**</div>

Duration: 4 Hours   **MAX.MARKS: 50**

Objectives:

- To understand internal organization and skills- of staining and mounting of materials. (Temporary and permanent), of dissection, display and labeling, of preparation of cultures of invertebrates by using common culture methods, laboratory observation of animal cell division.

Course Content

- **Study of museum specimens:** with respect to levels and patterns of organization biosytematics. Biodiversity, adaptations, development stages, population dynamics, ecological implications etc.

Porifera: Sycon, Spongilla, Euplectella, Leucosolnia, Hylonema, Hypospongia, Euspongia:

Coeleterata: Hydra, Tubularia, Millepora, Physalia, Porpita, Vellela, Aurelia, Tubipora, Alcyonium, Metridium, Pennatula, Grantia, Fungia, Gorgonia.

Helminthes: Fasciola, Taenia solium, Planaria, Ascaris, Ancyclostoma

Annelida: Nereis Heteroneresis, ApHRodite, Chaetoptreus. Arenicola, Pheretima, Hirudinaria

ArtHRopoda: Palaemon, Eupagurus, Scolopendra, Apis, Peripatus.

Mollusca: Chiton, Pila, Aplysia, Helix, Dentalium, Mytilus, Pinctada, Unio, Sepia, Loligo Octopus.

Echinodermata: Antedon, Holothuria, Cucumaria, Astropecten, Asterias, Echinus

- **Microscope:** Simple and compound microscope, working mechanism and maintenance.

- **Study of Permanent slides:**

Paramecium, Paramecium Conjugation, paramecium binary fission, Euglena, Vorticella, Sycon-L.S., Sycon T.S., Hydra L.S., Hydra T.S, Cercaria larva, Metacercaria, Miracidium larva, Sporocyst larva, Redia larva, Ascaris male and female T.S., T.S. thorough, pharynx region, Gizzard and intestinal region of Earthworm, T.S. tHRough buccal cavity of Hirudinaria, Crustacean larva- Zoea, Metazoea, Nauplius, Mysis, T.S. of gill of Unio, T.S. of the shell & mantle of Unio. Glochidium larva of Unio.

- **Dissections** and/or its demonstration tHRough Charts/Models/Video/CD/digital alternative etc and/or preparation of working models of the different systems of the following animals.

Earthworm: Alimentary canal Nervous system, Reproductive system

Leech: Alimentary canal

Cockoach: Mouthparts, Digestive system, nervous system

Prawn: Nervous system

Pila: Nervous system

Microsopic preparation or their observation of the following:-

- Paramecium, Eunglena, Sponge-spicules, gemmules, Obelia, Hydra, parapodium of Nereis, statocyst of Prawn, mouth parts of Cockroach, radula of Pila, gill of Unio.
- Study of bacterial and eukaroytic cell
- Slides of sub cellular components(Cell organelles)
- ErytHRocyte plasma membrane permeability.
- Study of Karyotype and Idiogram of man.
- Study of Barr Bodies in human buccal epithelial cells.
- Drosophila culture and life cycle.
- Sexual Dimorphism in Drosophila, Identification of wild or mutant varieties.
- Study of salivary gland Chromosomes of Drosophila
- Problems on pedigree analysis.
- Meiotic studies of testes of cockroach.

Guidelines/ Instructions for Practical Examination

MAX.MARKS: 50   Exercise   **Time: 4 HR.**

S. No.	Exercise	Marks
1.	Dissection* (Exposition, labeled diagram)	6
2.	Temporary mounting –one (Staining, identification, sketch	3
3.	Museum specimens – five (identification and classification	10
4.	Permanent slides – two or four (Identification with reasons)	4
5.	Preparation of cHRomosome slide (root tip/grasshopper testis)	5
6.	Drosophila spotting / pedigree	5
7.	Practical record and slides	5
8.	Viva	4
9.	Project report and assignment	8

Note:

- Use of animals for dissection is subject to the conditions that these are not banned under the Wildlife Protection Act or any other legislation.

- Students are required to submit the following during examination.

- One assignment on the instrument/ technique about its principle, working, precautions and applications, and /or reagents / solutions preparation.

- Report on study of animals from their natural habitat from their local surroundings.Vermicompost etc.

B.Sc.B.Ed. I Year				
COURSE CODE:	BSCBED-155 d I		COURSE TYPE : CORE	
COURSE TITLE :	Diversity of Microbes and Lower Plants& Plant Pathology (Thallophyta)			
MAX.MARKS:	50	MIN.PASS MARKS		20
THEORY EXAMINATION:	40	MIN.PASS MARKS		16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS		4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR			
EXAMINATION	TERM END EXAMINATION		MONTHLY TEST	
DURATION	03 HR		01 HR	

Objectives:
- To learn about the diversity that exists in microorganisms.
- To learn about the morphology, organization, structure, and reproduction in microbes.
- To learn the role and significance of microbes in human welfare and environment.
- To learn about the symptoms of selected diseases caused by microbes.

Learning Outcomes: This course will enable the students to:
- Acquaint students with the diversity that exists in microorganisms.
- Understand the morphology, organization, structure, and reproduction in microbes.
- Appreciate the role and significance of microbes in human welfare and environment.
- Study the symptoms of selected diseases caused by microbes.

UNIT-1 TEACHING HOURS (15)	**Viruses and Bacteria:** Structure, Multiplication, transmission and **disease symptoms of viruses, Structure** and economic importance of mycoplasma, **Bacteria structure, nutrition, reproduction and economic importance,** Gram's staining, **Disease *symptoms* of bacteria in plants** e.g.**:-** Citrus Canker, Viruses e.g.:- Mosaic Viruses *disease* in tobacco. General Account and Economic importance of Cyanobacteria.
UNIT-2 TEACHING HOURS (15)	**Algae:** **General characters, occurrence, classification** (Fritsch, 1935), Pigment constitution, fine structure of algal plastids, **life-cycles,** Origin and evolution of sex and **thallus in algae.** Cyanophyceae: Life Cycle of Nostoc, Anabena and Oscillatoria
UNIT-3 TEACHING HOURS (15)	**Structure, reproduction and evolutionary significance of following genera:** Chlorophyceae: Chlamydomonas, Volvox, *UlotHRix* and Coleochaete Xanthophyceae:Vaucheria, Phaeophyceae: Ectocarpus, Sargassum Rhodophyceae: *Polysiphonia*

UNIT-4 TEACHING HOURS (15)	**Fungi:** **General Characters, Occurrence, Classification** (Alexopolus and Mims, 1979;G. C. Ainswort,1986), Types of Mycelia, Structure of Fungal Cell, Fungal Flagella, Nutrition and **Economic Importance of Fungi**. Host-parasite interaction, Control of plant diseases. **Disease Symptoms of Fungi in Plants**.
UNIT-5 TEACHING HOURS (15)	**Structure reproduction and life history of:** Mastigomycotina –Synchytrium&Phytophthora Ascomycotina – Saccharomyces,Eurotium,Peziza Basidiomycotina – Puccinia, Agaricus, Ustilago Deuteromycotina –Alternaria, Cercospora,Colletotrichum, **General account and economic importance of Lichens**
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10

Total 160 marks equivalent reduced to CCA original marks 30.

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISE OF SYLLABUS	1. **ANNUAL** 2. **HOWEVER, THE UNIVERSITYmay revise the syllabus at any time during the running year after giving a notice for a period one months.**

| SELECTED READINGS | • Dube, H. C. (1990). Fungi, general characteristics. *An introduction to fungi, 2nd revised edn. Vikas, New Delhi*, 11-146.
• Hays, J. (1986). *Genetics of bacteria*: Edited by J. Scaife, D. Leach, and A. Galizzi. New York: Academic Press. (1985).
• Mudd, J. B. (Ed.). (2012). *Responses of plants to air pollution.* Elsevier.
• Odom, J. M., & Singleton, R. (1993). *The sulfate-reducing bacteria: contemporary perspectives* (pp. 189-210). New York: Springer-Verlag.
• Sharma, O. P. (1986). *Textbook of algae*. Tata McGraw-Hill Education.
• Sharma, O. P. (1992). *Textbook of Thallophyta*. McGraw Hill Pub. Co.
• Sharma, P. D. (1991). *The Fungi*. Rastogi Publications.
• Sharma. P.D. 1991. The Fungi. Rastogi & Co. Meerut.
• Smith Jr, J. P. (2018). The Herbarium.
• Smith, GM. (1971). Cryptogamic Botany. Algae & Fungi. Vol. 1 New Delhi: Tata McGraw Hill Publishing Co. |

B.Sc. B.Ed. I Year			
COURSE CODE:	**BSCBED-155 d II**	COURSE TYPE : CORE	
COURSE TITLE :	**Diversity of Cryptogams (Bryophytes & Pteridophytes)**		
MAX.MARKS:	50	MIN.PASS MARKS	20
THEORY EXAMINATION:	40	MIN.PASS MARKS	16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS	4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objective:

- To learn about the diversity that exists in cryptogams.
- To learn about the morphology, organization, structure, and reproduction in cryptogams.
- To learn about the role and significance of cryptogams in human welfare and environment.
- To learn about the Geological time scale, fossils and fossilization processes, significance of fossils.

Learning Outcome: After completion of the course, student-teachers will be able:

- Acquaint students with the diversity that exists in cryptogams.
- Understand the morphology, organization, structure, and reproduction in cryptogams.
- Appreciate the role and significance of cryptogams in human welfare and environment.
- Study the Geological time scale, fossils and fossilization processes, significance of fossils.

UNIT-1 TEACHING HOURS (15)	**General characters**, distribution, origin of the land habit in plants, **classification,** Evolutionary trends in Thallus and sporophyte development; Alternation of generations classification; and Economic importance of Bryophytes.
UNIT-2 TEACHIGN HOURS (15)	**Structure**, **reproduction**, and evolutionary significance of following genera: Hepaticopsida – **Riccia***Marchantia* Anthocerotopsida – *Anthoceros* Bryopsida –*Funaria*
UNIT-3 TEACHING HOURS (15)	**General characters**, distribution, **classification,** stelar evolution, and Origin of seed habit, and life cycles in pteridophytes. Structure, **reproduction** and evolutionary significance of the following genera: **Psilotum***;* Lycopodium

UNIT-4 TEACHING HOURS (15)	**Structure, reproduction** and evolutionary significance of the following genera: Selaginella; Equisetum; Pteris and Marsilea.
UNIT-5 TEACHING HOURS (15)	Geological time scale, fossils and fossilization processes, significance of fossils.Study of the following form genera of fossils *(a) Rhynia* *(b) Calamtes* *(c) Glossopteris*
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**

CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)

Details of Continuous and Comprehensive Assessment (CCA) are as follows:

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10

Total 160 marks equivalent reduced to CCA original marks 30.

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISE OF SYLLABUS	1. ANNUAL 2. **However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**

SELECTED READINGS	• Smith, GM. 1971. Cryptogamic Botany. Vol. 1 Algae & Fungi. Tata McGraw Hill Publishing Co, New Delhi. • Sharma, O.P. 1992. Text Book of Thallophytes. McGraw Hill Pub. Co. • Smith, GM. 1971. Cryptogamic Botany. Vol-II Bryophytes and Pteridophytes. Tata McGraw Hill Pub. Co. New Delhi. • Puri, P. 1980. Bryophyta. Atma Ram & Sons Delhi.

BOTANY-PRACTICALS:-I

Duration: 4 hours	MAX.MARKS: 50	Min. Pass Marks : 20
Practical List		

1. Study of the genera included in Theory syllabus of Algae and Fungi by making temporary micro preparations and observation of permanent slides.

2. Observation of disease symptoms in host infected by Fungi, Bacteria, Viruses and Mycoplasma. Section cutting of diseased material and identification of the pathogens as per the theory syllabus.

3. Study of morphology, anatomy and reproductive structures of genera included in Bryophytes and Pteridophytes by making temporary micro preparations and observation of permanent slides.

4. Gram staining of bacteria. Study of crustose, foliose & fruticose Lichens. Maintenance & submission of a record of all the Laboratory activities.

B.Sc. B.Ed. I Year			
COURSE CODE:	**BSCBED-155e I**	COURSE TYPE :CORE	
COURSE TITLE :	**Calculus**		
MAX.MARKS:	75	MIN.PASS MARKS	30
THEORY EXAMINATION:	60	MIN.PASS MARKS	24
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS	4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives:

- This course is designed to provide a deeper and rigorous understanding of fundamental concepts about limit, continuity, differentiability, integration, expansions of functions, curvature, asymptotes and curve tracing, partial derivatives, total derivative, extrema of a function of several variables, double and triple integrals with their utilization in vector calculus and their utilization and importance in different branches of sciences.

Learning Outcomes: This course will enable the students to:

- Learn conceptual variations while advancing from one variable to several variables in calculus.
- Apply multivariable calculus in optimization problems.
- Inter-relationship amongst the line integral, double and triple integral formulations.
- Know the mathematical background, properties of volume and surface of solids formed by revolution.
- Applications of multivariable calculus tools in physics, economics, optimization, and understanding the architecture of curves and surfaces in plane and space etc.
- Realize importance of Green, Gauss and Stokes' theorems in other branches of mathematics.

UNIT-1 TEACHING HOURS (15)	**Curvature, Asymptotes and Curve Tracing** Curvature; Asymptotes of general algebraic curves, Asymptotes parallel to axes; Symmetry, Concavity and convexity, Points of inflection, Tangents at origin, Multiple points, Position and nature of double points; Tracing of Cartesian, polar and parametric curves.
UNIT-2 TEACHIGN HOURS (20)	**Limit and Continuity** $\varepsilon - \delta$ definition of limit of a real valued function, Limit at infinity and infinite limits; Continuity of a real valued function, Properties of continuous functions, Intermediate value theorem, Geometrical interpretation of continuity, Types of discontinuity; Uniform continuity. **Differentiability:** Differentiability of a real valued function, Geometrical interpretation of differentiability, Relation between differentiability and continuity, Differentiability and monotonicity, Chain rule of differentiation; Darboux's theorem, Rolle's theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Geometrical interpretation of mean value theorems; Successive differentiation, Leibnitz's theorem.

UNIT-3 **TEACHING HOURS (12)**	**Expansions of Functions** Maclaurin's and Taylor's theorems for expansion of a function in an infinite series, Taylor's theorem in finite form with Lagrange, Cauchy and Roche–Schlomilch forms of remainder; Maxima and minima.
UNIT-4 **TEACHING HOURS (20)**	**Partial Differentiation** Functions of several variables, Level curves and surfaces, Limits and continuity, Partial differentiation, Tangent planes, Chain rule, Directional derivatives, The gradient, Maximal and normal properties of the gradient, Tangent planes and normal lines. Extrema of functions of two and more variables, Method of Lagrange multipliers, Constrained optimization problems, **Differentiation:** Higher order partial derivatives, Total differential and differentiability, Jacobians, Change of variables, Euler's theorem for homogeneous functions, Taylor's theorem for functions of two variables and more variables, Envelopes and evolutes.
UNIT-5 **TEACHING HOURS (23)**	**Double and Triple Integrals** Reduction formulae. Double integration over rectangular and non-rectangular regions, Double integrals in polar coordinates, Triple integral over a parallelepiped and solid regions, Volume by triple integrals, Triple integration in cylindrical and spherical coordinates, Change of variables in double and triple integrals, Dirichlet integral. **Green's, Stokes' and Gauss Divergence Theorem:** Definition of vector field, Divergence, curl, gradient and vector identities. Line integrals, Applications of line integrals: Mass and Work, Fundamental theorem for line integrals, Conservative vector fields, Green's theorem, Area as a line integral, Surface integrals, Stokes' theorem, The Gauss divergence theorem.
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The Teaching And Learning Strategies may be change as per requirement of the students and their capabilities.**
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10

	5.	Report writing	10
	6.	Workshop	10
	7.	Review of literature	10
	8.	Creativity/Innovation	10
	9.	Experimental Skill	10
	10.	Co-curricular activity	10
	11.	Attendance	10
	Total 160 marks equivalent reduced to CCA original marks 30.		
EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.		
PERIODICAL REVISE OF SYLLABUS	1. **ANNUAL** 2. **However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one months.**		
SELECTED READINGS	• Jerrold Marsden, Anthony J. Tromba & Alan Weinstein (2009). Basic Multivariable Calculus, Springer India Pvt. Limited. • James Stewart (2012). Multivariable Calculus (7th edition). Brooks/Cole. Cengage. • Monty J. Strauss, Gerald L. Bradley & Karl J. Smith (2011). Calculus (3rd edition). Pearson Education. Dorling Kindersley (India) Pvt. Ltd. • George B. Thomas Jr., Joel Hass, CHRistopher Heil & Maurice D. Weir (2018). • Thomas' Calculus (14th edition). Pearson Education.		

B.Sc. B.Ed. I Year			
COURSE CODE:	**BSCBED-155e II**	COURSE TYPE : CORE	
COURSE TITLE :	**Algebra and Geometry**		
MAX.MARKS:	75	MIN.PASS MARKS	30
THEORY EXAMINATION:	60	MIN.PASS MARKS	24
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15	MIN.PASS MARKS	6
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objective:

- This course is designed to provide a deeper and rigorous understanding of about concepts of roots of a polynomial, relations and functions, modular system and congruence, structure of matrices, characteristics and equations of straight lines, planes, sphere, cone and cylinder curves in spaces and their utilization and importance in different branches of sciences**.**

Learning outcomes: this course will enable the students to:

- Understand the importance of roots of real and complex polynomials and learn various methods of obtaining roots.
- Familiarize with relations, equivalence relations and partitions.
- Employ De Moivre's theorem in a number of applications to solve numerical problems.
- Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix, using rank.
- Find eigenvalues and corresponding eigenvectors for a square matrix.
- Explain the properties of tHRee dimensional shapes.

UNIT-1 TEACHING HOURS (15)	**Theory of Equations and Complex Numbers** Elementary theorems on the roots of an equations including Cardan's method, The remainder and factor theorems, Synthetic division, Factored form of a polynomial, The Fundamental theorem of algebra, Relations between the roots and the coefficients of polynomial equations, Imaginary roots, Integral and rational roots; Polar representation of complex numbers, The nth roots of unity, De Moivre's theorem for integer and rational indices and its applications.
UNIT-2 TEACHIGN HOURS (15)	**Relations and Basic Number Theory** Relations, Equivalence relations, Equivalence classes; Functions, Composition of functions, Inverse of a function; Finite, countable and uncountable sets; The division algorithm, Divisibility and the Euclidean algorithm, The fundamental theorem of arithmetic, Modular arithmetic and basic properties of congruences; Principles of mathematical induction and well ordering.

UNIT-3 **TEACHING HOURS** **(15)**	**Row Echelon Form of Matrices and Applications** Systems of linear equations, Row reduction and echelon forms, Linear independence, The rank of a matrix and applications; Introduction to linear transformations, The matrix of a linear transformation, Matrix operations, Determinants, The inverse of a matrix, Characterizations of invertible matrices; Applications to Computer Graphics; Eigenvalues and eigenvectors, The characteristic equation and the Cayley-Hamilton theorem.	
UNIT-4 **TEACHING HOURS** **(23)**	**Planes, Straight Lines and Spheres** **Planes:** Distance of a point from a plane, Angle between two planes, pair of planes, Bisectors of angles between two planes; **Straight lines:** Equations of straight lines, Distance of a point from a straight line, Distance between two straight lines, Distance between a straight line and a plane; **Spheres:** Different forms, Intersection of two spheres, Orthogonal intersection, Tangents and normal, Radical plane, Radical line, Coaxial system of spheres, Pole, Polar and Conjugacy.	
UNIT-5 **TEACHIN** **G HOURS** **(22)**	**Locus, Surfaces, Curves and Conicoids** Space curves, Algebraic curves, curvature and torsion, Serret-Frenet's formulae, Ruled surfaces, Some standard surfaces, Classification of quadric surfaces, Cone, Cylinder, Central conicoids, Tangent plane, Normal, Polar planes, and Polar lines.	

TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**

CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10
Total 160 marks equivalent reduced to CCA original marks 30.		

TEACHING AND LEARNING METHODS	1. **Lecture method** 2. **Graphical method** 3. **Seminar/Symposia method** 4. **Extension activity method** 5. **Project and report writing**
CONTINUES ASSESSMENT METHODS	1. **Seminar/Symposia** 2. **Project and report writing** 3. **Viva-voce** 4. **Monthly test**
EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISE OF SYLLABUS	1. **ANNUAL** 2. **HOWEVER, THE UNIVERSITYmay revise the syllabus at any time during the running year after giving a notice for a period one months.**
SELECTED READINGS	• Titu Andreescu,& Dorin Andrica (2014). Complex Numbers from A to...Z. (2nd edition). Birkhäuser. • Robert J. T. Bell (1994). An Elementary Treatise on Coordinate Geometry of THRee Dimensions. Macmillan India Ltd. • Chatterjee, D. (2009). Analytical Geometry: Two and THRee Dimensions. Narosa Publishing House. • Leonard Eugene Dickson (2009). First Course in the Theory of Equations. The Project Gutenberg EBook (http://www.gutenberg.org/ebooks/29785) • Edgar G. Goodaire & Michael M. Parmenter (2015). Discrete Mathematics with Graph Theory (3rd edition). Pearson Education Pvt. Ltd. India. • Bernard Kolman & David R. Hill (2003). Introductory Linear Algebra with Applications (7th edition). Pearson Education Pvt. Ltd. India. • David C. Lay, Steven R. Lay & Judi J. McDonald (2016). Linear Algebra and its Applications (5th edition). Pearson Education Pvt. Ltd. India.

SECOND YEAR

Course Code	Title of the course	EVALUATION			
		External	**Internal**	**Practical**	Total
BSCBED-210	Gen. Hindi(Compulsory)*	**70**	**30**	**-**	**100**
BSCBED-251	Knowledge & Curriculum	**70**	**30**	**-**	**100**
BSCBED-252	Teaching & Learning	**70**	**30**	**-**	**100**
BSCBED-253	Health & Physical Education	**35**	**15**		**50**
BSCBED-254	**Content: (BCZ& PCM)**				
BSCBED-254 a I	1. Physics I	**40**	**10**	**50**	**200**
BSCBED-254 a II	2. Physics II	**40**	**10**		
BSCBED-254 a III	3. Physics III	**40**	**10**		
BSCBED-254 b I	4. Chemistry I	**40**	**10**	**50**	**200**
BSCBED-254 b II	5. Chemistry II	**40**	**10**		
BSCBED-254 b III	6. Chemistry III	**40**	**10**		
BSCBED 250 c I	7. Zoology I	**40**	**10**	**50**	**200**
BSCBED 250 c II	8. Zoology II	**40**	**10**		
BSCBED-254 c III	9. Zoology III	**40**	**10**		
BSCBED-254 d I	10. Botany I	**40**	**10**	**50**	**200**
BSCBED-254 d II	11. Botany II	**40**	**10**		
BSCBED-254 d III	12. Botany III	**40**	**10**		
BSCBED-254 e I	13. Mathematics I	**60**	**7**		**200**
BSCBED-254 e II	14. Mathematics II	**60**	**7**		
BSCBED-254 e III	15. Mathematics III	**60**	**6**		
	CCA				**25**
Prayer, Yoga, Meditation & Festival etc					**25**
Total					**900**

COURSE CODE:	BSCBED-220		COURSE TYPE : CORE	
COURSE TITLE :	GENERAL HINDI			
MAX.MARKS:	100		MIN. PASS MARKS:	40
THEORY EXAMINATION	70		MIN. PASS MARKS:	28
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	30		MIN. PASS MARKS:	12
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR			
EXAMINATION	TERM END EXAMINATION		MONTHLY TEST	
DURATION	03 HR		01 HR	

उद्देश्य :

- हिन्दी साहित्य के प्रमुख कवियों एवं रचनाकारों की विस्तृत जानकरी करवाना।
- हिन्दी साहित्य की भाषा के साथ भारतीय सम्यता एवं संस्कृति का परिचय करवाना।
- आदिकाल की हिन्दी साहित्य की रचनाओं की समकालीन प्रमुख रचनाओं से तुलनात्मक अध्ययन करवाना।
- हिन्दी साहित्य के गद्य पद्य शैली द्वारा विभिन्न विकासात्मक प्रवृतियों की जानकरी करना।
- हिन्दी साहित्य के प्रमुख रचनाओं एवं उनके कालों की जानकारी करना।
- हिन्दी साहित्य के व्याकरण एवं भाषागत विकास की समझ विकसित करना।
- हिन्दी साहित्य के विभिन्न पारिभाषिक शब्दों एवं प्रारूप से परिचय करना।
- हिन्दी भाषा एवं साहित्य के प्रति सकारात्मक अभिरुचि एवं वृतियों का विकास करना।
- हिन्दी भाषा तत्वों एवं साहित्य के विविध रूपों का अध्ययन करवाना।
- हिन्दी साहित्य एवं हिन्दी भाषा की विविध विधाओं का ज्ञान करवाना।

अधिगम सम्प्राप्तियाँ :

- विद्यार्थी हिन्दी भाषा तत्वों एवं साहित्य के विविध रूपों को जान सकेंगे।
- विद्यार्थी गद्य साहित्य एवं हिन्दी भाषा की विविध विधाओं की व्याख्या कर सकेंगे।
- विद्यार्थी पाठ्य प्रकरण के अन्तर्गत आयी किसी कहानी एवं नाटक का रूपान्तरण करवाने में रुचि ले सकेंगे।
- हिन्दी साहित्य के प्रमुख कवियों एवं रचनाकारों की विस्तृत जानकरी प्राप्त कर सकेंगे।
- विद्यार्थी हिन्दी साहित्य की भाषा के साथ भारतीय सम्यता एवं संस्कृति को जान सकेंगे।
- आदिकाल की हिन्दी साहित्य की रचनाओं की समकालीन प्रमुख रचनाओं से तुलनात्मक अध्ययन प्राप्त करेंगे।
- हिन्दी साहित्य के गद्य–पद्य शैली द्वारा विभिन्न विकासात्मक प्रवृतियों की जानकरी प्राप्त कर सकेंगे।
- हिन्दी साहित्य के प्रमुख रचनाओं एवं उनके कालों की जानकारी प्राप्त कर सकेंगे।
- हिन्दी साहित्य के व्याकरण एवं भाषागत विकास को समझ सकेंगे।
- विद्यार्थी हिन्दी साहित्य के विभिन्न पारिभाषिक शब्दों एवं प्रारूप से परिचित हो सकेंगे।
- हिन्दी भाषा एवं साहित्य के प्रति सकारात्मक अभिरुचि एवं वृतियों का विकास हो सकेगा।

इकाई – 1 TEACHING HOURS (24)	**साहित्य खण्ड (गद्य भाग)** • भारतवर्ष की उन्नति कैसे हो – भारतेन्दु • मेरा जीवन – प्रेमचन्द • मजदूरी और प्रेम – पूर्णसिंह • भारतीय संस्कृति की देन – हजारी प्रसाद द्विवेदी • राष्ट्रपिता महात्मा गांधी – मुक्तिबोध • सवालों की नोक पर – मोहन राकेश • निन्दा रस – हरिशंकर परसाई (व्यंग्य) • नेता नहीं नागरिक चाहिए – रामधारी सिंह दिनकर
इकाई – 2 TEACHING HOURS (24)	**साहित्य खण्ड (पद्य भाग)** • अयोध्या सिंह उपाध्याय 'हरिऔध' – कर्मवीर • मैथिलीशरण गुप्त – भूलोक का गौरव (भारत–भारती) • सूर्यकान्त त्रिपाठी 'निराला' – तोड़ती पत्थर • जयशंकर प्रसाद – अरुण यह मधुमय देशहमारा • सुभद्रा कुमारी चौहान – झाँसी की रानी • हरिवंशराय बच्चन – पथ की पहचान • नागार्जुन – प्रेत का बयान • भवानी प्रसाद मिश्र – सरफरोश
इकाई – 3 TEACHING HOURS (24)	**व्याकरण खण्ड** • *वर्ण विचार* • *शब्द विचार (तत्सम, तद्भव, देशज, विदेशी)* • पारिभाषिक शब्दावली • *शब्दों को शब्दकोष क्रम में लिखना।* • युग्म शब्द, उपसर्ग, प्रत्यय, संधि, समास • संज्ञा, सर्वनाम, क्रिया, विशेषण, लिंग, वचन काल
इकाई – 4 TEACHING HOURS (22)	**रचना खण्ड – अ** • शुद्धिकरण (क) शब्द शुद्धिकरण (ख) वाक्य शुद्धिकरण • वाक्य रचना (क) वाक्य के अंग (ख) वाक्य के प्रकार • संक्षेपण • पल्लवन • लोकोक्ति, मुहावरे • पत्र (प्रारूप)
इकाई – 5 TEACHING HOURS (22)	**रचना खण्ड – ब** • निबन्ध (किसी भी विषय पर पाँच निबन्ध पूछे जायेंगे, जिनमें से एक करना होगा।) • *भाषा सौंदर्य (भाव सौंदर्य, विचार सौंदर्य, नाद सौंदर्य, शिल्प सौंदर्य)*

Teaching and LEARNING METHODS	- Lecture methods - Presentation (PPT) - Groups discus methods - Seminal/Symposia methods - Extinction activate methods - Project and report writing
CONTINUOUS ASSESSMENT METHODS	- Academic presentence in person - Seminal/Symposia - Extinction activate - Vive voce - Monthly test
EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISE OF SYLLABUS	1. Annual 2. However the University may revise the syllabus at any time during the running year after giving a notice for a period one months.
SELECTED READINGS	- शर्मा, राजकुमारी (2006). हिन्दी शिक्षण. राधा प्रकाशन मन्दिर. आगरा। - मंगल, उमा (2005). हिन्दी शिक्षण. आर्य बुक डिप्पो. करोल बाग नई दिल्ली. - पाण्डेय. मुतिकान्त (2010). हिन्दी शिक्षण–अभिनव आयाम. विश्व भारती पब्लिकेशनः नई दिल्ली. - शर्मा, अनुराधा (2012). भाषा विज्ञान तथा सिद्धान्त. विश्व भारती पब्लिकेशनः नई दिल्ली. - गुप्ता, प्रभा (2012). मातृभाषा व विविध योजनाएँ. साहित्य प्रकाशनः आगरा. - गुप्ता, ओ.पी. (1994). वृहत पुस्तकालय व सूचना विकास शब्दावली. अवधारणा प्रकाशन कंपनी प्रा.लि.ः नई दिल्ली. - किशोरीदास (2013). हिन्दी की वर्तनी व शब्द प्रयोग मीमांसा. वाणी प्रकाशनः नई दिल्ली। - नारंग, वैश्ना (2013). सम्प्रेषणपरक हिन्दी भाषा शिक्षा. ए.पी. भार्गव बुक हाऊसः आगरा. - शर्मा, प्रसाद (2007). हिन्दी शिक्षण. साहित्यागार. धामाणी मार्केट की गली. चौड़ा रास्ताः जयपुर. - सिंह, सावित्री (2001). हिन्दी शिक्षण. लायल बुक डिपोः मेरठ. - प्रसाद, भगवती (2002). प्रारंभिक स्तर पर हिन्दी शिक्षण. सुखपाल गुप्त आर्य बुक डिपोः नई दिल्ली. - त्यागी, एस.के. (2008). हिन्दी भाषा शिक्षण. अग्रवाल पब्लिकेशन्सः आगरा.

B.Sc.B.Ed. II Year			
COURSE CODE:	**BSCBED-251**	**COURSE TYPE: CORE**	
COURSE TITLE:	**Knowledge and Curriculum**		
MAX.MARKS:	**100**	MIN. PASS MARKS:	**40**
THEORY EXAMINATION	70	MIN. PASS MARKS:	28
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	30	MIN. PASS MARKS:	12
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives:
- To understand the Meaning and Concept of knowledge.
- To understand the various dimensions of the curriculum.
- To understand concept and the process of knowledge generation and their linkage with society.
- To understand distinction between Data, knowledge and Information.
- To understand critically analyze various curriculum textbook.

Learning Outcomes: After completion of the course, students will be able to:
- To understand concept and the process of knowledge generation and their linkage with society.
- To critically analyse various/ curriculum textbook.
- To identify various dimensions of the curriculum and their relationship.
- To identify relationship between the curriculum framework and syllabus.
- To understand the relationship between ideology and the curriculum.

UNIT-1 TEACHING HOURS (24)	**Knowledge Generation** • Meaning Concept and nature of knowledge. • Distinction between Data, knowledge, Information and skill Teaching and Training, Knowledge and information, reason and belief. • Process of Knowledge generation: Local window, Sharing, practice and creation. • Various structures of society and knowledge and their linkage and relationship. **Assignment** • Conduct a group discussion on Distinction between Data, knowledge, Information and write a report. • Conduct a play on journey of knowledge on any one issue/innovation/ Discovery such as aeroplane or Robot.

UNIT-2 **TEACHING HOURS(24)**	**Curriculum and origin of knowledge** • Knowledge as the bases of curriculum. • Curriculum: Meaning, concept, nature component and its basis. • Type of curriculum: Explicit, hidden, absent or null curriculum. • Curriculum, Syllabus, content and co-curriculum for knowledge generation. **Assignment** • Identified the transaction of curriculum in a prescribed text book. • Organize a workshop on types of curriculum.	
UNIT-3 **TEACHING HOURS (24)**	**Features of Curriculum Framework** • The salient features of NCF- 2005 and NCFTE-2010 and analysis of these documents with respect to various aspects of foundations, concerns and the changes made with important considerations. **Assignment** • Make a comparative Analysis of curriculum of school at any one level in the light of NCF 2005. • Organize an orientation program for school teachers on NCF-2005 and NCFTE-2010.	
UNIT-4 **TEACHING HOURS (22)**	**Text book and curriculum** • Text book – Criteria of selection, and critical analysis of Text Book, Children's literature and teacher's handbooks. • Relationship among curriculum, syllabus and textbook. • Selection of materials; Development of activities and tasks. • Connecting learning to the world outside - Moving away from rote-learning to constructivism. **Assignment** • Critical review or analysis of the text book at upper primary and senior secondary level. • Organize a seminar on relationship among power, ideology and Curriculum.	
UNIT-5 **TEACHING HOURS (22)**	**Modernity, Post Modernity and Knowledge in Curriculum** • Meaning and Concept of knowledge in modernity • Meaning and Concept of knowledge in Post-modernity • Knowledge process tHRough curriculum transaction. **Assignment** • Make a report on the journey of knowledge from modernity to post-modernity. • The students will be asked to collect the facts regarding current knowledge and then prepare report.	
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey	

	10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**
CONTINUOUS &COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:** <table><tr><th>SR. NO.</th><th>CCA: COMPONENT</th><th>MAXIMUM MARKS</th></tr><tr><td>1</td><td>Monthly Test</td><td>10X6 Test = 60</td></tr><tr><td>2</td><td>Presentation</td><td>10</td></tr><tr><td>3</td><td>Group Discussion</td><td>10</td></tr><tr><td>4</td><td>Debate</td><td>10</td></tr><tr><td>5</td><td>Participation and Presentation in Seminar</td><td>10</td></tr><tr><td>6</td><td>Report Writing</td><td>10</td></tr><tr><td>7</td><td>Viva Voce</td><td>10</td></tr><tr><td>8</td><td>Attendance*</td><td>10</td></tr><tr><td>9</td><td>Co-curricular Activity</td><td>10</td></tr><tr><td>10</td><td>Team Teaching</td><td>10</td></tr></table> **EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):** CCA will be reduced to 30 marks or 15 marks (as per course weightage). Formula: Marks obtained/Total marksX30 For example: 60÷160X30 =11.25 **PROVISO-I:** Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course. **PROVISO-II:** Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course. ***Attendance in Lectures and Practical** | Percentage	Marks Allotted
75% to 80%	02
81% to 85%	04
86% to 90%	06
91% to 95%	08
Above 96%	10	
EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	**1. ANNUAL** **2. However the Unviersitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• Schilvest, W.H. (2012), Curriculum: Prospective Paradigm and Possiilty. M.C MILLAN publication. • Letha ram mohan (2009). Curriculum Instruction and Evaluation. Aggarwal publication, Agra. • Kelly, AV. (2009). The curriculum: Theory and Practice, sage

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- पूनम मदन (२०१६). पाठ्यचर्या के सैद्धान्तिक आधार, अग्रवाल प्रकाशन. आगरा.
- पूनम मदन (२०१६). ज्ञान एवं पाठ्यचर्या, अग्रवाल प्रकाशन, आगरा.
- पूनम मदन (२०१६). पाठ्यक्रम विकास एवं आकलन, अग्रवाल प्रकाशन. आगरा.

B.Sc.B.Ed. II Year			
COURSE CODE:	BSCBED-252	**COURSE TYPE:**	CORE
COURSE TITLE:	Teaching and Learning		
MAX.MARKS:	100	MIN. PASS MARKS:	**40**
THEORY EXAMINATION	70	MIN. PASS MARKS:	28
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	30	MIN. PASS MARKS:	12
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR		
EXAMINATION	TERM END EXAMINATION	MONTHLY TEST	
DURATION	03 HR	01 HR	

Objectives:

- To develop Cognitive Psychology, Social Development and its effect on Teaching & Learning.
- To develop the emotional Development and Spiritual Development of the students.
- To develop effective Teaching
- To teach about Learning & its factors influencing Learning etc.
- To acquaint with the Diversity among learners and learning needs
- To make aware about the Role of ICT in Learning Enhancement.
- To relate with Teaching learning processes, Teaching learning strategies and methods in the context of NCF.
- To acquaint with Action Research. Right to Education Act 2009.

Learning Outcomes: After completion of the course, students will be able to:

- To develop scientific attitude for the process of teaching & learning.
- To develop understanding about the relationship of cognitive, social and emotional development with learning process.
- To provide an overall view on teaching & learning style and ideas to enhance these activities.
- To make aware about teaching skills, components and parameters of effective teaching.
- To relate various Psychological domains of Teaching & Learning.
- To familiarize with ICT in teaching & learning process.

UNIT-1 **TEACHING HOURS (24)**	**Psychological Domains of Teaching & Learning** - Cognitive Psychology: - Meaning, Concept, Important, domains and its relationship with Learning & Teaching. - Social Development – Meaning, Importance, Social Process and its effect on Teaching & Learning, Theory of Social Construction. - Emotional Development - Meaning, Process, need to study and its effect on Teaching and Learning process. - Spiritual Development: - Meaning, Concept, important domains and its relationship with Learning & Teaching. **Assignment:** - Make a critical analysis of school situation in terms of its role in promoting learner's cognitive and non-cognitive learning outcome and report on entire activities. - Prepare learners' profile based on cognitive and non cognitive characteristics of two adopted students.

UNIT-2 **TEACHING HOURS (24)**	**Effective Teaching** • Effective Teaching : Meaning, Component and Parameters of Effective Teaching, Identification of Teaching Skills, Principles of Teaching, Classroom Instruction Strategies, Teacher as a Learner, Responsibilities of Teacher. • Teaching for Culturally Diverse Students, Theory of Culturally Relevant Pedagogy. • Values and personal relationship between Teachers and Learners, relationship among learners, self–esteem and freedom experienced by learner. • Teaching Models & factor effecting teaching & learning. **Assignment:** • Draft a survey based report on an effective Teacher's behaviour . • Prepare an academic schedule of students after a thorough analysis of school dairy of students. Focus on the analysis of record of Teaching and Learning.
UNIT-3 **TEACHING HOURS (24)**	**Learning** • Learning – Meaning, and Characteristics, Learning Factors, Influencing Factors, Kind of Learning, tradition and changes in view of the learning process a shift from teaching to Learning. • Principles of Learning, Quality of Learning. • Discovering Learning - Meaning, Concept, Principles to assess quality of Learning. • A Learning Cycle for Discovery, Classroom Instruction Strategies Theories Supporting the new view of the Learning process. • Learning as construction of Knowledge (NCERT, 2005) learning in and outside school and its relationship with learner's motivation learning in diverse socio-cultural condition. **Assignment:** • Conduct a Study of a case and prepare a report on factors influencing learning of two adopted students. • Conduct a test of at least two students to determine which side of the brain is more powerful.
UNIT-4 **TEACHING HOURS (22)**	**Learning Style** • Diversity among learners and learning needs (with reference to special needs) background & Concept of Multilingual. • Learning & thinking Style - Concept, Types and importance in Teaching – Learning process, factor effecting and relationship between Learning & Thinking Style. • Role of ICT in Learning Enhancement. **Assignment:** • Prepare an academic record of two students justifying your contribution in academic enhancement of them. • Observe differential learning needs of the learners with regard to learning styles tHRough active involvement of students (playing, storytelling, puzzle games, reading etc) and draft a report for presentation.

UNIT-5 **TEACHING HOURS (22)**	**Teaching Style** • Teaching learning processes, Teaching learning strategies and methods in the context of National Curriculum Framework 2005. • Action Research, Right to Education Act 2009 (Role and Responsibilities of Teachers) • Teaching as Profession, Effective Classroom Management. • ICT & Teaching. **Assignment:** • Draft a report on Teachers' Teaching Style for one week based on the Classroom observation of two teachers. • Make your own lesson Plan by studying Teacher's diaries.
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**

| CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA) | Details of Continuous and Comprehensive Assessment (CCA) are as follows: |

Details of Continuous and Comprehensive Assessment (CCA) are as follows:

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	**Monthly Test**	**10X6 Test = 60**
2	**Presentation**	**10**
3	**Group Discussion**	**10**
4	**Debate**	**10**
5	**Participation and Presentation in Seminar**	**10**
6	**Report Writing**	**10**
7	**Viva Voce**	**10**
8	**Attendance***	**10**
9	**Co-curricular Activity**	**10**
10	**Team Teaching**	**10**

EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):

CCA will be reduced to 30 marks or 15 marks (as per course weightage).

Formula: Marks obtained/Total marksX30

For example: $60 \div 160 X30 = 11.25$

PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.

PROVISO-II: Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course.

*Attendance in Lectures and Practical

Percentage	Marks Allotted
75% to 80%	02
81% to 85%	04
86% to 90%	06
91% to 95%	08
Above 96%	10

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	1. **ANNUAL** 2. **HOWEVER, THE UNIVERSITYmay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READING	• चौबे.एस.पी. (२००५). बाल विकास व मनोविज्ञान के मूल तत्व.Concept Publishing Company Private Ltd. Mahan Garden: New Delhi. • भूषण,शैलेन्द्र (२००७–०८).शैक्षिक तकनीकी. अग्रवाल पब्लिकेशनः आगरा–७. • शर्मा, आर.ए. (२००८). शिक्षा के मनोविज्ञान आधार. इंटरनेशनल पब्लिशिंग हाउसः मेरठ. • सेवानी, अशोक एवं सिंह,उमा (२००८). शिक्षा

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B.Sc.B.Ed. II Year			
COURSE CODE:	**BSCBED-253**	**COURSE TYPE:**	**CORE**
COURSE TITLE:	**Health and Physical Education**		
MAX.MARKS:	**50**	MIN. PASS MARKS:	**20**
THEORY EXAMINATION	35	MIN. PASS MARKS:	14
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15	MIN. PASS MARKS:	6
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives:
- To develop an understanding of Concept of Health, Health needs of children and adolescents.
- To get acquainted with body system-Skeleton, Muscular, Digestive in relation to Health fitness, & their Functions.
- To know the physical fitness, strength, endurance and self-defense activities.
- To learn about Safety and Security — disasters in and outside schools, ways of prevention etc.
- To familiarize with various Games and Sports and their impact on health
- To understand and learn various Yogic practices, health services, policies and major of institutions.

Learning outcome: After completion of the course, student-teachers will be able -
- To develop positive attitude towards health as individual and be collectively responsible to achieve it.
- To know their health status, identify health problems and be informed for taking remedial measures.
- To generate awareness about rules of safety in hazardous situation (illness, accident and injury) and equip them with first aid measures about common sickness and injuries.
- To learn and to form right habits about exercise, games and sports, sleep, rest and relaxation.
- To sensitize, motivate and help them to acquire the skills for physical fitness, learn correct postural habits and activities for its development.
- To understand various policies and programmes related to health, physical education and Yoga.
- To understand the process of assessment of health and physical fitness.

UNIT-1 TEACHING HOURS (12)	• Concept of Health, Importance, Dimensions and Determinants of Health; Health needs of children and adolescents, including differently-abled children. • Physical Education- Meaning, concept and importance. • Health and Physical Education and its relationship with other subject areas like Science, Social Science and Languages. **Assignment:** • Analysis various text book in light of health education, prepare report. • Prepare an awareness program on healthy life style of children or adolescence.

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UNIT-2 **TEACHING HOURS (12)**	• The body system-Skeleton, Muscular, Respiratory, Circulatory and Digestive in relation to Health fitness, Bones, Muscles and Joints, their Functions. • Food and Nutrition, Food habits, Timing of food, Nutrients and their functions, diversity of Indian food, seasonal foods and festivals, economics of food, preservation of food value during cooking, indigenous and modern ways to persevere food, shift in food practices food and waterborne and deficiency diseases and prevention. **Assignment:** • Ask school student to prepare a first aid box and conduct a training program on first aid treatment of injury. • Conduct an awareness program in community on preservation of food value during cooking.
UNIT-3 **TEACHING HOURS (12)**	• Safety and Security — disasters in and outside schools, ways of prevention, safety from snake and dog bites, animal attacks, prevention and treatment. • Physical fitness, strength, endurance and flexibility, its components, sports skills, indigenous and self-defense activities. **Assignment:** • Organize a Training program for girl students of school on self-defense activities. • Organize a workshop on prevention of disasters in school.
UNIT-4 **TEACHING HOURS (11)**	• Games and Sports — athletics (general physical fitness exercises), games (lead-up games, relays and major games) rhythmic activities, gymnastics and their impact on health. • Fundamental skills of games and sports; Sports for recreation and competition; Rules and regulations of sports; sports, ethics; sports awards and scholarships, sports-person ship. **Assignment:** • Organization of inter school games and sports tournaments in your district/village/town. • Orientation program on Fundamental Sports Skills : Basics of track and field (100 mts. 200 mts., long jump, shot-put, 4×50 mts. Relay) Gymnastics.
UNIT-5 **TEACHING HOURS (11)**	• Yogic practices—importance of yoga, yogasanas, kriyas and pranayams of (school, family and sports), health services, policies and major of institutions. **Assignment:** • Learning and performing of basic yogic activities. • Conduct yoga activities for development of physical fitness, i.e strength, speed, endurance, flexibility and body composition of students in school.
TUTORIALS	**One tutorial class once a week (12)**
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review

	6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**
CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:** | SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
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1	**Monthly Test**	**10X6 Test = 60**
2	**Presentation**	**10**
3	**Group Discussion**	**10**
4	**Debate**	**10**
5	**Participation and Presentation in Seminar**	**10**
6	**Report Writing**	**10**
7	**Viva Voce**	**10**
8	**Attendance***	**10**
9	**Co-curricular Activity**	**10**
10	**Team Teaching**	**10** | **EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):** CCA will be reduced to 30 marks or 15 marks (as per course weightage). Formula: Marks obtained/Total marksX30 For example: 60÷160X30 =11.25 **PROVISO-I:** Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course. **PROVISO-II:** Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course. ***Attendance in Lectures and Practical** | Percentage	Marks Allotted
75% to 80%	02
81% to 85%	04
86% to 90%	06
91% to 95%	08
Above 96%	10	
EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	1. **ANNUAL** 2. **HOWEVER, THE UNIVERSITYmay revise the syllabus at any time during the running year after giving a notice for a period one month.**

| SELECTED READINGS | - Bhatt, B.D. and S.R. Sharma (2008). Teaching of Physical and Health Education. Kanishka Publishing House. Kailash Nagar: Delhi.
- शर्मा, हरिकिशन (1333).विद्यालयी शारीरिक शिक्षा एवं खेल : संचालन. प्रशासन एवं पर्यवेक्षण. पण्डित प्रकाशन. वैरवाड़ाः दिल्ली।
- शर्मा, एन.पी. (2004). शारीरिक शिक्षा. खेल साहित्य केन्द्रः नई दिल्ली।
- अमतरे, के.एस. (2010). शारीरिक शिक्षा और खेज विज्ञान. स्पोर्ट्स् पब्लिकेशनः नई दिल्ली।
- पाण्डेय, राजकुमारी (1993). भारतीय योग परम्परा के विविध आयाम. राधा पब्लिकेशनः नई दिल्ली।
- थानी, योगराज (2007). शारीरिक शिक्षा के तत्व. खेल साहित्य केन्द्रः नई दिल्ली।
- गुप्ता, डी.के. एवं रितु जैन (2005). विद्यालयों में स्वास्थ्य शिक्षा. खेल साहित्य केन्द्रः नई दिल्ली। |

B.Sc. B.Ed. II Year			
COURSE CODE:	**BSCBED-254 a I**	COURSE TYPE : CORE	
COURSE TITLE :	**Paper-I: Electricity and Magnetism**		
MAX.MARKS:	50	MIN.PASS MARKS	20
THEORY EXAMINATION:	40	MIN.PASS MARKS	16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS	4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objective:

• Electricity and Magnetism is one of the core courses in Physics curriculum. The course covers static and dynamic electric and magnetic field, and the electric and magnetic field in matter.It also includes analysis of electrical circuits.

Learning outcomes: After completion of the course, student-teachers will be able to-

• Acquire a broad conceptual framework of electromagnetic phenomenon.

• Evaluating and understanding the difference between steady and alternating current.

• Get familiar with concepts of force on a moving charge.

• Apply their Knowledge of Magnetic Fields of Matter in higher study.

UNIT-1 TEACHING HOURS(13)	**Electrostatics:** Electrostatic field, calculations of E for simple distributions of charges at rest, dipole and quadrupole fields, Work done on a charge in an electrostatic field, conservative nature of the electrostatic field, Electric potential, relation between electric field and electric potential, *potential energy of a system*, **Torque on a dipole in a uniform field and non-uniform electric field and its energy**, *Potential and field due to dipole*, flux of the electric field, Gauss's law and its application for finding E for symmetric charge distributions, Poisson's equation, Laplace equation, boundary conditions and uniqueness theorems. **Electric field around conductor:** Induced charges, field and potential inside a conductor, field near the surface of conductor, method of images
UNIT-2 TEACHIGN HOURS(10)	**Dielectrics:** Electric field in matter, Dielectric medium, Free and Bound Charges, dielectric constant, polarization and polarization vector, Capacitor (parallel plate, spherical, cylindrical) filled with dielectric, displacement vector D, Relations between E, P and D, Electric field due to a Dielectric Sphere placed in a Uniform Electric Field, Gauss Law in dielectric medium, Claussius-Mossotti Relation, boundary conditions satisfied by E and D at the interface between two homogenous dielectrics.

UNIT-3 **TEACHING HOURS(12)**	**Current Electricity:** Electric Currents (steady and alternating), current-density (J), non-steady currents and continuity equation, **Kirchhoff's laws** and analysis of multiloop circuits, **rise and decay of current in LR and CR circuits**, decay constants, transients in **LCR circuits**, **AC circuits**, complex numbers and its application in solving AC circuit problems, complex impedance and reactance, **LCRseries and parallel resonance**, **Q factor**, power consumed by an AC circuit, power factor, Y and delta networks and transmission of electric power.	
UNIT-4 **TEACHING HOURS(15)**	**Magnetostatics:** Force on a moving charge: Lorentz force, equation and definition of B, force on a straight conductor carrying current in a uniform magnetic field, Torque on a current loop, magnetic dipole moment, angular momentum and gyromagnetic ratio. Motion of charged particles in electric and magnetic fields. Linear accelerator, E as deflecting field, CRO sensitivity. Transverse B field, curvatures of tracks for energy determination of nuclear particles, principle of a cyclotron. Mutually perpendicular E and B fields, mass spectrograph, velocity selector, its resolution.	
UNIT-5 **TEACHING HOURS(10)**	**Magnetic Fields in Matter:Biot-Savart law and it's simple applications:** straight wire and circular loop, calculation of H in simple geometrical situations, **Ampere's Law and it's simple applications**: (1) Solenoid and (2) Toroid, Ampere's law in differential and integral form. Magnetic vector potential and Poisson's equation, the divergence and curl of B, field due to a magnetic dipole, magnetization current, magnetization vector (M), magnetic intensity (H), magnetic permeability (linear cases), interpretation of a bar magnet as a surface distribution of solenoidal current, the field of a magnetized object.	

TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing 7. Group Discussion 8. Videos/Animation 9. Self-Learning/e-Learning 10. Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**

CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	Details of Continuous and Comprehensive Assessment (CCA) are as follows:		
	S. No.	CCA- Components	Max. Marks Allocation
	1.	Monthly test	20*3 Test=60
	2.	Quizzes and Assignments	10
	3.	Viva-voce	10

	4.	Seminar/Symposia	10
	5.	Report writing	10
	6.	Workshop	10
	7.	Review of literature	10
	8.	Creativity/Innovation	10
	9.	Experimental Skill	10
	10.	Co-curricular activity	10
	11.	Attendance	10
	Total 160 marks equivalent reduced to CCA original marks 30.		
EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.		
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. However the Unviersitymay revise the syllabus at any time during the running year after giving a notice for a period one months.**		
SELECTED READINGS	• Griffith, D. J., & Ruppeiner, G. (1981). Introduction to electrodynamics.Prentice-Hall of India). Reitz and Milford; Electricity and Magnetism (Addison-Wesley). • Halliday and Resnik (2010). Physics, Vol-2 (Wiley Eastern) • Mahajan, A. S., & Rangwala, A. A. (2001). Electricity and magnetism. Tata McGraw-Hill Education. • Portis, A. M. (1978). Electromagnetic fields: sources and media. Wiley. • Pugh, E. M. (1960). Principles of electricity and magnetism.Addison-Welsley). Panofsky and Phillips; Classical Electricity and Magnetism (India Book House). • Purcell, E. M. (1985). Berkeley Physics Course: Electricity and Magnetism. McGraw-Hill. • Resnik, H. Krane (2010). The Nature of Light" in Physics Vol II, 2010. • Resnik, R. Halliday D. & Krane, K. S. (1992). Physics (volume 1). Wiley, New York, 1, 992.		

B.Sc. B.Ed. II Year			
COURSE CODE:	BSCBED-254 a II	COURSE TYPE : CORE	
COURSE TITLE :	Paper-II: Kinetic Theory and Thermodynamics		
MAX.MARKS:	50	MIN.PASS MARKS	20
THEORY EXAMINATION:	40	MIN.PASS MARKS	16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS	4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR		
EXAMINATION	TERM END EXAMINATION	MONTHLY TEST	
DURATION	03 HR	01 HR	

Objective:

- This course work deal with the relationship between the macroscopic properties of the physical system in equilibrium. The students understand the fundamental laws of thermodynamics and it's applications to various thermo dynamical systems and processes. In addition, it will also give exposure to students about the Kinetic theory of gases, transport phenomenon involved in ideal gases, phase transitions and behavior of real gases.

Learning Outcomes: After completion of the course, student-teachers will be able to-

- Know the background and properties of gases.
- Get familiar with the laws of thermodynamics.
- Apply the principles of laws of thermodynamics in real situations.
- Learn the Classical theory of radiation.

UNIT-1 TEACHING HOURS(10)	**Ideal Gas**: Kinetic model, deduction of Boyle's law, interpretation of temperature, estimation of rms speeds of molecules, Brownian motion, estimate of the Avogadro number, **Equipartition of energy**, **specific heat of monoatomic gas**, **extension to di-and triatomic gases**, Behaviour at low temperatures, Adiabatic expansion of an ideal gas, applications to atmospheric physics. **Real Gas**: **Van der Waals gasequation of state**, nature of Van der Waals forces, comparison with experimental P-V curves, **The critical constants**, gas and vapour, Joule expansion of ideal gas and of a Van der Waals gas, **Joule coefficient**, **Joule-Thomson effect**.
UNIT-2 TEACHIGN HOURS(10)	**Liquefaction of Gases:** Boyle temperature and inversion temperature, Principle of regenerative cooling and of cascade cooling, liquefaction of hydrogen and helium, Refrigeration cycles, meaning of efficiency. **Transport phenomena in Gases:** Molecular collisions mean free path and collision cross sections, estimates of molecular diameter and mean free path, Transport of mass, momentum and energy and interrelationship, dependence on temperature and pressure.

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UNIT-3 **TEACHING HOURS(15)**	**The Laws of Thermodynamics:** The Zeroth law, various indicator diagrams, work done by and on the system, first law of thermodynamics, internal energy as a state function, **reversible and irreversible processes**, Carnot cycle and its efficiency, Carnot theorem and the second law of thermodynamics, Different versions of the second law, **practical cycles used in internal combustion engines** (**Otto and Diesel engines**), **Entropy**, principle of increase of entropy, The thermodynamic scale of temperature, its identity with the perfect gas scale, Impossibility of attaining the absolute zero temperature, third law of thermodynamics.
UNIT-4 **TEACHING HOURS(15)**	**Thermodynamic Relationships:** Thermodynamic variables: extensive and intensive, **Maxwell's general relationships and applications**, Joule Thomson expansion and adiabatic cooling in a general system, Van der Waals gas, **Clausius-Clapeyron equation**, Thermodynamic potentials and equilibrium of thermodynamical systems, relation with thermodynamical variables, **Cooling due to adiabatic demagnetization**, production and measurement of very low temperatures.
UNIT-5 **TEACHING HOURS(10)**	**Classical Theory of Radiation:** Properties of Thermal Radiation, Pure temperature dependence, Kirchhoff's law, **Stefan-Boltzmann law**, Pressure of Radiation, **Wien's displacement law**, Wien's distributions law, **Rayleigh-jean's law**, Planck's quantum postulates, **Planck's law**, complete fit with experiment, **interpretation of behavior of specific heats of gases at low temperature**.
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	Details of Continuous and Comprehensive Assessment (CCA) are as follows: See table below.

Details of Continuous and Comprehensive Assessment (CCA):

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10

	8.	Creativity/Innovation	10
	9.	Experimental Skill	10
	10.	Co-curricular activity	10
	11.	Attendance	10
	Total 160 marks equivalent reduced to CCA original marks 30.		
EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.		
PERIODICAL REVISE OF SYLLABUS	1. **ANNUAL** 2. **However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one months.**		
SELECTED READINGS	• Glasstone, S. (2007). Thermodynamics for chemists. Narahari Press. • Hoyst, R., & Poniewierski, A. (2012). Thermodynamics for chemists, physicists and engineers. Springer Science & Business Media. • K.S. Pitzer, L. Brewer (1961). Thermodynamcs (Mc Graw Hill Book Company). • Reif, F. (2009). Fundamentals of statistical and thermal physics. Waveland Press. • Saha, M., & Srivastava, B. N. (1935). Treatise on heat. The Indian Press. (Publication) Pvt. Ltd. Allahabad. • Samuel Glasston (2006). Thermodynamics for Chemists (Affiliated East West Press Pvt. Ltd., New Delhi) • Umezawa, H. (1995). Advanced field theory: Micro, macro, and thermal physics. AIP. • Zemansky, M. W., & Dittman, R. H. (1981). Heat and Thermodynamics (International Edition). Mcgraw-Hill Book Company).		

B.Sc. B.Ed. II Year			
COURSE CODE:	**BSCBED-254 a III**	COURSE TYPE : CORE	
COURSE TITLE :	**Paper-III: Optics and Lasers**		
MAX.MARKS:	50	MIN.PASS MARKS	20
THEORY EXAMINATION:	40	MIN.PASS MARKS	16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS	4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objective:

- This course familiarizes the students with the phenomenon of interference, diffraction, polarization, LASER and holography to enable them to acquire sufficient understanding and knowledge to recognize the usefulness of these phenomena of light in everyday life and to stimulate their interest in Physics. Further, the students also acquire knowledge of working principles and applications of LASER in Industry, Science and Technology.

Learning Outcomes: After completion of the course, student-teachers will be able to -

- Gain knowledge on various theories of light.
- Classify the properties of light like reflection, refraction, interference, diffraction etc.
- Apply the principles of Construction, Working principle and Applications of laser induction in real situations.
- Learn the Interference of a light, optics, Polarization and Optical Rotationand Lasers.

UNIT-1 **TEACHING HOURS(13)**	**Geometrical Optics: Fermat's Principle,laws of reflection and refraction**, Axial, Lateral and angular magnifications and their inter-relationship, Abbe's Sine condition for spherical surface, Lagrange's Law, Refraction tHRough Thick and Thin lens, lens combinations, Cardinal points of an optical system, properties of cardinal points, Newton's formula and other relations for a coaxial system, Cardinal points of two thin lens separated by a finite distance. **Aberration in images:CHRomatic and spherical aberrations**, acHRomatic combination of lenses in contact and separated lenses, MonocHRomatic Aberration and corrections, aplanatic points of a spherically refracting surface and sphere, oil immersion objectives, meniscus lens.
UNIT-2 **TEACHIGN HOURS(12)**	**Interference of a light:***Young's Double slit Experiment*, The principle of superposition, Relation for Fringe Width, Incoherent and Coherent Sources, Division of wavefront and division of amplitude, Fresnel's Biprism, Interference in thin film, Wedge-shaped film, **Newton's rings**, application of interference in determination of wavelength and precision measurements. **Haidinger fringes:** fringes of equal inclination, **Michelson interferometer**, its application for precision determination of wavelength, wavelength difference and the width of spectral lines, Intensity distribution in **multiple beam interference**, **Fabry-Perot interferometer**.

UNIT-3 TEACHING HOURS(15)	**Fresnel diffraction:** Fresnel **half-period zones**, Types of **zone plates**, **Circular aperture**, Circular disc, Diffraction at a straight edge, Construction and working principle of Zone plate and its application as a lens. **Fraunhofer diffraction:** Phasor diagram, **Diffraction at a single slit**, **double slits**& N parallel slits and their intensity distribution, **plane diffraction grating**, reflection grating and blazed grating, Concave grating and different mountings, **diffraction by a circular aperture**. Rayleigh criterion of Resolution, **resolving power** of Telescope, Microscope, Grating and Prism.
UNIT-4 TEACHING HOURS(10)	**Polarization and Optical Rotation:** Meaning and representation of Polarized light, Types of polarized light, *Production of linearly and circularly polarized light*, Brewster law, Malus law, **double refraction**, Phase retardation plates, Analysis of Polarized light as plane polarized, circularly polarized and Elliptically polarized light, Rotation of plane of polarization, Specific rotation and its experimental determination, Polarimeter (Laurent and Biquartz).
UNIT-5 TEACHING HOURS(10)	**Lasers and Holography:**Einstein's **A and B coefficients**, Spontaneous and Induced emissions, conditions for laser action, population inversion. Construction, working principle and Applications of **Ruby laser**, **He-Ne laser** and CO_2 lasers. **Characteristics of Laser beam**, directionality, **spatial and temporal coherence**. *Focusing of laser beams. THRee-level scheme for laser operation*. Basic concepts of **Holography**, Construction of a Hologram and reconstruction of the image. *Applications of Holography*.
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**
CONTINUOUS &COMPREHENSIVE ASSESSMENT (CCA)	Details of Continuous and Comprehensive Assessment (CCA) are as follows:

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10

	10.	Co-curricular activity	10
	11.	Attendance	10
	Total 160 marks equivalent reduced to CCA original marks 30.		
EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.		
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one months.**		
SELECTED READING	• Akhmanov, S. A., & Nikitin, S. Y. (1997). Physical optics. Clarendon Press. • Bhadra, S., & Ghatak, A. (Eds.). (2013). Guided Wave Optics and Photonic Devices. CRC Press. • Boyd, R. W. (2019). Nonlinear optics. Academic press. • Brewer, R. (Ed.). (2012). Laser spectroscopy. Springer Science & Business Media. • De Fornel, F. (2001). Evanescent waves: from Newtonian optics to atomic optics (Vol. 73). Springer Science & Business Media. • Hann, R. A., & Bloor, D. (Eds.). (1989). Organic materials for non-linear optics. London: Royal Society of Chemistry. • Jenkins, F. A., & White, H. E. (1937). Fundamentals of optics. Tata McGraw-Hill Education. • Longhurst, R. S., (1970). Geometrical and physical optics. Orient Black Swan. • Wood, R. W. (1905). Physical optics. Macmillan.		

PHYSICS PRACTICALS-II
Duration: 4 HR   MAX.MARKS: 50   Min. Marks: 20

Total number of experiments to be performed by the students during the session should be 16, selecting any eight from each section. In examination two experiments are to be performed taking at least one from each section.

The distribution of marks in the practical examination will be as follows:

(i) Two experiments   30 Marks

For each experiment, distribution of marks will be as follows:

Figure: 2

Formula/Theory: 2

Observation: 7

Calculation and Result: 3

Precautions: 1

(ii) Viva voce   10

(iii) Records   10

Total   50 Marks

LIST OF EXPERIMENTS

Section A

- Determination of wavelength using Biprism.
- Determination of wavelength of light using diffraction grating.
- Michelson's interferometer and determination of D1& D2.
- To find out the wavelength of a monocHRomatic source of light using Newton's rings and find the refractive index of liquid.
- Determine the specific rotation of sugar solution by Polarimeter.
- Find out the melting point of a given substance using platinum resistance thermometer.
- Determine thermal conductivity of a bad conductor by Lee's method.
- Determine the thermodynamic constant (γ) using Clements's and Desormas method.
- Study of variation of total thermal radiation with temperature.
- Determination of Resolving Power of Telescope.
- Determine wavelength of laser light using a diffraction grating.
- Determination of wavelength of Mercury source.

Section B

- Study thermo emf versus temperature of a thermo couple. Find the neutral temperature and use it to find temperature of an unknown substance.
- Study the magnetic field along the axis of a current carrying circular coil for different currents. Plot the observations on a graph and find out the radius of a circular coil.
- Determination of band gap using a junction diode.
- Measurement of inductance of a coil by Anderson's bridge.
- Measurement of Capacitance and dielectric constant of a liquid by Desauty bridge.
- Study of decay of currents in LR and RC circuits.
- Response curve for LCR circuit and resonance frequency and quality factor.
- Determination of power factor (Cos θ) of a given coil using CRO.
- Determination of velocity of sound in air by standing wave method using speaker microphone and CRO.
- Determine the Ballistic constant of a ballistic galvanometer.
- Determination of a small thickness by interference method.

B.Sc. B.Ed. 1I Year				
COURSE CODE:	**BSCBED-254 b I**		COURSE TYPE : CORE	
COURSE TITLE :	**Paper-I : Inorganic Chemistry**			
MAX.MARKS:	50	MIN.PASS MARKS		20
THEORY EXAMINATION:	40	MIN.PASS MARKS		16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS		4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE SESSION			
EXAMINATION	**TERM END EXAMINATION**		**MONTHLY TEST**	
DURATION	**03 HR**		**01 HR**	

Objectives:

- The aim and objective of this course is to teach the Basic concepts of chemistry of Coordination Compounds," F'Block elements , organo metallic compounds , Carbonyls and Nitrosyls , Stability of Metal complexes and Oxidation Reduction to the student-teachers **.**

Learning outcomes - After completion of the course, student-teachers will be able to -

- Know the background, properties of organo metallic compounds.
- Get familiar with concepts of coordination compounds, chemistry of lanthanide and ac tinids.
- Apply the principles of thermodynamics stability of metal complexes and factors affecting the stability.
- Learn the Stability of Metal complexes and Oxidation Reduction.

UNIT-1 TEAACHING HOURS (12)	**Coordination Compounds** Werner's coordination theory and its experimental verification, effective atomic number concept, chelates, nomenclature of coordination compounds, isomerism in coordination compounds, valence bond theory of transition metal complexes. Limitations of valance bond theory, an elementary idea of crystal field theory, thermodynamic aspects of crystal field theory, crystal field splitting in octahedral, tetrahedral and square planner complexes, factors affecting the crystal-field parameters
UNIT-2 TEAACHIGN HOURS (12)	**Chemistry of " F" Block elements : Lanthanide and Actinides** **Chemistry of Lanthanide:** Occurrence and separation, Electronicstructure, oxidation states and ionic radii and lanthanide contraction, spectral and magnetic properties, complex formation and applications. **Chemistry of Actinides:** Electronic configuration, oxidation states, actinide contraction, complex formation spectral and magnetic properties, applications. Chemistry of separation of Np, Pu and Am from Uranium, similarities between the later actinides and later lanthanides and applications of actinides.
UNIT-3 TEACHI NG HOURS (10)	**Organometallic compounds** Definition, nomenclature and classification of organometallic compounds, Preparation, properties, bonding and applications of alkyls and aryls of Li, Mg, Fe ,Sn

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UNIT-4 **TEACHING HOURS(13)**	**Carbonyls and Nitrosyls** **Metallic carbonyls**: Metallic carbonyls General methods of Preparation, general properties, structure and nature of Metal carbonyls, bonding in carbonyls, Effective atomic number (EAN) rules as applied to metallic carbonyls. 18-electron rules applied to metallic carbonyls. Preparation, properties and structure of nickel tetracarbonyl, iron penta carbonyls, cHRomium hexa carbonyls, dimanganese deca carbonyl, dicobalt octa carbonyl. **Metallic nitrosyls:** Some metallic notrosyls: Metal nitrosyl carbonyls, metal nitrosyl halides, sodium nitroprusside (Preparation properties, structures and uses) structure and nature of M-N bonding in nitorsysl. Effective atomic number (EAN) rules as applied to metallic nitrosyls.
UNIT-5 **TEACHING HOURS(13)**	**Stability of Metal complexes and Oxidation Reduction** **Thermodynamic and Kinetic Aspects of Metal Complexes:** A brief outlineof thermodynamics stability of metal complexes and factors affecting the stability, stability constants of complexes and their determination, substitution reactions of square planar complexes. **Oxidation Reduction:** Use of redox potential data-analysis of redox cycle, redox stability in water – Frost, Latimer and Pourbaix diagrams. Principles involved in the extraction of the elements.
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10

	Total 160 marks equivalent reduced to CCA original marks 30.
EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. However, the Universitymay revise the syllabus at any time during the running session after giving a notice for a period one month.**
SELECTED READINGS	• Mehrotra.R. C. and A. Singh (1991). organometallic Chemistry A Unified Approach. Wiley. • Shar.A. G. (2012).Inorganic Chemistry. Pearson. • Bell and Lott (1995).Modern approach to Inorganic chemistry. Van Nostrand. • Emelns and Anderson (1991). Principles of Inorganic Chemistry – • Miessler.G. L. and D. A. (1962).Tarr Inorganic Chemistry. Prentice Hall. • Cotton and Wilkinson (2001).Advanced Inorganic Chemistry. 6th Edition. Wiley. • Lee, J.D.(1964).Concise Inorganic Chemistry. ELBS. • Douglas, B.E. and Mc Daniel, D.H.(1994).Concepts & Models of Inorganic Chemistry. • Day, M.C. and Selbin, J. (1963).Theoretical Inorganic Chemistry.ACS Publications. • SHRiver and Atkins (2003).Inorganic Chemistry. W. H. Freeman and Company • James Huheey, (1972). Inorganic chemistry: Principles of Structure and Reactivity, Pearson Education India. • B.N. Figgis, J.E Huheey, P.W. (1990). Atkins Inorganic Chemistry. Pearson Education.

B.Sc. B.Ed. 1I Year		
COURSE CODE:	BSCBED-254II	COURSE TYPE : CORE
COURSE TITLE :	Paper II :Organic Chemistry	
MAX.MARKS:	50	MIN.PASS MARKS	20
THEORY EXAMINATION:	40	MIN.PASS MARKS	16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS	4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE SEESSION	
EXAMINATION	TERM END EXAMINATION	MONTHLY TEST
DURATION	03 HR	01 HR

Objective:

- To learn the fundamental and advanced concepts in reaction mechanisms in organic chemistry along with the study of reaction mechanisms in various types of substitution and elimination reactions
- To predict the relationships between organic chemical structures and their reactivity.
- To learn the basic concept of Stereochemistry of Organic Compounds and*Pericyclic reactions*.
- To learn the principles of IUPAC nomenclature of alkanes,Cycloalkenes, Dienes,and Alkynes.

Learning outcomes - After completion of the course, student-teachers will be able to:-

- *Know t*he background, properties of Fundamentals of Organic Chemistry.
- Get familiar with concepts of isomerism and Types of isomerism.
- Apply the principles of IUPAC nomenclature of branched and unbranched alkanes.
- Lear n the Cycloalkenes , Dienes ,and Alkynes.

UNIT-1 TEACHING HOURS(12)	**Fundamentals of Organic Chemistry** **Structure and Bonding:** Hybridization, bond lengths and bond angles, bondenergy, localized and delocalized chemical bonding, van der Waals interactions, inclusion compounds, clatherates, charge transfer complexes, resonance, hyperconjugation, aromaticity, inductive and field effects, hydrogen bonding. **Mechanism of Organic Reactions:** Curved arrow notation, drawing electronmovements with arrows, half-headed and double-headed arrows, homolytic and heterolytic bond breaking, Types of reagents - electrophiles and nucleophiles, Types of organic reactions, Energy considerations. Reactive intermediates Carbocations, carbanions, free radicals, carbenes, arynes and nitrenes (with examples). Assigning formal charges on intermediates and other ionic species. Methods of determination of reaction mechanism (product analysis, intermediates, isotope effects, kinetic and stereochemical studies)

UNIT-2 **TEACHIGN HOURS (10)**	**Stereochemistry of Organic Compounds** **Concept of isomerism**, Types of isomerism; Optical isomerism, elements of symmetry, molecular chirality, enantiomers, stereogenic center, optical activity, properties of enantiomers, chiral and achiral molecules with two stereogenic centers, diastereomers, tHReo and erytHRo diastereomers, meso compounds, resolution of enantiomer, inversion, retention and racemisation. Relative and absolute configuration, sequence rules, D & L and R & S systems of nomenclature. **Geometric isomerism:** determination of configuration of geometric isomers, E & Z system of nomenclature, geometric isomerism in oximes and alicyclic compounds. **Conformational isomerism:** conformational analysis of ethane and n-butane; conformations of cyclohexane, axial and equatorial bonds, conformation of mono substituted cyclohexane derivatives, Newman projection and Sawhorse formulae, Fischer and flying wedge formulae, Difference between configuration and conformation.
UNIT-3 **TEACHING HOURS(12)**	**Alkanes, Cycloalkanes and Alkenes** **Alkanes:-** IUPAC nomenclature of branched and unbranched alkanes, the alkyl group, classification of carbon atom in alkanes, Isomerism in alkanes, sources, methods of formation (with special reference to Wurtz reaction, Kolbe reaction, Corey-House reaction and decarboxylation of carboxylic acids), physical properties and chemical reactions of alkanes, Mechanism of free radical halogenation of alkanes: orientation, reactivity and selectivity **Cycloalkanes**: Nomenclature, methods of formation, chemical reactionsBaeyer's strain theory and its limitations. Ring strain in small rings (cyclopropane and cyclobutane), theory of strainless rings. The case of cyclopropane ring, banana bonds. **Alkenes**:- Nomenclature of alkenes, methods of formation, mechanisms ofdehydration of alcohols and dehydrohalogenation of alkyl halides, regionselectivity in alcohol dehydration, The Saytzeff's rule, Hofmann elimination, physical properties and relative stabilities of alkenes. Chemical reactions of alkenes, mechanism involved in hydrogenation, electrophilic and free radical additions, Markownikoff's rule, hydroboration oxidation, oxymercuration-reduction. Epoxidation, ozonolysis, hydration, hydroxylation and oxidation with $KMnO_4$, Polymerization of alkenes, Substitution at the allylic and vinylic positions of alkenes, Industrial applications of ethylene and propene.

UNIT-4 **TEACHING HOURS(13)**	**Cycloalkenes, Dienes, Alkynes** **Cycloalkenes**: Methods of formation, conformation and chemical reactions ofcycloalkenes, Nomenclature and classification of dienes: isolated, conjugatedand cumulated dienes, Structure of allenes and butadiene, methods of formation, polymerization, chemical reaction – 1, 2 and 1, 4 additions, Diels-Alder reaction. **Alkynes**: Nomenclature, structure and bonding in alkynes, Methods offormation, Chemical reactions of alkynes, acidity of alkynes, Mechanism of electrophilic and nucleophilic addition reactions, hydroboration-*oxidation,* metal-ammonia reductions, oxidation and polymerization. **Pericyclic reactions: classification and examples ,Woodward Hoffmann rules - elctrocyclic, cyclo- addition and sigmatropic rearrangement.** **Arenes and Aromaticity:** Nomenclature of benzene derivatives, the arylgroup, Aromatic nucleus and side chain, Structure of benzene; molecular formula and kekule structure, stability and carbon-carbon bond lengths ofbenzene, resonance structure, MO picture. **Aromaticity**: The Huckle rule, aromatic ions
UNIT-5 **TEACHING HOURS(13)**	**Concept of Electrophilic substitution reaction** **Aromatic electrophilic substitution:** general pattern of the mechanism, role of σ- and π- complexes, Mechanism of nitration, halogenation, sulphonation, mercuration and Friedel-Crafts reaction. Energy profile diagrams. Activating and deactivating substituents, orientation and ortho-para ratio, Side chain reactions of benzene derivatives, Birch reduction, Methods of formation and chemical reactions of alkylbenzenes alkynylbenzenes and biphenyl, naphthalene and AntHRacene. **Alkyl and Aryl Halides**: Nomenclature and classes of alkyl halides, methodsof formation, and chemical reactions, **Mechanisms of nucleophilic substitution** reactions of alkyl halides, SN^2 and $SN^1E_1$and E_2 reactions reactions with energy profile diagrams, Polyhalogen compounds: Chloroform, carbon tetrachloride. Methods of formation of aryl halides, nuclear and side chain reactions, The addition-elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions, Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides, synthesis and uses of DDT and BHC
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**
CONTINUOUS COMPREHENSIVE	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:** | S. No.	CCA- Components	Max. Marks Allocation
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1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10	

ASSESSMENT (CCA)	3.	Viva-voce	10
	4.	Seminar/Symposia	10
	5.	Report writing	10
	6.	Workshop	10
	7.	Review of literature	10
	8.	Creativity/Innovation	10
	9.	Experimental Skill	10
	10.	Co-curricular activity	10
	11.	Attendance	10
	Total 160 marks equivalent reduced to CCA original marks 30.		
EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.		
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. However, the Universitymay revise the syllabus at any time during the running sessionafter giving a notice for a period one month.**		
SELECTED READINGS	• Ali, Hashmat, (2016). Reaction Mechanism in Organic Chemistry. S. Chand publishing. • Eliel, E. L. & Wilen, (1994).Stereochemistry of Organic Compounds; Wiley: London, • Finar, I. L. (2011). Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education). • Finar, I. L. (2011). Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education). • Singh, Harkishan and V. K. Kapoor. (1996). Medicinal and Pharmaceutical Chemistry. Vallabh Prakashan Publishers, Delhi. • John Leonard, Barry Lygo (1995).Garry Procter Advanced Practical Organic Chemistry. Third Edition. • March's Advanced (2001).Organic Chemistry: Reactions, Mechanisms, and Structure, Sixth Edition. • Morrison, R. N. & Boyd, R. N. (2010) Organic Chemistry. Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).		

B.Sc. B.Ed. 1I Year				
COURSE CODE:	**BSCBED-254 b III**		COURSE TYPE : CORE	
COURSE TITLE :	**Paper-III: Physical Chemistry**			
MAX.MARKS:	50	MIN.PASS MARKS		20
THEORY EXAMINATION:	40	MIN.PASS MARKS		16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS		4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE SEESSION			
EXAMINATION	**TERM END EXAMINATION**		**MONTHLY TEST**	
DURATION	**03 HR**		**01 HR**	

Objective:
- This course will equip students with the necessary chemical knowledge concerning the fundamentals in the basic areas of physical chemistry viz. thermodynamics, electrochemistry and chemical kinetics, with regard to various theories developed and their applicability for various systems under consideration.
- To develop the problem solving skills of students are expected to be enhanced tHRough due weightage given to numerical problems in each unit.

Learning outcomes - After completion of the course, student-teachers will be able to:-
- Know the background, properties of Fundamentals of thermodynamics.
- Get familiar with concepts of Chemical Kinetics and Catalysis.
- Apply the principles laws of thermodynamics and thermo chemistry.
- Learn the Electrical transport-conduction in metals and in electrolyte solutions, conductance.

UNIT-1 **TEACHING HOURS (12)**	**Thermodynamics-I** **Thermodynamics:** Definition of thermodynamic terms: system, surroundingsetc. Types of systems, intensive and extensive properties, State and path functions and their differentials. Thermodynamic process, Concept of heat and work .First Law of Thermodynamics: Statement, definition of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship .Joule's law-Joule-Thomson coefficient and inversion temperature. Calculation of w, q, dU, &dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process. **Thermo chemistry**: standard state, standard enthalpy of formation–Hess'sLaw of heat summation and its applications. Heat of reaction at constant volume. Enthalpy of neutralization. Bond dissociation energy and its calculation from thermo-chemical data, temperature dependence of enthalpy, Kirchhoff's equation

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UNIT-2 **TEACHIGN HOURS (12)**	**Thermodynamics-II** **Thermodynamics**: Second law of thermodynamics: need for the law, different statements of the law. Carnot cycle and its efficiency, Carnot theorem. Thermodynamic scale of temperature. **Concept of entropy:** entropy as a state function, entropy as a function of V & T, entropy as a function of P & T, entropy change in physical change, clausius inequality, entropy as a criterion of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases. **Third law of thermodynamics:***Jule-thompson's experiment*,Nernst heat theorem, statement and concept of residual entropy, evaluation of absolute entropy from heat capacity data. Gibbs and Helmholtz functions, Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities, A & G as criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change. Variation of G with A with P, V and T.
UNIT-3 **TEACHING HOURS (10)**	*Electrochemistry-I* • *Electrical transport-conduction in metals and in electrolyte solutions, specific conductance and equivalent conductance, measurement of equivalent conductance, variation of equivalent and specific conductance with dilution.* • *Migration of ions and Kohlrausch law, Arrhenius theory of electrolyte dissociation and its limitations, weak and strong electrolytes, Ostwald's dilution law its uses and limitations.* • *Debye-Huckel- Onsager's equation for strong electrolytes (elementary treatment only). Transport number, definition and determination by Hittorf method and moving boundary method.* • ***Applications of conductivity measurements:-*** *determination of degree of dissociation, determination of K_a of acids, determination of solubility product of sparingly soluble salt, conductometric titrations*
UNIT-4 **TEACHING HOURS (13)**	**Electrochemistry –II** • Types of reversible electrodes-gas-metal ion, metal-insoluble salt anion and redox electrodes. Electrode reactions, Nernst equation, derivation of cell E.M.F. and single electrode potential, standard hydrogen electrode-reference • Electrodes-standard electrode potential, sign conventions, electrochemical series and its significance. Electrolytic and Galvanic cells-reversible and irreversible cells, conventional representation of electrochemical cells.EMF of a cell and its measurements. Computation of cell EMF. Calculation of thermodynamic quantities of cell reactions (ΔG, ΔH, and ΔK), polarization, over potential and hydrogen overvoltage. • Concentration cell with and without, liquid junction potential, application of concentration cells, valency of ions, solubility product and activity coefficient, potentiometric titrations. Definition of pH and pK_a determination of pH using hydrogen, quinhydrone and glass electrodes, by potentiometric methods. • Buffers-mechanism of buffer action, Handerson-hazel equation. Hydrolysis of salts. Corrosion-types, theories and methods of combating it.

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UNIT-5 **TEACHING HOURS (13)**	_**Chemical Kinetics and Catalysis**_ • _**Chemical Kinetics:**_ _Chemical kinetics and its scope, rate of a reaction, factorsinfluencing the rate of a reaction-concentration, temperature, pressure, solvent, light catalyst, concentration dependence of rates, mathematical characteristics of simple chemical reactions- zero order, first order, second order, pseudo order, half-life and mean life, Determination of the order of reaction differential method, method of integration, method of half-life period and isolation method._ • _**Radioactive decay:**_ _as a first order phenomenon, Experimental methods of chemical kinetics: conductometric, potentiometric, optical methods, polarimetry and spectrophotometer. Theories of chemical kinetics: effect of temperature on rate of reaction, Arrhenius equation, concept of activation energy. Simple collision theory based on hard sphere model, transition state theory (equilibrium hypothesis), Expression for the rate constant based on equilibrium constant and thermodynamic aspects._ • **Catalysis:** characteristics of catalysed reactions, classification of catalysis homogeneous and heterogeneous catalysis, enzyme catalysis, miscellaneous examples.
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10

Total 160 marks equivalent reduced to CCA original marks 30.

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.

PERIODICAL REVISE OF SYLLABUS	1. ANNUAL 2. **However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one months.**
SELECTED READINGS	• Adamson, A. (2012). *A textbook of physical chemistry*. Elsevier. • Atkins, P., & De Paula, J. (2009). *Elements of physical chemistry*. Macmillan. • Espenson, J. H. (1995). *Chemical kinetics and reaction mechanisms* (Vol. 102). New York: McGraw-Hill. • Glasstone, S. (1951). *Textbook of physical chemistry*. Macmillan. • Jones, H. C. (1903). *The elements of physical chemistry*. Macmillan Company. • Kapoor, K. L. (2001). *A textbook of Physical Chemistry* (Vol. 3). Macmillan. • Laidler, K. J. (2008). *Chemical Kinetics. (3rdedn).* Pearson Education. • Lewis, D., & Glasstone, S. (1960). *Elements of physical chemistry*. Macmillan. • Negi, A. S., & Anand, S. C. (1985). *A textbook of physical chemistry*. New Age International. • Renner, T. (2007). *Quantities, units and symbols in physical chemistry*. Royal Society of Chemistry. • Roussel, M. R. (2012). *A life scientist's guide to physical chemistry*. Cambridge University Press. • Steinfeld, J. I., Francisco, J. S., & Hase, W. L. (1999). *Chemical kinetics and dynamics* (pp. 325-389). Upper Saddle River, NJ: Prentice Hall

CHEMISTRY PRACTICALS-2	
Duration:4 HR MAX.MARKS: 50 Min. Marks: 20	
Inorganic Chemistry	
Ex.1 Volumetric analysis	15
Organic Chemistry	
Ex.2 Identification of given organic compounds tHRough functional group analysis	15
Physical Chemistry	
Ex.3 Perform one of the experiments mentioned in the syllabus.	10
Ex. 4Vive-Voce	05
Ex.5 Practical-Record	05
Total	*50 Marks*
LIST OF EXPERIMENTS	

Inorganic Chemistry

Quantitative Analysis: Volumetric Analysis-

- Determination of acetic acid in commercial vinegar using NaOH.
- Determination of alkali content – antacid tablet using HCl.
- Estimation of calcium content in chalk as calcium oxalate by permanganometry.
- Estimation of ferrous and ferric by dicHRomate method.
- Estimation of copper using thiosulphate.

OrganicChemistry

Qualitative Analysis

- Detection of extra elements (N, S and halogens), solubility behaviour and functional groups (Alcoholic, phenolic, carboxylic, carbonyl, esters, carbohydrates, amines, amides, nitro and anilide) in simple organic compounds.
- Identification of an organic compound tHRough the functional group analysis and preparation of suitable derivatives.

Physical Chemistry

- Determination of the **transition temperature** of the given substance by thermometric/ dialometric method (e.g.$MnCl_2. 4H_2O$/$SrBr_2. 2H_2O$).
  Phase Equilibrium
- Study of the effect of a solute (e.g. NaCl, succinic acid) on the critical solution temperature of two partially miscible liquids (e.g. phenol-water system) and to determine the concentration of that solute in the given phenol-water system.
- Construction of the phase diagram of two component (e.g. diphenylamine, benzophenone) system by cooling curve method.
  Thermo chemistry
- Determination of the solubility of benzoic acid at different temperatures and to determine ΔH of the dissolution process.
- Determination of the enthalpy of neutralization of a weak acid/weak base versus strong base/strong acid and determine the enthalpy of ionization of the weak acid/weak base.
- Determination of the enthalpy of solution of solid calcium chloride and calculate the lattice energy of calcium chloride from its enthalpy data using Born Haber cycle.
  Distribution Law
- Determination of the distribution coefficient for the distribution of iodine between water and CCl_4.
- Study the distribution of benzoic acid between benzene and water.

B.SC.B.ED. II Year				
COURSE CODE:	**BSCBED-254 c I**		COURSE TYPE : CORE	
COURSE TITLE :	**Chordata**			
MAX.MARKS:	50	MIN.PASS MARKS	20	
THEORY EXAMINATION:	40	MIN.PASS MARKS	16	
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS	4	
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR			
EXAMINATION	**TERM END EXAMINATION**		**MONTHLY TEST**	
DURATION	**03 HR**		**01 HR**	

Objective :

- To lear about understand in respect of vertebrates– their organizational hierarchies and complexities.
- To learn about the evolutionary trends in external morphology and comparative studies of internal structures; identification and classification with examples.
- To Learn them to understand various modes of adaptions in animals.

Learning Out Come : After completion of the course, student-teachers will be able**:**

- To enable students to understand in respect of vertebrates– their organizational hierarchies and complexities, the evolutionary trends in external morphology and comparative studies of internal structures; identification and classification with examples; to enable them to understand various modes of adaptions in animals.

UNIT-1 TEACHING HOURS (15)	• An outline classification of chordates up to orders but up to sub-classes only in case of protochordate groups and mammals. • Comparative anatomy of vertebrates from an evolutionary point of view of the following: Alimentary canal, Heart and aortic arches. Kidney and associated urinogenital ducts
UNIT-2 TEACHIGN HOURS(15)	• Habit and habitat, structure, reproduction (excluding development) of following types:- 　• Hemichordate: *Banlanoglossus* 　• Urocohordata: *Herdmania,* ascidian tadpole larva and its metamorphosis. 　• Cephalochordata: *Amphioxus* 　• Agnatha: Petromyzon
UNIT-3 TEACHING HOURS (15)	• Habit and habitat, structure (morophology, digestive system, respiratory system, blood vascular system, nervous system (central and peripheral) and urinogenital system of the following types – 　• Pisces: scoliodon 　• Structure and development of placoid scales 　• Amphibia: frog 　• Parental care in Amphibia.
UNIT-4 TEACHIN G HOURS (15)	• Habit and habitat, structure (morophology, digestive system, respiratory system, blood vascular system, nervous system (central and peripheral) and urinogenital system of the following types – • Reptile : uromastix, Poisonous and non-poisonous snakes, poison apparatus and biting mechanism. First aid of snake bite.

UNIT-5 TEACHING HOURS (15)	• Habit, habitat, structure, morophology, digestive system, respiratory system, blood vascular system, system nervous system (central and peripheral) and urinogenital syesystem of the following types:- • Aves: *Columba* ,Mammalia: *Rabbit*. Origin of birds, migration & flight adaptation of birds.
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**

Details of Continuous and Comprehensive Assessment (CCA) are as follows:

CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	S. No.	CCA- Components	Max. Marks Allocation
	1.	Monthly test	20*3 Test=60
	2.	Quizzes and Assignments	10
	3.	Viva-voce	10
	4.	Seminar/Symposia	10
	5.	Report writing	10
	6.	Workshop	10
	7.	Review of literature	10
	8.	Creativity/Innovation	10
	9.	Experimental Skill	10
	10.	Co-curricular activity	10
	11.	Attendance	10
	Total 160 marks equivalent reduced to CCA original marks 30.		

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one months.**
SELECTED READINGS	• Barnes, R. D. (1987). *Invertebrate zoology* (No. Ed. 5). WB Saunders Company. • Brooks, W. K. (1882). *Handbook of invertebrate zoology: for laboratories and seaside work*. SE Cassino. • Brooks, W. K. (1882). *Handbook of invertebrate zoology: for laboratories and seaside work*. SE Cassino. • Curtis, W. C., GutHRie, M. J., & Jeffers, K. R. (1938). *Textbook of general zoology*. Wiley.

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	• Hegner, R. W., & Engemann, J. G. (1968). *Invertebrate zoology*(No. QL362 H4 1968). Macmillan.
	• Hyman, L. H. (1940). *The invertebrates: mollusca I* (Vol. 6). McGraw-Hill.
	• Jordan, E. L., & Verma, P. S. (1996). *Invertebrate Zoology.* Sixth revised and enlarged edition. *S. Chand and Company, Ltd. 857pp*.
	• Jordan, E. L., & Verma, P. S. (2009). *Invertebrate zoology*. S. Chand & Company.
	• Light, S. F. (1941). *Laboratory and field text in invertebrate zoology*. Associated Students Store, University of California.
	• McEdward, L. (2020). *Ecology of marine invertebrate larvae*. CRC press.
	• Parker, T. J., & Haswell, W. A. (1967). *Textbook of zoology*. Macmillan International Higher Education.
	• Scott-Ram, N. R., & Scott-Ram, N. R. (1990). Transformed cladistics, taxonomy and evolution. Cambridge University Press.
	• Sedgwick, A. (1905). A Student's Text-book of zoology (Vol. 2). Allen & Unwin.
	• Verma, P. S. (2001). *Invertibrate Zoology*. S. Chand Publishing.

B.Sc.B.Ed. II Year			
COURSE CODE:	BSCBED-254 c II	COURSE TYPE : CORE	
COURSE TITLE :	**Animal Physiology and Endocrinology**		
MAX.MARKS:	50	MIN.PASS MARKS	20
THEORY EXAMINATION:	40	MIN.PASS MARKS	16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS	4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

OBJECTIVE :

- To learn about the comprehend the modern concepts of physiological aspects on various organs and systems of animals and human being to comprehend chemical nature, biological molecules and physiological roles.

Learning outcomes - After completion of the course, student-teacher will be able:-

- To enable students to comprehend the modern concepts of physiological aspects on various organs and systems of animals and human being to comprehend chemical nature, biological molecules and physiological roles.

UNIT-1 TEACHING HOURS (15)	- **Physiology of digestion:** Chemical nature of food stuff (including micronutrients), various types of digestive enzymes and their digestive action in the alimentary canal, role of GI hormones in digestion, mechanism of absorption of digested food.Disorders of digestive system. - **Physiology of respiration:** Mechanism and control of breathing, exchange of gases transport of respiratory gases (oxygen and carbon dioxide) .elementry idea about asthma and emphysema.
UNIT-2 TEACHING HOURS (15)	- **Physiology of blood circulation:** Composition and function of blood.Blood groups (ABO and Rh) Blood coagulation – factors, mechanism, theories and anticoagulants. Origin, conduction and regulation of heart beat in mammals. Cardiac cycle, ECG, Elementary ideas of cardiovascular disorders,hypertension,angina pectoris,myocardial infarction.
UNIT-3 TEACHING HOURS (15)	- **Nerve physiology:** structure and types of neuron, origin and conduction of nerve impulse, Synapse-structure, types, properties and signal transmission tHRough synapses. - **Muscle physiology:** Ultra-structure and mechanism of contraction of skeletal muscle, summation and fatigue. Common disorders of muscles. - **Physiology of Excretion:** Nitrogenous wastes, anatomy of mammalian kidney, structure of nepHRon, mechanism of urea and urine formation (including hormonal regulation),disorders of excretory system.Osmoregulation.

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UNIT-4 TEACHING HOURS (15)	• **Endocrinology:** Types of endocrine glands and their disorders;pituitary, pineal body,Adreanl,Thyroid,Islets of langerhans,Testis and Ovary.Chemical nature of Hormone,hormone action(including role of cyclic AMP in hormone action). • Preliminary idea of neurosecretion;Hypothalamic control of pituitary functions. • Endocrine glands in Insects. • Neurotransmitters.
UNIT-5 TEACHING HOURS (15)	• Endocrine glands;Ovary and Placenta,ovarian cycles and their neuroendocrine control.Endocrinology of Ovulation,Implantation,Parturition and Lactation. MTP and related social issues. • Endocrine glands;Testis,testicular cycle and its hormonal control.hormonal control of reproduction using mammalian examples.reproductive disorders.
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**

CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10

Total 160 marks equivalent reduced to CCA original marks 30.

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. However the Unviersitymay revise the syllabus at any time during the running year after giving a notice for a period one months.**

SELECTED READINGS	• Guyten and hall (2013), *A text book of Medical physiology*, Elsvier Pub (South Asia)
	• Schmidt – Nielson, (2013).*Animal Physiology*, 5thed, Cambridge Pub
	• D Voet & JG Voet (2011).*Biochemistry,* Wiley Arumugam Animal Physiology (Saras Publication, Nagercoil, Tamil Nadu).
	• K.V. Sastry (2008).*Animal Physiology and biochemistry*, Rastogi Publications.
	• Pandey, Kamleshwar and Shukla, J.P. (2008). *Regulatory mechanism in Vertebrates*–Jaipur: Rastogi Publications.
	• Goyal, K.A. and K.V. Sastry (2008).*Animal Physiology*, Rastogi Publication.
	• Sasyry, K.V. (2008).*Endocrinology and Reproductive Biology*, Jaipur: Rastogi Publication.
	• Arora, M.P. (1989). *Animal Physiology*–Shimla: Himalaya Pucations House.
	• Guyton, A.C. & Hall J.E (1996). *Textbook of Medical Physiology*. W.B. Saunders & Co.
	• Hoar, W.S. (1983).*General and Comparative Physiology*-Prentice Hall Publication).
	• Hurtkar, P.C. & Mathur, P.N. (1976). *A textbook of Animal Physiology*. S Chand & Co.
	• Turner, C.D. & Gangara, J.T. (1971). *General Endocrinology* - W. B. Saunders & Co.
	• Soni, KC (2001). *Animal Physiology and Immunology*, Hindi Edition, Jaipur: College book centre, Chaura Rasta.
	• Pawar, VS (2001). *Mammalian Endocrinology and Animal Behavior*, Hindi Edition, Jaipur: College book centre, Chaura Rasta.

B.Sc.B.Ed. II Year				
COURSE CODE:	BSCBED-254 c III		COURSE TYPE : CORE	
COURSE TITLE :	**Evolution and Palentology**			
MAX.MARKS:	50	MIN.PASS MARKS		20
THEORY EXAMINATION:	40	MIN.PASS MARKS		16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS		4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR			
EXAMINATION	**TERM END EXAMINATION**		**MONTHLY TEST**	
DURATION	**03 HR**		**01 HR**	

Objective :

- To learn about Origin of life, Molecular basis of evolution and Variation.
- To learn about get familiar with concepts of species/subspecies/sibling, Isolation, Embryology and Paleontology.
- To learn about apply the Theories of evolution in understanding of real life.
- To learn about the Mimicry and protective coloration

Learning Out Come:- After completion of the course, student-teachers will be able:

- Know about Origin of life, Molecular basis of evolution and Variation.
- Get familiar with concepts of species/subspecies/sibling, Isolation, Embryology and Paleontology.
- Apply the Theories of evolution in understanding of real life.
- Learn the Mimicry and protective coloration.

UNIT-1 TEACHING HOURS (15)	- **Origin of life** (Abiogenesis and biogenesis): Evidence in favor of evolution: Evidences from morphology and comparative anatomy, Embryology and Paleontology. Molecular basis of evolution.
UNIT-2 TEACHING HOURS (15)	- **Theories of evolution:** Lamarckism, inheritance of acquired characters and Neo-Lamarckism. Darwinism, theory of natural selection and Neo Darwinism, Mutation theory of Hugo de Vries, Weismann theory of germplasm, Recapitulation theory.
UNIT-3 TEACHING HOURS (15)	- **Variation:** Kinds, sources of variation, origin of new mutations. - **Isolation:** Definition, mechanism and role of isolation in evolution. - **Adaptation:** Introduction, kinds (structural, physiological and behavioural), Mimicry and protective coloration: Definition, kinds, condition necessary for mimicry, significance, divergent evolution, convergent evolution,
UNIT-4 TEACHING HOURS (15)	- **Origin of species:** Concept of species/subspecies/sibling, Factors causing genetic divergence in the population of species, genetic drifts, Bottle Neck effect founder's effect. - Zoogeographical distribution of animals, geological time scale, eras origin and evolution of amphibian, reptiles, birds and mammals.

UNIT-5 TEACHING HOURS (15)	• Introduction, formation, kinds, determination of age of fossil and its significance. • Dinosaurs, fossil evidence & reasons for extinction of dinosaurs. • **Evolution of man:** Time of origin, compelling causes, ancestor of man, evolution from apes and evolutionary trends.
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**

CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)

Details of Continuous and Comprehensive Assessment (CCA) are as follows:

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10

Total 160 marks equivalent reduced to CCA original marks 30.

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one months.**
SELECTED READINGS	• Becker, J. B., Breedlove, S. M., Crews, D., & McCarthy, M. M. (Eds.). (2002). *Behavioral endocrinology*. Mit Press. • Blackwelder, R. E., & Blackwelder, R. E. (1967). *Taxonomy: a text and reference book* (No. QL351 B54). New York: Wiley. • Cope, E. D. (1904). *The primary factors of organic evolution*. Open Court.

	• Darlington, C. D. (1969). *The evolution of man and society* (p. 69ff). New York: Simon and Schuster.
	• Gilbert, W. (1986). *Origin of life: The RNA world. Nature*, *319* (6055), 618-618.
	• Haeckel, E. (1897). *The evolution of man* (Vol. 1). D. Appleton.
	• Harvey, P. H., & Pagel, M. D. (1991). *The comparative method in evolutionary biology* (Vol. 239). Oxford: Oxford university press.
	• Küppers, B. O. (1990). *Information and the Origin of Life*. Mit Press.
	• Nelson, R. J. (2005). *An introduction to behavioral endocrinology.* Sinauer Associates.
	• Provine, W. B. (1989). *Sewall Wright and evolutionary biology.* University of Chicago Press.
	• Rose, M. R. (1994). *Evolutionary biology of aging*. Oxford University Press on Demand.
	• Spencer, H. (1887). *The factors of organic evolution*. D. Appleton.
	• Washburn, S. L. (1978). *The evolution of man*. *Scientific American*, *239*(3), 194-211.

120

Duration: 4 HR.   **Maximum Marks - 50**

Learning outcome: -

- To develop in the student the skills of staining and mounting of materials (temporary and permanent) and of dissection, display and labeling as per UGC guidelines; Cadaver or otherwise collection, preservation, mounting, identification and labeling of specimens as per UGC guidelines: Field observation of animals. To enable students to develop the skills of hematology and endocrinology.

Course Content

- Study of Museum specimen with respect to levels and patterns of organization, biosystematics, biodiversity, adaptations, development stages, population dynamics, ecological implications ets.

- Hemichordata:*Balanoglossus*.

- *Urochordata: Herdmania, Pyrosoma*

- *Cephalochordata: Petromyzon, Myxine*

- *Cyclostomata: Petromyzon, Myxine*

- *Pisces: Scoliodon, Sphyrna, Torpedo, Pristis, Trygon Lepidosteus, Clarias, Ophiocephalus, Anabas. Exocoetus, Hippocampus, Tetradon, Protopterus*

- *Amphibia: Icthyophis, Necturus, Proteus, Ambystoma, Axolotl larva, Triturus. Amphiuma, Alytes Bufo,Hyla,Rana.*

- *Reptilia: Testudo, Trionyx, Sphenodon, Hemidactylus, Draco, Calotes, Chamaeleon, Varanus, Heloderma, Typhlops, Eryx, Hydrophis, Viper, Bungarus, Naja Alligator,*

- *Aves: Pavo, Columba, Psitacula, Passer, Corvus, Archaeopteryx.*

- *Mammals: Ornithorhynchus, Echidna, Macropus, Loris, Manis, Rattus.*

Study of Permanent Sildes

- *Balanoglossus:* T.S. of proboscis, collgar region and trunk

- *Amphioxus:*T.S. or oral hood, pharynx.

- *Mammals:* T.S., skin Stomach, Duodenum, IIeum, liver, Pancreas, spleen, lung, kindney Testis, Ovary.

- Study of skull bone of Frog, Varanus, Bird and Rabbits.

- Study of vertebral of Frog.Varanus, Bird and Rabbit.

- Study of girdles, forelimb and hind limb bones of Frog, Varanus, Bird and Rabbit.

- Dissections and/or its demonstration tHRough Charts / Models/Video/CD/digital alternatives etc and/or preparation of working

- Models of the different system of the following animals.

- *Scoliodon:* Afferent brachial systems, efferent branchial system, cranialnerves and internal ear.

- Frog: Anatomy, digestive, system, Urino-genital system

- Permanet /Temporary preparation of the follwing-:

- Scales: Placoid, Cycloid

- Blood film of any vertebrate

- Filoplumes of birds
- Thigh muscles of frog
- Estimation of Hemoglobin.
- Enumeration of RBC in blood samples.
- Enumeration of WBC in blood samples.
- Preparation of Haemin Crystals.
- Effect of different concentrations of NaCI on RBC.
- Measurement of blood pressure, Heart beat and Pulse rate.
- Study of bleeding time, Coagulation time of blood.
- Study of Histological slides of the following endocrine gland of mammal testis, ovary, thyroid, adrenal, pituitary, Islets of Langerhans

Note:
- Use of animals of materials for dissection or otherwise is subject to the condition that these are not banned under the Wildlife Protection Act.
- Report on study of animals from their natural habitat from their local surroundings or as assigned.

Guidelines/Instructions for Practical Examination
Time allowed: 4 HRMax.Marks: 50

S. No.	Exercise	Marks
1.	Dissection* (Exposition, labeled diagram)	**6**
2.	Temporary mounting –one (Staining, identification, sketch	**3**
3.	Museum specimens – four or six (identification and classification	**12**
4.	Permanent slides – two or four (Identification with reasons)	**4**
5.	Osteology	**3**
6.	Physiological exercise	**5**
7.	Practical record and slides	**5**
8.	Viva	**4**
9.	Project report assignment	**8**

* as per UGC guidelines

B.SC.B.ED. II Year				
COURSE CODE:	**BSCBED-254 d I**		COURSE TYPE : CORE	
COURSE TITLE :	**Diversity of Seed Plants (Gymnosperm, Angiosperm and Plant breeding)**			
MAX.MARKS:	50	MIN.PASS MARKS		20
THEORY EXAMINATION:	40	MIN.PASS MARKS		16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS		4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR			
EXAMINATION	TERM END EXAMINATION		MONTHLY TEST	
DURATION	3 HR		1 HR	

Objective :
- To learnaboutCharacteristics, Origin and evolution of seed plants.
- To learnaboutget familiar with General features of gymnosperms.
- To learnaboutapply the principles of Asymptotes, multiple points, curve tracing in real situations.
- To learn about morphology and anatomy of vegetative and reproductive parts.

Learning Out Come: After completion of the course, student-teachers will be able:
- Know aboutCharacteristics, Origin and evolution of seed plants.
- Get familiar with General features of gymnosperms.
- Apply the principles of Asymptotes, multiple points, curve tracing in real situations.
- Learn Morphology and anatomy of vegetative and reproductive parts.

UNIT-1 TEACHING HOURS (15)	**Characteristics of seed plants,(Gymnosperm & Angiosperm**), Homospory, Heterospory & orgion of Seed Plants,Evoulation & Diversity of Gymnosperms,Fossil and Living seed Plants,Fossil Gymnosperms.(williamsonia)
UNIT-2 TEACHING HOURS (15)	**Angiosperms:** Origin and Evolution,Primitive Angiosperms. Diversity in Plant Forms-annuals, Biennials and Perennials,Convergence of Evolution of Tree Habit inGymnosperms, Monocotyledons and Dicotyledons,
UNIT-3 TEACHING HOURS (15)	General features of Gymnosperms, Distribution and Their **Classification**,Morphology and Anatomy of **Vegetative and Reproductive** Parts and Life Cycle of Cycas.
UNIT-4 TEACHING HOURS (15)	Morphology and Anatomy of **Vegetative and reproductive** Parts and life cycle of PinusandEphedra, Economic importance of Gymnosperms
UNIT-5 TEACHING HOURS (15)	Principles ofPlant breeding, Methods ofBreeding, Introduction and Acctimatisation, Selection(mass, purelme, and clonal), Hydridizaion, pedi-gree analysis, Hybrid vigour, use of mutation and Polyploidy in breeding.

TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10

Total 160 marks equivalent reduced to CCA original marks 30.

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. However the Unviersitymay revise the syllabus at any time during the running year after giving a notice for a period one months.**
SELECTED READINGS	• Bhatnagar, A.P. and Moitra, A. (1996). Gymnosperms. New Delhi: New Age International Limited. • Gifford, E.M. and Foster, A.S. (1988). Morphology and Evolution of Vascular Plants. New York:W. H. Freeman & Company. • Singh, D. (2009). Diversity and Systematics of Seed Plants. Jaipur: Rastogi Publications. • Sporne, K.R. (1965). The Morphology of Gymnosperms. London: Hutchinson & Co. (Publishers) Ltd., London. Stewart, W. M. (1983). Paleobotany and the Evolution of Plants. Cambridge University Press. Cambridge. • Van Balgooy, M. M. J. (1997). Malesian seed plants (Vol.1). Rijksherbarium/Hortus Botanicus.

B.Sc.B.Ed. II Year			
COURSE CODE:	**BSCBED-254 d II**	COURSE TYPE : CORE	
COURSE TITLE :	**Systematics of Angiosperms**		
MAX.MARKS:	50	MIN.PASS MARKS	20
THEORY EXAMINATION:	40	MIN.PASS MARKS	16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS	4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR		
EXAMINATION	TERM END EXAMINATION	MONTHLY TEST	
DURATION	3 HR	1 HR	

Objective:

- TO Learn about the continuity and differentiability of vector functions, unit tangent vector.
- TO Learnget familiar with concepts of artificial, natural and phylogenetic system of classification.
- TO Learnapply the principles of Principles and rules of ICBN in real situations.
- To Learn about the Botanical Nomenclature.
- To learn about develop Herbarium and identified on the bases of diversity of flowering plants as illustrated by members of the families.

Learning Out Come:- After completion of the course, student-teachers will be able:

- Know about the Continuity and differentiability of vector functions, unit tangent vector.
- Get familiar with concepts of artificial, natural and phylogenetic system of classification.
- Apply the principles of Principles and rules of ICBN in real situations.
- Learn the Botanical Nomenclature.
- Develop Herbarium and identified on the bases of diversity of flowering plants as illustrated by members of the families.

UNIT-1 TEACHING HOURS (15)	• **Angiosperm taxonomy**: Brief history, aims and fundamental concepts of artificial, natural and phylogenetic system of **classification, Bentham & Hooker, Engler & Prantle and Hutchinson, system of classification**. • **Herbarium; Tools and techniques, important herbaria and botanical gardens of India and their importance.**
UNIT-2 TEACHING HOURS (15)	• **Botanical Nomenclature: Principles and rules of ICBN**, type of concept, taxonomical categories, principle of priority, identification keys, floras.
UNIT-3 TEACHING HOURS (15)	• Diversity of flowering plants as illustrated by members of the families–**Brassicaceae, Malvaceae**, Rutaceae, and **Fabaceae(Lotoidae, Caesalpinoidae, and Mimosoidae) Apiaceae.**
UNIT-4 TEACHING HOURS (15)	• Diversity of Flowering plants as illustrated by members of the families–Ranunculaceae,Apocynaceae, Asclepiadaceae, **Asteraceae, Solanaceae,** and Lamiaceae.

UNIT-5 TEACHING HOURS (15)	• Diversity of flowering plants as illustrated by members of the families–Amaranthaceae, Cucurbitaceae, Euphorbiaceae, **Liliaceae**, and **Poaceae.**
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**

CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)

Details of Continuous and Comprehensive Assessment (CCA) are as follows:

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10

Total 160 marks equivalent reduced to CCA original marks 30.

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals**.**
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one months.**
SELECTED READINGS	• Davis, P.H. and Heywood, V.H. (1963). Principles of Angiosperm Taxonomy. Oliver and Boyd, London. • Heywood, V.H. and Moore, D.M. (eds.) (1984). Current Concepts in Plant Taxonomy. Academic Press. London. • Jaffrey, C, (1982). An Introduction to Plant Taxonomy, Cambridge University Press, Cambridge, London. • Jones, S.B., Jr. and Luchsinger, A.E. (1986). Plant Systematics (2nd edition). Mc Graw-Hill Book Co., New York.

	• Maheshwari, J.K. (1963). Flora of Delhi, CSIR, New Delhi. • Radrord, A.E. (1986). Fundamentals of Plant Systematics. Harper and Row, New York. • Singh, F. (1999). Plant Systematics: theory and Practice. Oxford and IBH Pvt. Ltd., New Delhi.

B.Sc.B.Ed. II Year				
COURSE CODE:	**BSCBED-254 d III**		COURSE TYPE : CORE	
COURSE TITLE :	**Plant Cell Biology and Genetics**			
MAX.MARKS:	50	MIN.PASS MARKS		20
THEORY EXAMINATION:	40	MIN.PASS MARKS		16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS		4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR			
EXAMINATION	TERM END EXAMINATION		MONTHLY TEST	
DURATION	3 HR		1 HR	

Objective:

- To learn about the Ultrastructure of cell and cell organelles.
- To learn about get familiar with concepts of Chromosome organization and genetic expression.
- To learn apply the principles of Mendal's law of inheritance, Linkage and crossing over; allelic and non-allelic interactions in real situations.
- To learnabout the Nuclear and extra nuclear genetic material.

Learning Out Come: After completion of the course, student-teachers will be able:

- To know about the Ultrastructure of cell and cell organelles.
- To get familiar with concepts of CHRomosome organization and genetic expression.
- To apply the principles of Mendal's law of inheritance, Linkage and crossing over; allelic and non-allelic interactions in real situations.
- To learn the Nuclear and extra nuclear genetic material.

UNIT-1 TEACHING HOURS (15)	• **Ultrastructure of cell and cell organelles:**Cell wall, Plasma membrane, Golgi Complex, endoplasmic reticulum, Lysosomes, Ribosomes, peroxisomes, vacuoles, mitochondria, chloroplast, nucleus.
UNIT-2 TEACHING HOURS (15)	• **Chromosome organization:Structure/Morphology**, centromere and telomere; **cHRomosome aberrations** – deletions, duplication, inversions and translocations; Variations in cHRomosome number – aneuploidy, euploidy, sex cHRomosomes. **Cell division**; **Cell cycle and Mitosis and meiosis.**
UNIT-3 TEACHING HOURS (15)	• **Nuclear and extra nuclear genetic material: DNA structure;Replication**; DNA protein interaction; nucleosome model; **Genetic code**; satellite and repetitive DNA; mitochondrial and plastid DNA; plasmid; gene mapping.
UNIT-4 TEACHING HOURS (15)	• **Gene expression**: Structure of gene; transfer of genetic information; proteins. Structure and classification; **transcription; translation; regulation of gene expression in prokaryotes and eukaryotes.**

UNIT-5 TEACHING HOURS (15)	• **Genetic inheritance: Mendelism, Mendal's law of inheritance, Linkage and crossing over; allelic and non-allelic interactions.** Genetic variations: Mutations - spontaneous and induced; transposable genetic elements; DNA damage and repair. • **Mean,Mode,Median**, **Standard deviation**,*Tabular and graphical representation of data table, histogram, Pie diagram, bar diagram, line graph*
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10

Total 160 marks equivalent reduced to CCA original marks 30.

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISE OF SYLLABUS	**1.ANNUAL** **2.However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one months.**
SELECTED READINGS	• Alberts, B., Bray, D., J., Raff, M., Roberts, K and Watson, I. D. 2001. Molecular Biology of Cell Garland, publishing Co. Inc., New York, USA. • Atherely,.G., Girton, J. R. and McDonald, J. F. 1999. The Science of Genetics Saunders College Publishing, Fort Worth, USA. • Gupta, P.K. 1999. A Textbook of Cell and Molecular Biology. Rastogi Publications, Meerut. • Kleinsmith, L. J. and Kish. V.M. 1995, Principles of Cell and

Molecular Biology (3rd edition). Harper Collins College Publishers, New York, USA.
- Lodish, H., Berk, A., Aipursky, S.L., Matsudaira, P., Baltimore, D. and Darnell, J.2000. Molecular Cell Biology. W.H. Freeman & Co. New York, USA. Russel, P. J. 1998. enetics. The Benjamin/Cummings Publishing Co. Inc., USA.
- Snustad, D.P. and Simmons, M. J. 2000. Principles of Genetics. John Wiley & Sons, Inc., USA.
- Stent, G.S. 1986. Molecular Genetics. CBS Publications, Delhi.

BOTANY-PRACTICALS:-II
Duration: 4 hours   MAX.MARKS: 50   Min. Pass Marks : 20
Practical List

Gymnosperms:

1. **Cycas**
   Habit, armour of leaf bases on the stem, very young leaf (circinate vernation) and old foliage leaves, scale leaf, bulbils, male cone, microsporophyll, megasporophyll, and mature seed. Study tHRough temporary micro preparations or permanent slides – normal root, coralloid root, stem, rachis, leaflet, microsporophyll, pollen grains, and ovule.

2. **Pinus**
   Habit, long and dwarf shoot showing cataphylls and scale leaves, T.S. wood showing growth rings, male cones, female cones, and winged seeds.
   Study tHRough temporary micro preparations and/or permanent slides – stem (young and old), needle, pollen grains, root, female cone, ovule, embryo (W.M.) showing polycotyledonous condition.

3. **Ephedra**
   Habit and structure of whole male and female cones.
   Temporary micro preparations and/or permanent slides of node, internode, macerated stem to see vessel structure; epidermal peel mount of vegetative parts to study stomata, male cone, female cone, and pollen grains.

4. **Angiosperms**
   Familiarity with the terms used in technical description of plants. Study of representative plants of families included in the syllabus.

5. **Cyto-genetics**

   1. Study of cell structure from onion leaf peels; demonstration of staining and mounting methods.
   2. Comparative study of cell structure in onion cells, Hydrilla and Spirogyra. Study of cyclosis in Tradescantia, staminal hairs.
   3. Study of plastids to examine pigment distribution in plants (e.g., Cassia, Lycopersicon and Capsicum).
   4. Examination of electron micrographs of eukaryotic cells with special reference to organelles.
   5. Study of electron micrographs of viruses, bacteria, cyanobacteria and eukaryotic cells for comparative cellular organization.
   6. Examination of various stages of mitosis and meiosis using appropriate plant material

(e.g. onion root tips, onion flower buds),.

7. Preparation of karyo types from dividing root tip cells and pollen grains.
8. Cytological examination of special types of cHRomosomes: bar body, lamp brush and polytene cHRomosomes.
9. Working out the laws of inheritance using seed mixtures.
10. Working out the mode of inheritance of linked genes from test cross and or F2 data.
11. Mean, Mode, Median, Standard deviation, Tabular and graphical representation of data table, histogram, Pie diagram, bar diagram, line graph.

B.Sc.B.Ed. II Year			
COURSE CODE:	**BSCBED-254e-I**		COURSE TYPE : CORE
COURSE TITLE :	**Abstract Algebra**		
MAX.MARKS:	67	**MIN.PASS MARKS**	27
THEORY EXAMINATION:	60	**MIN.PASS MARKS**	24
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	7	**MIN.PASS MARKS**	3
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR		
EXAMINATION	TERM END EXAMINATION		MONTHLY TEST
DURATION	3 HR		1 HR

Objectives

- This course is designed to give students a foundation for all future mathematics courses. The fundamentals of algebraic problem-solving are explained. Students will explore: foundations of Algebraic structures, Groups, Rings, Ideals, Fields, Homomorphism etc. The course also fulfills the objective to make students aware of the applicability of abstract mathematics in real world problems.

Learning Outcomes: The course will enable the students to:

- Recognize the mathematical objects called groups.
- Link the fundamental concepts of groups and symmetries of geometrical objects.
- Explain the significance of the notions of cosets, normal subgroups, and factor groups.
- Analyze consequences of Lagrange's theorem.
- Learn about structure preserving maps between groups and their consequences.
- Know the fundamental concepts in ring theory such as the concepts of ideals, quotient rings, integral domains, and fields.
- Learn in detail about polynomial rings, fundamental properties of finite field extensions, and classification of finite fields.

UNIT-1 TEACHING HOURS (12)	• Symmetries of a square, Definition and examples of groups including dihedral, permutation and quaternion groups, Elementary properties of groups. Subgroups and examples of subgroups, Cyclic groups, Properties of cyclic groups, Lagrange's theorem, Euler phi function, Euler's theorem, Fermat's little theorem.
UNIT-2 TEACHIGN HOURS (12)	• Properties of cosets, Normal subgroups, Simple groups, Factor groups, Cauchy's theorem for finite abelian groups; Centralizer, Normalizer, Center of a group, Product of two subgroups; Classification of subgroups of cyclic groups. Cycle notation for permutations, Properties of permutations, Even and odd permutations, alternating groups, Cayley's theorem and its applications.
UNIT-3 TEACHING HOURS (12)	• Group homomorphisms, Properties of homomorphisms, Group isomorphisms, Properties of isomorphisms; First, second and third isomorphism theorems for groups.

UNIT-4 TEACHING HOURS (12)	• Definition, examples and elementary properties of rings, Commutative rings, Integral domain, Division rings and fields, Characteristic of a ring, Ring homomorphisms and isomorphisms, Ideals and quotient rings. Prime, principal and maximal ideals, Relation between integral domain and field, Euclidean rings and their properties, Wilson and Fermat's theorems.
UNIT-5 TEACHING HOURS (12)	• Polynomial rings over commutative ring and their basic properties, The division algorithm; Polynomial rings over rational field, Gauss lemma and Eisenstein's criterion, Euclidean domain, principal ideal domain, and unique factorization domain. Extension of a field, Algebraic element of a field, Algebraic and transcendental numbers, Perfect field, Classification of finite fields.
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**

CONTINUOUS &COMPREHENSIVE ASSESSMENT (CCA)

Details of Continuous and Comprehensive Assessment (CCA) are as follows:

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10
Total 160 marks equivalent reduced to CCA original marks 30.		

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISE OF SYLLABUS	1. ANNUAL 2. HOWEVER, THE UNIVERSITYmay revise the syllabus at any time during the running year after giving a notice for a period one months.

SELECTED READINGS	• Herstein, (1975).Topics In Algebra: Wiley Eastern, New Delhi, • Khanna V.K. And S.K. Bhambri, (1998).A Course In Abstract Algebra: Vikas Pub. House, New Delhi, 2nd Rev. Ed. 1998. • Vashistha, A.R. (1971). Modern Algebra: Krishna Prakashan Mandir, Meerut, 2ndrev.Ed. • Artin, M. (1991) Algebra: Prentice Hall. • Bhattacharya, P. B., Jain, S. K. & Nagpaul, S.R. (2003). Basic Abstract Algebra (2nd edition). Cambridge University Press. • David S. Dummit & Richard M. Foote (2008). Abstract Algebra (2nd edition). Wiley. • John B. Fraleigh (2007). A First Course in Abstract Algebra (7th edition). Pearson. • Joseph A. Gallian (2017). Contemporary Abstract Algebra (9th edition). Cengage. • Gopalakrishnan, N. S. (1986). University Algebra, New Age International Publishers. • Thomas W. Hungerford (2004). Algebra (8th edition). Springer. • Nathan Jacobson (2009). Basic Algebra I & II (2nd edition). Dover Publications. • Serge Lang (2002). Algebra (3rd edition). Springer-Verlag. • Luthar, I. S. & Passi, I. B. S. (2013). Algebra: Volume 1: Groups. Narosa. • Luthar, I. S. & Passi, I. B. S. (2012). Algebra: Volume 2: Rings. Narosa.

B.Sc. B.Ed. II Year				
COURSE CODE:	**BSCBED-254e-II**		COURSE TYPE : CORE	
COURSE TITLE :	**Real Analysis**			
MAX.MARKS:	67	MIN.PASS MARKS		27
THEORY EXAMINATION:	60	MIN.PASS MARKS		24
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	7	MIN.PASS MARKS		3
ATTENDANCE ELIGIBILITY	80PERCENT IN RESPECTIVE YEAR			
EXAMINATION	TERM END EXAMINATION		MONTHLY TEST	
DURATION	3 HR		1 HR	

Objective

- This course is designed to provide a deeper and rigorous understanding of fundamental concepts viz. continuous functions, sequences and series of numbers as well as functions, and the Riemann integral etc. The main focus of this course will be on theoretical foundation of the above said concepts and it will cultivate the rigorous mathematical logics and skills in the students.

Learning Outcomes: This course will enable the students to:

- Understand many properties of the real line R and learn to define sequence in terms of functions from R to a subset of R.
- Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence.
- Apply the ratio, root, and alternating series and limit comparison tests for convergence and absolute convergence of an infinite series of real numbers.
- Learn some of the properties of Riemann integrable functions, and the applications of the fundamental theorems of integration.
- Learn the Uniform convergence of series of function and fundamental theorem of integral calculus, Mean value theorems of integral calculus.

UNIT-1 TEACHING HOURS (12)	**Real Number System** Algebraic and order properties of $\mathbb{R}$, Absolute value of a real number; Bounded above and bounded below sets, Supremum and infimum of a nonempty subset of $\mathbb{R}$, The completeness property of $\mathbb{R}$, Archimedean property, Density of rational numbers in $\mathbb{R}$, Definition and types of intervals, Nested intervals property; Neighborhood of a point in $\mathbb{R}$, Open, closed and perfect sets in $\mathbb{R}$, Connected subsets of $\mathbb{R}$, Cantor set and Cantor function.
UNIT-2 TEACHIGN HOURS (12)	**Sequences of Real Numbers** Convergent sequence, Limit of a sequence, Bounded sequence, Limit theorems, Monotone sequences, Monotone convergence theorem, Subsequences, Bolzano-Weierstrass theorem for sequences, Limit superior and limit inferior of a sequence of real numbers, Cauchy sequence, Cauchy's convergence criterion.
UNIT-3 TEACHING HOURS (12)	**Infinite Series** Convergence and divergence of infinite series of positive real numbers, Necessary condition for convergence, Cauchy criterion for convergence; Tests for convergence of positive term series; Basic comparison test, Limit comparison test, D'Alembert's ratio test, Cauchy's nth root test, Integral test; Alternating series, Leibniz test, Absolute and conditional convergence, Rearrangement of series and Riemann's theorem.

UNIT-4 TEACHING HOURS (12)	**Riemann Integration** Riemann integral, Integrability of continuous and monotonic functions, Fundamental theorem of integral calculus, First mean value theorem, Bonnet and Weierstrass forms of second mean value theorems.
UNIT-5 TEACHING HOURS (12)	**Uniform convergence and Improper integral** Pointwise and uniform convergence of sequence and series of functions, Weierstrass's M-test Dirichlet test and Abel's test for uniform convergence, Uniform convergence and continuity, Uniform convergence and differentiability, Improper integrals, Dirichlet test and Abel's test for improper integrals.
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10

Total 160 marks equivalent reduced to CCA original marks 30.

EXAMINATION PATTERN	**Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.**
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. HOWEVER, THE UNIVERSITYmay revise the syllabus at any time during the running year after giving a notice for a period one months.**
SELECTED READINGS	• Malik, S.C. (2004) Mathematical Analysis: New Age International, New Delhi. • Apostol, T.M. (1985) Real Analysis: Narosa Publishing House, New Delhi. • Royden, H.L. (1993).Real Analysis: Macmillan, 4th Edition.

| | • Rudin, W. (1976).Principles Of Mathematical Analysis: Mcgraw Hill, 3rd Edition 1976.
• Robert G. Bartle & Donald R. Sherbert (2015). Introduction To Real Analysis (4th Edition).Wiley India.
• Gerald G. Bilodeau, Paul R. Thie & G. E. Keough (2015). An Introduction To Analysis (2nd Edition), Jones And Bartlett India Pvt. Ltd.
• Ross, K. A. (2013). Elementary Analysis: The Theory Of Calculus (2nd Edition). Springer. |

B.Sc. B.Ed. I YearI				
COURSE CODE:	**BSCBED-254e-III**	COURSE TYPE : CORE		
COURSE TITLE :	**Differential Equations**			
MAX.MARKS:	66	MIN.PASS MARKS		27
THEORY EXAMINATION:	60	MIN.PASS MARKS		24
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	6	MIN.PASS MARKS		3
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR			
EXAMINATION	TERM END EXAMINATION		MONTHLY TEST	
DURATION	3 HR		1 HR	

Objective

- The Objective of this course is to introduce ordinary and partial differential equations and fundamental theorems for existence and uniqueness. This course further explains the analytic techniques in computing the solutions of various differential equations appearing in various fields of science and technology.

Learning Outcomes: The course will enable the students to:

- Understand the genesis of ordinary differential equations.
- Learn various techniques of getting exact solutions of solvable first order differential equations and linear differential equations of higher order.
- Know Picard's method of obtaining successive approximations of solutions of first order differential equations, passing tHRough a given point in the plane and Power series method for higher order linear equations, especially in cases when there is no method available to solve such equations.
- Grasp the concept of a general solution of a linear differential equation of an arbitrary order and also learn a few methods to obtain the general solution of such equations.
- Apply a range of techniques to solve first & second order partial differential equations.
- Model physical phenomena using partial differential equations such as the heat and wave equations.

UNIT-1 **TEACHING HOURS (10)**	**First Order Differential Equations** Basic concepts and genesis of ordinary differential equations, Order and degree of a differential equation, Differential equations of first order and first degree, Equations in which variables are separable, Homogeneous equations, Linear differential equations and equations reducible to linear form, Exact differential equations, Integrating factor, First order higher degree equations solvable for x, y and p. Clairaut's form and singular solutions. Picard's method of successive approximations and the statement of Picard's theorem for the existence and uniqueness of the solutions of the first order differential equations. Orthogonal trajectories.

UNIT-2 **TEACHIGN HOURS (16)**	**Second Order Linear Differential Equations** Statement of existence and uniqueness theorem for linear differential equations, General theory of linear differential equations of second order with variable coefficients, Solutions of homogeneous linear ordinary differential equations of second order with constant coefficients, Transformations of the equation by changing the dependent/independent variable, Method of variation of parameters and method of undetermined coefficients, Reduction of order, Coupled linear differential equations with constant coefficients. **Higher Order Linear Differential Equations** Principle of superposition for a homogeneous linear differential equation, Linearly dependent and linearly independent solutions on an interval, Wronskian and its properties, Concept of a general solution of a linear differential equation, Linear homogeneous and non-homogeneous equations of higher order with constant coefficients, Euler-Cauchy equation, Method of variation of parameters and method of undetermined coefficients, Inverse operator method.
UNIT-3 **TEACHI NG HOURS (10)**	**Series Solutions of Differential Equations** Power series method, Legendre's equation, Legendre polynomials, Rodrigue's formula, Orthogonality of Legendre polynomials, Frobenius method, Bessel's equation, Bessel functions and their properties, Recurrence relations.
UNIT-4 **TEACHING HOURS (10)**	**First Order Partial Differential Equations** Family of surfaces in tHRee dimensions and formulation of partial differential equations; Order and degree of Partial differential equations (PDE), Concept of linear and non-linear partial differential equations, Solution of quasi-linear partial differential equations of the first order, Cauchy's method of characteristics; Partial differential equations of the first order, Lagrange's method, Some special type of equation which can be solved easily by methods other than the general method, Charpit's general method.
UNIT-5 **TEACHING HOURS (14)**	**Second Order Partial Differential Equations** Classification of linear partial differential equations of second order, Homogeneous and non-homogeneous equations with constant coefficients. Second Order Partial Differential Equations with Variable Coefficients, Partial differential equations reducible to equations with constant coefficient, Second order PDE with variable coefficients, Classification of second order PDE, Reduction to canonical or normal form; Monge's method; Solution of heat and wave equations in one and two dimensions by method of separation of variables.

TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**

CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**		
	S. No.	CCA- Components	Max. Marks Allocation
	1.	Monthly test	20*3 Test=60
	2.	Quizzes and Assignments	10
	3.	Viva-voce	10
	4.	Seminar/Symposia	10
	5.	Report writing	10
	6.	Workshop	10
	7.	Review of literature	10
	8.	Creativity/Innovation	10
	9.	Experimental Skill	10
	10.	Co-curricular activity	10
	11.	Attendance	10
	Total 160 marks equivalent reduced to CCA original marks 30.		

EXAMINATION PATTERN	**Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.**
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one months.**
SELECTED READINGS	• Boyce, W. E., Diprima, R. C., & Meade, D. B. (2017). Elementary Differential Equations. John Wiley & Sons. • Mao, X. (1994). Exponential Stability Of Stochastic Differential Equations. Marcel Dekker. • Hale, J. K. (1971). Functional Differential Equations. In Analytic Theory Of Differential Equations (Pp. 9- 22). Springer, Berlin, Heidelberg. • Sewell, G. (2005). The Numerical Solution Of Ordinary And Partial Differential Equations (Vol. 75). John Wiley & Sons. • Yakubov, Y., & Yakubov, S. (1999). Differential-Operator Equations: Ordinary And Partial Differential Equations (Vol. 103). Crc Press. • Fox, L. (2014). Numerical Solution Of Ordinary And Partial Differential Equations: Based On A Summer School Held In Oxford, August-September 1961. Elsevier. • Coddington, E. A. (2012). An Introduction To Ordinary Differential Equations. Courier Corporation.

THIRD YEAR

Course code	Title of the course	EVALUATION			
		External	**Internal**	**Practical**	Total
BSCBED-350	ICT in Education*	**70**	**30**		**100**
BSCBED-351	Gender. School & Society	**35**	**15**		**50**
BSCBED-352	Creating an Inclusive School	**35**	**15**		**50**
BSCBED-353	Educational aspects of Geeta	**35**	**15**		**50**
BSCBED-354	Pedagogy of School subject-I				
BSCBED-354-I	Mathematics	**35**	**15**		**50**
BSCBED-354-II	General Science	**35**	**15**		**50**
BSCBED-354-III	Chemistry	**35**	**15**		**50**
BSCBED-354-IV	Biology	**35**	**15**		**50**
BSCBED-354-V	Physics	**35**	**15**		**50**
BSCBED-355	**Content: (BCZ& PCM)**				
BSCBED-355 a I	1. Physics I	**40**	**10**	**50**	**150**
BSCBED-355 a II	2. Physics II	**40**	**10**		
BSCBED-355 b I	3. Chemistry I	**40**	**10**	**50**	**150**
BSCBED-355b II	4. Chemistry II	**40**	**10**		
BSCBED-355 c I	5. Zoology I	**40**	**10**	**50**	**150**
BSCBED-355 c II	6. Zoology II	**40**	**10**		
BSCBED-355 d I	7. Botany I	**40**	**10**	**50**	**150**
BSCBED-355 d II	8. Botany II	**40**	**10**		
BSCBED-355 e I	9. Mathematics I	**60**	**15**		**150**
BSCBED-355e II	10. Mathematics II	**60**	**15**		
	CCA				**25**
Prayer, Yoga, Meditation & Festival etc					**25**
Internship (4 Weeks)					**50**
Total					**750**

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B.Sc.B.Ed. III Year			
COURSE CODE:	**BSCBED-330**	**COURSE TYPE: CORE**	
COURSE TITLE:	**ICT in Education (Compulsory)**		
MAX.MARKS:	**100**	MIN. PASS MARKS:	**40**
THEORY EXAMINATION	70	MIN. PASS MARKS:	28
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	30	MIN. PASS MARKS:	12
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives :
- To enable to understand the Role of ICT in education.
- To enable to understand Instructional Technology.
- To understand about the Multimedia techonolgy.
- To enable to understand Database Management System.
- To know about Internet and it's uses.
- Make to know about E-Commerce and E-Governance.

Learning outcomes: On the completion of the Course, the student teacher will be able to
- To acquaint the teacher educator with the knowledge of latest computer technology and its use in education.
- To acquaint the teacher educator with the various computer software packages available now a days.
- To develop the capabilities to analyse the educational data using computers and already developed software
- To train the teacher educators to computer science as a subject at Secondary level and Graduation/B.Ed. (Computing) level.
- To acquaint the students with Author ware package.
- To develop the skills of writing programs to analyse and process the statistical data.
- Recognise, understand and appreciate ICT as an effective learning tool for learners and as an enormous functional support to teachers.

UNIT-1 TEACHING HOURS	• Computer Fundamentals:Introduction to InformationTechnology, Generation of Computers, Types of computers: Micro, Mini, Mainframe, Super, Architecture of Computer System: CPU, ALU Primary Memory: RAM, ROM, Cache memory, Secondary Memories, Input/Output device, Pointing device. Number System (binary, octal, decimal and hexadecimal) and their conversions, Logic gates, Languages: machine, assembly and high-level languages including 3GL, 4GL.
UNIT-2 TEACHING HOURS	• Word Processing packages: Standard features like toolbar, word wrap, text formatting, paragraph formatting, effect to text, mail merge. • Spreadsheet Packages: Type of entries, Simple arithmetic calculations, formula and statistical functions, Different types of charts, Sorting, searching, formatting, printing.

	• Power point: - Slide creation, slide show, adding graphics, formatting, customizing and printing.
UNIT-3 TEACHING HOURS	• Multimedia techonolgy Introducing framework for multimedia devices, imae compression standrsa, JPEG, MPEG, MIDI formats. • Database Management System: Data, fileds and records, information database, creation of a database file, inserting, deletion and updating of records, modifying structure, editing and browsing of records, searching, sorting and indexing of records.
UNIT-4 TEACHING HOURS	• Concept of Operating System, need and types of operating systems: batch, single user, multiprocessing, and time sharing, introduction to Unix/Linux, Windows and its simple commands. • Type of networks, LAN, MAN and WAN, concept of topology, bridges, routers, gateways, modems, ISDN leased lines, teleconferencing and videoconferencing.
UNIT-5 TEACHING HOURS	• Internet: Concept, email services, www, web browsers, search engines, simple programs in HTML, type of HTML document, documents structures: element, type and character formatting, tables, frames and forms, E-mail. • E-Commerce: Concept of e-commerce, benefits and growth of e-commerce, e-commerce categories, e-Governance, EDI, electronic funds transfer on EDI networks Electronic payment system.
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**

CONTINUOUS&COMPREHENSIVEASSESSMENT (CCA)	Details of Continuous and Comprehensive Assessment (CCA) are as follows:		
	SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
	1	Monthly Test	10X6 Test =
	2	Presentation	10
	3	Group Discussion	10
	4	Debate	10
	5	Participation and Presentation in Seminar	10
	6	Report Writing	10
	7	Viva Voce	10
	8	Attendance*	10
	9	Co-curricular Activity	10
	10	Team Teaching	10

EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA)

CCA will be reduced to 30 marks or 15 marks (as per course weightage).

Formula: Marks obtained/Total marksX30

For example: $60 \div 160 \times 30 = 11.25$

PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.

PROVISO-II: Provided further that this will be mandatory for a candidate appear in the monthly test conducted in the respective course.

*Attendance in Lectures and Practical

Percentage	Marks Allotted
75% to 80%	02
81% to 85%	04
86% to 90%	06
91% to 95%	08
Above 96%	10

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	1. ANNUAL 2. HOWEVER, THE UNIVERSITYmay revise the syllabus at any time during the running year after giving a notice for a period one month.

SELECTED READINGS	

- Bott, E., Siechert, C., & Stinson, C. (2009). *Windows 7 inside out*. Pearson Education.

- Comer, D. E. (2018). *The Internet book: everything you need to know about computer networking and how the Internet works*. CRC Press.

- Emberton, D. J., & Hamlin, J. S. (2000). *Flash 4 magic*. New Riders Publishing.

- Geoghan, D. (2011). *Visualizing Technology, Introductory*. Delhi: Pearson Higher Ed.

- Melton, B., Dodge, M., Swinford, E., & Schorr, B. (2013). *Microsoft Office Home and Student 2013 Step by Step*. Pearson Education.

- Mohanty, L., & VoHRa, N. (2006). *ICT strategies for schools: A*

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guide for school administrators. SAGE Publishing India.
- Rathbone, A. (2012). *Windows 8 for dummies*. John Wiley & Sons.
- Saxena, J. (2008). *Role of Ict& Total Quality Management in Professional Education*. New Delhi: APH Publishing Corporatio.
- Shaikh, I. R. (2013). *Introduction to Educational Technology & ICT*. Tata McGraw-Hill Education.
- Solomon, G., & ScHRum, L. (2007). Web 2.0. *New tools, new schools. Eugene, Oregon, Washington, DC: ISTE*.
- Solomon, G., & ScHRum, L. (2007). *Web 2.0: New tools, new schools*. ISTE (Interntl Soc Tech Educ.

B.Sc.B.Ed. III Year			
COURSE CODE:	BSCBED-351	**COURSE TYPE: CORE**	
COURSE TITLE:	**Gender, School and Society**		
MAX.MARKS:	**50**	MIN. PASS MARKS:	**20**
THEORY EXAMINATION	35	MIN. PASS MARKS:	14
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15	MIN. PASS MARKS:	6
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives:

- To describe the concept of gender and sex.
- To describe the social construction of gender.
- To understand different types of gender roles.
- To understand Analysis the gender relationship matrix.
- To identify the division of gender and valuation of work based on gender.

Learning outcome: After completion of the course, student-teachers will be able -

- Develop basic understanding and familiarity with key concepts–gender, gender bias, gender stereotype, empowerment, gender parity, equity and equality, patriarchy and feminism.
- Understand the gradual paradigm shift from women's studies to gender studies and some important landmarks in connection with gender and education in the historical and contemporary period.
- Learn about gender issues in school, curriculum and textual materials across disciplines, pedagogical processes and its intersection with class, caste, religion and region.
- Understand how gender, power and sexuality are related to education (in terms of access, curriculum and pedagogy).
- Develop an understanding of the paradigm shift from women studies to gender studies, based on the historical backdrop.
- Student to construct critically the impact of policies programmes and scheme for promotion of gender equality and empowerment.
- Apply the conceptual tools learnt regarding gender and sexuality to understand issues related to Sexual Harassment at the workplace and Child Sexual Abuse.
- Develop an understanding of different theories on gender and education and relate it to power relations. The institutions involved in socialization processes would be analyzed to see how socialization practices impact power relations and identity formation.
- Understand how gender relates to education and schooling. The students will be able to understand on how school as an institution addresses gender concerns in curriculum, textual materials and pedagogy. It will enable the student to draw linkages between life skills and sexuality.

UNIT-1 **TEAACHINGHOURS (12)**	**Gender Issues an Introduction** • Meaning of Sex and Gender. • Key concept of Gender Studies. • Purpose of Gender Studies. • Gender socialization and Gender Roles. • Gender discrimination at Social, Cultural, Religious, Economic, Political, and Educational stage. **Assignment:** • Organize cultural seminars/symposia with school-students and prepare a report on gender equality. • Collect material related to Women Role Models in various fields with Emphasis on Women in Unconventional Roles and prepare a brief report. • Collect thoughts of Eminent Men and Women of India on Girls Education and Women's Empowerment.
UNIT-2 **TEACHING HOURS (12)**	**Gender Identities and Socialization Practices in** • Gender Identity: Definitions and concept. • Gender Identity and Socialization Practices in Family, School, and other formal and informal organizations. • Social construction of Gender. • Schooling of Girls: Inequalities and resistances. • Gender Concerns related to access, enrolment, retention, participation and overall achievement. **Assignment:** • Collection of folklores reflecting socialization processes and drafts a report on entire program. • Analyze of textual materials from the perspective of gender bias and stereotype. • Find out the concept of women empowerment in ancient Indian culture and analyze its relevance at present scenario.
UNIT-3 **TEACHING HOURS (12)**	**Creating Gender Inclusive Classroom** • Gender Inclusive Classroom-tips/activities/toolkit. • Developing Positive Self-Concept and Self-Esteem among Students. • Teaching-Learning Materials to teach Gender Issues. • Classroom Transaction in relation to Gender. • Teacher as an Agent of Change in the Context of Gender and Society. **Assignment:** • Write a survey based report on financial allocations/field conditions/policies/ imperatives of schools. • Field visits to schools, to observe the schooling process from a gender perspective.
UNIT-4 **TEACHING HOURS (11)**	**Gender Issues in Curriculum** • Gender and Education (Indian context): Socialization-theory and Structural-theory. • In the Culture, Gender and Institution, Girls as Learners, Curriculum, Gender Culture and Hidden Curriculum, Gender- Education content and Construction of Knowledge. • Curriculum frame-work and Pedagogy based on gender issues.

	Assignment: • Debate on women role models in various fields with emphasis on women in unconventional roles. • Prepare tools to analyze reflection of gender in curriculum and draft a report after administration of scoring and prepare a report. Report will be presented in seminar.
UNIT-5 **TEACHING HOURS (11)**	**Gender, Sexual Harassment and Legislative Action** • Meaning, Definition, Concept, types and identification of term Gender/Sexual harassment. • Institutions redressing sexual harassment and abuse. • Prenatal Diagnostic Technique Act, 1994. • The draft sexual Law Reforms in India-2000. • Domestic Violence Act, 2005. • Reservation for Women. • Constitutional provisions against sexual harassment. **Assignment:** • Gathering Information on Laws by Compiling Violence against Women in India. • Case study on how students perceive role models in their own lives. • Draft a report with the help of field interview while studying the issue of reservation as an equalitarian policy. • Group Assignment on Examining Policies and Schemes on Girls.
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**

CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	Details of Continuous and Comprehensive Assessment (CCA) are as follows:

Details of Continuous and Comprehensive Assessment (CCA) are as follows:

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	Monthly Test	10X6 Test = 60
2	Presentation	10
3	Group Discussion	10
4	Debate	10
5	Participation and Presentation in Seminar	10
6	Report Writing	10
7	Viva Voce	10
8	Attendance*	10
9	Co-curricular Activity	10
10	Team Teaching	10

EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):
CCA will be reduced to 30 marks or 15 marks (as per course weightage).
Formula: Marks obtained/Total marksX30
For example: $60 \div 160 \times 30 = 11.25$
PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.
PROVISO-II: Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course.
*Attendance in Lectures and Practical

Percentage	Marks Allotted
75% to 80%	02
81% to 85%	04
86% to 90%	06
91% to 95%	08
Above 96%	10

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	**1. ANNUAL** **2. However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**

SELECTED READINGS	

- Mr. Chandramoulesh G K, Mr. Manjunath D R & Mrs Jaya K (2016). Gender, School and Society. (ISBN13:9789381846728): Sirivara Prakashana. Kanpur. Pp.no.-188.
- Ovink, Sarah M. 2013. "They Always Call Me an Investment" Gendered Formalism and Latino / a College Pathways. Gender & Society: (089124321350808.)
- Trived, Vinoti Ojha (2016). Gender school and society. Agrawal Publication: C.
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	• Nath, pramanik rathindra (2006). Gender Lhequality and women's empowerment. abhijeet publication: Delhi
	• Malik, C.D (2008). Social and Political Thought B.R. Ambedkar. Arise Publishers and Distributors: New Delhi.
	• Naik, S.C. (2005) Society and Environment. Oxford & 1B Publishing Co. Pvt.ltd: New Delhi.
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B.Sc.B.Ed. III Year			
COURSE CODE:	BSCBED-352	**COURSE TYPE: CORE**	
COURSE TITLE:	**Creating an Inclusive School**		
MAX.MARKS:	**50**	MIN. PASS MARKS:	**20**
THEORY EXAMINATION	35	MIN. PASS MARKS:	14
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15	MIN. PASS MARKS:	6
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives:
- Prepare teachers for inclusive schools.
- Develop the conceptual understanding of inclusive education .
- Develop the understanding of difference between Special Education, Integrated Education and Inclusive Education.
- Develop critical understanding of the recommendations of various commissions and committees towards teacher preparation for inclusive education.
- Develop the understanding for curriculum and pedagogy in Inclusive School.
- Make enable to conducive teaching learning environment in inclusive school .
- Make enable to conducive Assessment and Evaluation in Inclusive Classroom.

Learning outcome: After completion of the course, student-teachers will be able -
- Understand concept, meaning and significance of inclusive education
- Bring about an understanding of the culture, policies and practices that need to be addressed in order to create an inclusive school.
- Appreciate the need for promoting inclusive practice and the roles and responsibilities of the teachers.
- Develop critical understanding of the recommendations of various commissions and committees towards teacher preparation for inclusive education; understand the nature of difficulties encountered by children.
- Prepare teachers for inclusive schools.
- Analyze special education, integrated education, mainstream and inclusive education practices.
- Identify and utilize existing resources for promoting inclusive practice.
- Develop a positive attitude and sense of commitment towards actualizing the right to education of all learners.
- Prepare a conducive teaching learning environment in varied school settings.
- Develop the ability to conduct and supervise action research activities.

UNIT-1 TEACHINGHOURS (12)	**Introduction, Issues & perspectives of Inclusive Education** • Definitions, Concept and Importance of Inclusive Education, • Difference between Special Education, Integrated Education and Inclusive Education. • Advantages of Inclusive Education for Education for all Children in the context of Right to Education. **Assignment:** • Organize a group discussion on Difference between Special Education, Integrated Education and Inclusive Education. • To investigate the opinion of teachers on the integration of students with disability in normal schools.

UNIT-2 **TEACHING HOURS 12)**	**Concept & Policy Perspective** • Recommendations of the Indian Education Commission (1964-66), National Curriculum Framework, 2005 NCERT. • The Convention on the Rights of the Child (Specific articles related to inclusive education). • The World Declaration on the Survival, Protection and Development of Children. • Promoting Inclusion Preventing Exclusion. • UNESCO Conventions, Declaration and Recommendations related to Rights of persons with Disabilities. **Assignment:** • To study the conceptions of teachers about the need of inclusive education in primary schools, collect views of teachers of school. Analyze in the light of inclusive education and write a report. • Organize a seminar on constitutional provisions on inclusive education.
UNIT-3 **TEACHING HOURS (12)**	**Diversity in the Classroom** • Diversity due to disability: Nature, Characteristic and Needs. • Diversity due to Socio-Cultural and Economic factors: Discrimination, Language Attitudes, Violence and Abuse. • Concept, Nature, and Characteristics of Multiple Disabilities, Classroom Management for Inclusive Education. • MDGs (Millennium Development Goals) UNESCO. **Assignment:** • Conduct an awareness program on millennium goal of UNESCO. • Conduct a survey on the type of supportive service needed for inclusion of children with any disability and share the findings in the class.
UNIT-4 **TEACHING HOURS (11)**	**Curriculum & Pedagogy in Inclusive School** • Inclusive Curriculum- Meaning and Characteristics. • Teaching and Learning Environment with special reference to Inclusive School. • Individual differences, children with disabilities: Hearing Impairment, visual Impairment, voice Impairment and orthopedic. **Assignment:** • Planning and conducting multi level teaching in the persons with disabilities (two classes). • Write a report on entire activity and present it in classroom presentation. (among peer group)
UNIT-5 **TEACHING HOURS (11)**	**Assessment in Inclusive School** • Alternative means for Assessment and Evaluation in Inclusive Classroom. • Utilization of records/case profiles for identification, assessment and intervention for Inclusive Classrooms. • Evaluation and follow-up Programmes for improvement of teacher preparation programmes in Inclusive Education. **Assignment:** • Discussion, group work and presentation by students on any topic of course. • Study the assessment and evaluation practice being followed in a school. Critically reflect on the practice in the context of inclusive education.
TEACHING AND	1. Lectures 2. E-learning

LEARNING STRATEGIES	3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**
CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	**Monthly Test**	**10X6 Test = 60**
2	**Presentation**	**10**
3	**Group Discussion**	**10**
4	**Debate**	**10**
5	**Participation and Presentation in Seminar**	**10**
6	**Report Writing**	**10**
7	**Viva Voce**	**10**
8	**Attendance***	**10**
9	**Co-curricular Activity**	**10**
10	**Team Teaching**	**10**

EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):

CCA will be reduced to 30 marks or 15 marks (as per course weightage).

Formula: Marks obtained/Total marksX30

For example: $60 \div 160 X30 = 11.25$

PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.

PROVISO-II: Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course.

*Attendance in Lectures and Practical

Percentage	Marks Allotted
75% to 80%	02
81% to 85%	04
86% to 90%	06
91% to 95%	08
Above 96%	10

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.

PERIODIC AL REVISION OF SYLLABUS	1. **ANNUAL** 2. **However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	- Siddiqui, Hena (2016). Inclusive education. Agraval Publication: Agra. - Mitara, Krishna and Saxena, vandana (2008). Inclusive Issues and Perspectives. Arihant Publication: Jaipur. - Sharma, P.L (2003). Planning Inclusive Education in Small Schools. R .I E. Mysore . - Delpit, L.D. (2012). Multiplication is for white people: raising expectations for other people's children. The new press: USA. - GOI, (1966). Report of the education commission: Education and national development. Ministry of education: New Delhi. - Govinda R. (2011). Who goes to school? Exploring exclusion in Indian education. Oxford University Press: United Kingdom. - Parekh, B.C. (2000). Rethinking multiculturalism: Cultural diversity and political theory. Palgrave: 213-230. - UNESCO (2006). United Nations convention on the rights of persons with disabilities. - UNESCO. (2009). Policy guidelines on inclusion in education UNESCO.

B.Sc.B.Ed. III Year				
COURSE CODE:	**BSCBED-353**		**COURSE TYPE:**	**CORE**
COURSE TITLE:	**Educational Aspects of the Geeta**			
MAX.MARKS:	**50**		MIN. PASS MARKS:	**20**
THEORY EXAMINATION	35		MIN. PASS MARKS:	14
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15		MIN. PASS MARKS:	6
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**			
EXAMINATION	**TERM END EXAMINATION**		**MONTHLY TEST**	
DURATION	**03 HR**		**01 HR**	

Objectives:
- To understand the philosophy of the Geeta.
- To understand different Aspects of the Geeta Education.
- To learn the significance of the teachnigs of the Geeta in the present context.

Learning outcome: After completion of the course, student-teachers will be able -
- Develop understanding about the Meaning & Nature of The Geeta Philosophy.
- Understand impact of the Geeta on Education.
- Understand Concept related to the Geeta Philosophy.
- Implement Social theories with special reference to the Geeta in education.
- Understand Contribution of the Geeta in the various fields of Education.

UNIT-1 TEACHING HOURS (12)	**Introduction of the Geeta** - General Assumption and Ideas. - Need, Importance and Concept of the Geeta Education. - Different Aspects of the Geeta Education. - Educational Aims and Place of the Geeta. - Life philosophy in the Geeta. - Educational Elements – Teacher, Student, Teaching Method, Curriculum. **Assignment:** - Conduct a drama to demonstrate life philosophy in the Geeta. - By playing method show teacher student relationship according to the Geeta.
UNIT-2 TEACHING HOURS 12)	**Philosophical Aspects** - God, Human being, Nature, Universe. - Human life and Duties. - Soul, Knowledge and Science. - Religion, Morality and Nishkam Karma (Service of Selflessness) **Assignment:** - Poster presentation competition on god, human being, nature and universe according to the Geeta darshan. - Essay competition on Nishkam Karma (concept of the Geeta)

UNIT-3 **TEACHING HOURS (12)**	<u>**Social Aspects**</u> • Man and its Social Nature. • Social duty, Understanding and Coordination. • Concept and Significance of Lok Sangrah (Public Collection). • Importance of The Geeta in present Social Scenario. • Social life skill and Management. **Assignment:** • Conduct an awareness programme in society with the help of students on social duties/social life skill then assess the impact of program and present the report in class. • Conduct one week orientation program in school on the Geeta Darshan and evaluate the effectiveness of the program tHRough examination.
UNIT-4 **TEACHING HOURS (11)**	<u>**Psychological Aspects**</u> • Nature of Man- Satvik, Rajashi & Tamasi. • Nature, Types and forms of intelligence in the Geeta. • Concept of mind in the Geeta. • Guidance and motivation in the Geeta. **Assignment:** • Conduct a nukkar natak, to demonstrate satvik, rajsi & tamsi nature of man.
UNIT-5 **TEACHING HOURS (11)**	<u>**Multi-dimensional aspects and current significance of the Geeta**</u> • Yoga and Spiritualism. • Religion, Religious – Secularism, Peace and Ahinsa. • Universal values and decision making system (Conviction). • Cosmic order and symbolism in the Geeta, Expansion of all religions fellow feeling. • Environmental Conservation. **Assignment:** • Practice Surynamaskar with school students and explain them importance of the yoga. • Organize a Drama/ play on universal values as described in The Geeta Darshan.
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**

CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**	

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	Monthly Test	10X6 Test = 60
2	Presentation	10
3	Group Discussion	10
4	Debate	10
5	Participation and Presentation in Seminar	10
6	Report Writing	10
7	Viva Voce	10
8	Attendance*	10
9	Co-curricular Activity	10
10	Team Teaching	10

EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):

CCA will be reduced to 30 marks or 15 marks (as per course weightage).

Formula: Marks obtained/Total marksX30

For example: $60 \div 160 \times 30 = 11.25$

PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.

PROVISO-II: Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course.

***Attendance in Lectures and Practical**

Percentage	Marks Allotted
75% to 80%	02
81% to 85%	04
86% to 90%	06
91% to 95%	08
Above 96%	10

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	1. ANNUAL 2. HOWEVER, THE UNIVERSITYmay revise the syllabus at any time during the running year after giving a notice for a period one month.
SELECTED READINGS	• Radha Krishanan, S (2009). Bhagwat the Geeta. Hindi Pocket Books. • Wood, Ernest (1954). Great system of Yoga. DB. Taraporevala Sons & Co. • Sharma, Jawahar Lal (2003). Cultural Study of SHRibhagawat. Rajasthan Hindi Granth Academy: Jaipur. • Vyas, Girls (2001). The Geeta & Bible. Hansa Prakashan: Jaipur. • Giri, Gagra Dev (2008). Coordination of Knowledge. Karma in SHRi Bhagwat the Geeta. Jyoti Prakashan: Varansi. • Easwaran, Eknath (1997). The Bhagavad Gita. Jaico Publishing

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- NCERT (2011). Teachers' Handbook on Environmental Education for the Higher Secondary Stage, DESM, NCERT: New Delhi.
- Ram,P.S. and Singh,R.(2013). Paryawaran Shiksha Ke Ubharate Aayam. Sharda Pustak Bhawan: Allahabad

B.Sc.B.Ed. III Year			
COURSE CODE:	**BSCBED-354-I**	**COURSE TYPE: CORE**	
COURSE TITLE:	**Pedagogy of Mathematics**		
MAX. MARKS:	**50**	MIN. PASS MARKS:	**20**
THEORY EXAMINATION	35	MIN. PASS MARKS:	14
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15	MIN. PASS MARKS:	6
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives:
- Understand the need for teaching-learning of Mathematics in secondary classes.
- Develop a critical understanding about the aims and objectives of Mathematics in a Democratic and Secular country.
- Understand the nature of Mathematics curriculum and its pedagogical issues.
- Critique and develop suitable evaluation mechanisms in Mathematics
- Develop the ability to organize co-curricular activities and community resources for promoting Mathematics learning.
- Understand the Approaches to teaching of mathematics
- Understand the Concept of Teaching Skills

Learning outcome: After completion of the course, student-teachers will be able -
- Develop insight into the meaning, nature, scope and objective of mathematics education.
- Learn important mathematics: mathematics is more than formulas and mechanical procedures.
- See mathematics as something to talk about, to communicate tHRough, to discuss among them-selves to work together on; Pose and solve meaningful problems.
- Appreciate the importance of mathematics laboratory in learning mathematics.
- Stimulate curiosity, creativity and inventiveness in mathematics.
- Develop competencies for teaching-learning mathematics tHRough various measures.

UNIT-1 TEACHING HOURS(12)	**Nature and Scope of Mathematics** - Meaning, Nature and Scope of Mathematics teaching. - History of mathematics teaching and contribution of mathematician with reference to–Bhaskaracharya, Aryabhatta, Ramanujan, Euclid, Pythogores etc. - Importance of Aims and Objectives of Mathematics Teaching. - Co-relation with other subjects of Mathematics. **Assignment:** - Prepare a model of Pythagoras Theorem/Cube, Cuboid, and Cone etc. - Organise seminar on contribution of mathematician.

UNIT-2 **TEACHING HOURS(12)**	**Aims and Objectives of Teaching School Mathematics** • Aims and general objectives of teaching mathematics, Bloom's Digital Taxonomy (Cognitive, Effective and Psychomotor) in terms of Instructional Behaviour, the objectives of school education; writing specific objectives of various content areas in mathematics like algebra, geometry, trigonometry, etc. • Approaches to teaching of mathematics – Analytic-Synthetic, Inductive-Deductive, Heuristic, Problem Solving, Project and Laboratory • Using various techniques of teaching mathematics viz-oral, written, drill, assignment, team teaching, supervised study and programmed learning. **Assignment:** • Organise workshop on techniques of teaching mathematics. • Organise a training program on Bloom's Digital Taxonomy.
UNIT-3 **TEACHING HOURS(12)**	**Planning** • Concept, Meaning and Objectives of Mathematics teaching Plan (Lesson Plan, Unit Plan, Yearly Plan) and Preparation of these plans. • Meaning and Concept of Teaching Skills. • Micro Teaching-Meaning, Need and Importance of Micro Teaching Cycle and its Features. • Concept, Meaning, Principles and Objectives of Curriculum, Characteristics of good Curriculum. • Dale cone of experiences. **Assignment:** • Prepare and present a lesson tHRough power point presentation on any topic of your choice. • Organise a training program on Micro Teaching.
UNIT-4 **TEACHING HOURS(11)**	**Teaching-learning Resources in Mathematics** • Meaning, Objectives, Scope, Characteristics, Types, Preparation, Presentation and Importance of Teaching Learning Material. • Planning and Importance of Mathematics Laboratories and its uses. • Qualities of Mathematics Text Books at Secondary Level. • Audio-Visual Aids- Meaning, Concept, Utility and Significance of Different types of Audio-Visual Aids in the teaching of Mathematics. **Assignment:** • Conduct a training program on use of Different types of Audio-Visual Aids in the teaching of Mathematics. • Make a report on Mathematics Teaching Planning and Importance of Mathematics Laboratories and its uses.
UNIT-5 **TEACHING HOURS(11)**	**Assessment and Evaluation** • Meaning, concept and construction of Achievement test, diagnostic test and remedial teaching. • Types of Questions, Characteristics of a good test. • Blue print: Meaning, concept, need and construction. • Continuous and Comprehensive Evaluation: Meaning, concept, importance and limitations. • Models of Teaching.

	Assignment:
	• Construction, administration and interpretation of an achievement test of any standard of school.
	• Make a diagnostic test of your subject and apply it in school, after discussion with concerning teacher and give remedial measure.
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**

CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)

Details of Continuous and Comprehensive Assessment (CCA) are as follows:

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	**Monthly Test**	**10X6 Test = 60**
2	**Presentation**	**10**
3	**Group Discussion**	**10**
4	**Debate**	**10**
5	**Participation and Presentation in Seminar**	**10**
6	**Report Writing**	**10**
7	**Viva Voce**	**10**
8	**Attendance***	**10**
9	**Co-curricular Activity**	**10**
10	**Team Teaching**	**10**

EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):
CCA will be reduced to 30 marks or 15 marks (as per course weightage).
Formula: Marks obtained/Total marksX30
For example: 60÷160X30 =11.25
PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.
PROVISO-II: Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course.
*Attendance in Lectures and Practical

Percentage	Marks Allotted
75% to 80%	02
81% to 85%	04

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	86% to 90% 06 91% to 95% 08 Above 96% 10
EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	1. **ANNUAL** 2. **However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• धाकड़, परशुराम एवं त्रिवेदी, शिल्पा (2009). गणित शिक्षण विधियाँ. साहित्यागार चौड़ा रास्ताः जयपुर. • मंगल, एस.के. (2005). गणित शिक्षण. आर्य बुक डिपो. नई दिल्ली. • शर्मा, एच.एस. (2005). गणित शिक्षण. राधा प्रकाशन मन्दिरः आगरा. • नेगी, जे.एस. (2007). गणित शिक्षण. विनोद पुस्तक मन्दिर. आगरा. • सिंह,योगेश कुमार (2010). गणित शिक्षण आधुनिक पद्धतियाँ. ए.पी.एच.पब्लिशिंग कॉरपोरेशनः नई दिल्ली–02. • कुलश्रेष्ठ, अरूण कुमार (2013). गणित शिक्षण. आर. लाल.बुक डिपोः मेरठ

B.Sc.B.Ed. III Year			
COURSE CODE:	**BSCBED-354-II**	**COURSE TYPE: CORE**	
COURSE TITLE:	**Pedagogy of General Science**		
MAX. MARKS:	**50**	MIN. PASS MARKS:	**20**
THEORY EXAMINATION	35	MIN. PASS MARKS:	14
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15	MIN. PASS MARKS:	6
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives:

- To develop the ability to Students insight on the meaning and nature of General science for determining aims and strategies of teaching- learning.
- To develop the ability to Students appreciate the fact that every child possesses curiosity about his/her natural surroundings.
- Students will be able to identify and relate everyday experiences with learning of science.
- Students will be able to integrate the science knowledge with other school subjects.
- Students will be able to analyze the contents of science with respecttopots, branches, process skills, knowledge organization and other critical issues.
- Students will be able to identify the concepts of science.

Learning outcomes: After completion of the course, student-teachers will be able to:-

- Develop insight on the meaning and nature of General science for determining aims and strategies of teaching-learning.
- Appreciate that science is a dynamic and expanding body of knowledge.
- Appreciate the fact that every child possesses curiosity about his/her natural surroundings.
- Identify and relate everyday experiences with learning of science.
- Appreciate various approaches of teaching- learning of science.
- Explore the process skill in science and role of laboratory in teaching-learning.
- Use effectively different activities /experiments /demonstrations /laboratory experiences for teaching-learning of science.
- Integrate the science knowledge with other school subjects.
- Analyze the contents of science with respecttopots, branches, process skills, knowledge organization and other critical issues.
- Develop process-oriented objectives based on the content themes/units.
- Identify the concepts of science that are alternatively conceptualized by teachers and students in general.

UNIT-1 **TEACHING** **HOURS(12)**	**Nature and Scope of General Science Teaching** • Meaning, Nature and Scope of General Science teaching. • Contribution of Scientist:-Har Govind Khurana, J .C.Boss, C.V. Raman. Chander Shekhar, A.P.J.Kalam. • Importance, Aims and Objectives of General Science Teaching. • Co-relation with other Subjects Journal and Referenced Book and daily routine. **Assignment:** • Group discussion on importance of General Science. • Organise seminar on Contribution of Scientist in General Science and preapre a report.
UNIT-2 **TEACHING HOURS(12)**	**Aims and Objectives** • Bloom's Taxonomy (Cognitive, effective and psycho. motor) In terms of Instructional Behavior. • Quality and responsibilities of Science teacher. • Methods of General Science teaching Subject- lecture method, Demonstration, Lab Method, Problem Solving, Heuristics Project Method, Inductive and deductive Method. • Techniques of General Science Teaching. **Assignment:** • Organise workshop on techniques of teaching General Science. • Organise a training program on Bloom's Digital Taxonomy.
UNIT-3 **TEACHING HOURS (12)**	**Planning** • Concept Meaning and Objectives Teaching Plan (Lesson Plan, Unit Plan, Yearly Plan) and Preparation of these Plans. • Meaning and Concept of Teaching Skills- micro Teaching - Meaning. Need and Importance. Micro-Teaching Cycle and its features. • Concept, Meaning, Principles and Objectives of Curriculum, Characteristics of good curriculum. • Evaluation of General Science Syllabus at Secondary level **Assignment:** • Prepare and present a lesson tHRough power point presentation on any topic of your choice. • Organise a training program on Micro Teaching.
UNIT-4 **TEACHING HOURS(11)**	**Teaching-learning Resources inGeneral Science** • Meaning, Objectives, Scope, Characteristics, Types, Preparation, Presentation and Importance of Teaching Learning Material. • Planning and Importance of General Science Laboratories and its uses. • Qualities of General Science Text Books at Secondary Level. • Audio-Visual Aids- Meaning, Concept, Utility and Significance of Different types of Audio-Visual Aids in the teaching of General Science. **Assignment:** • Conduct a training program on use of Different types of Audio-Visual Aids in the teaching of General Science.

	• Make a report on General Science Teaching Planning and Importance of General Science Laboratories and its uses.
UNIT-5 **TEACHINGHOURS(11)**	**<u>Assessment and Evaluation</u>** • Meaning, concept and construction of Achievement test, diagnostic test and remedial teaching. • Types of Questions, Characteristics of a good test. • Blue print: Meaning, concept, need and construction. • Continuous and Comprehensive Evaluation: Meaning, concept, importance and limitations. • Models of Teaching. **Assignment:** • Construction, administration and interpretation of an achievement test of any standard of school. • Make a diagnostic test of your subject and apply it in school, after discussion with concerning teacher and give remedial measure.
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**

	Details of Continuous and Comprehensive Assessment (CCA) are as follows:	
CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)		

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	**Monthly Test**	**10X6 Test = 60**
2	**Presentation**	10
3	**Group Discussion**	10
4	**Debate**	10
5	**Participation and Presentation in Seminar**	10
6	**Report Writing**	10
7	**Viva Voce**	10
8	**Attendance***	10
9	**Co-curricular Activity**	10
10	**Team Teaching**	10

EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):

CCA will be reduced to 30 marks or 15 marks (as per course weightage).

Formula: Marks obtained/Total marksX30

For example: $60 \div 160 \times 30 = 11.25$

PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.

PROVISO-II: Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course.

*Attendance in Lectures and Practical

Percentage	Marks Allotted
75% to 80%	02
81% to 85%	04
86% to 90%	06
91% to 95%	08
Above 96%	10

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	**1. ANNUAL** **2. However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• Solomon, J., & Aikenhead, G. (1994). STS Education: International Perspectives on Reform. Ways of Knowing Science Series. NY: Teachers College Press. • Lawson, A. E. (1995). Science teaching and the development of thinking. Belmont, CA: Wadsworth. • Ellis, A. B. (1993). Teaching General Chemistry: A Materials Science Companion. American Chemical Society, Distribution Office Department 225, 1155 16th Street, NW, Washington, DC 20036. • Das, R. C. (1990). Science teaching in schools. Sterling Publishers Pvt.

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B.Sc.B.Ed. III Year			
COURSE CODE:	BSCBED-354-III	**COURSE TYPE: CORE**	
COURSE TITLE:	**Pedagogy of Chemistry**		
MAX. MARKS:	50	MIN. PASS MARKS:	20
THEORY EXAMINATION	35	MIN. PASS MARKS:	14
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15	MIN. PASS MARKS:	6
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives:

- To understand ability to gain insight on the meaning and nature of chemistry.
- To develop ability to determining aims and strategies of teaching-learning.
- To develop ability to use effectively different activities/ demonstration/ laboratory experiences for teaching-learning of chemistry.
- To understand ability to integrate in chemistry knowledge with other school subjects.

Learning outcomes: After completion of the course, student-teachers will be able to:-

- Gain insight on the meaning and nature of chemistry for determining aims and strategies of teaching-learning.
- Appreciate that science is a dynamic and expanding body of knowledge.
- Appreciate the fact that every child possesses curiosity about his/her natural surroundings.
- Identify and relate everyday experiences with learning chemistry.
- Appreciate various approaches of teaching-learning of chemistry.
- Understand the process of science and role of laboratory in teaching-learning situations.
- Use effectively different activities/demonstration/laboratory experiences for teaching-learning of chemistry.
- Integrate in chemistry knowledge with other school subjects.

UNIT-1 **TEACHING HOURS (12)**	**Basic of Chemistry Teaching** • Meaning, Nature and Scope of Chemistry teaching. • Nature of Science with special reference to chemistry. • History and Contribution of Chemistry teaching, history of Chemistry with special reference to India. • Importance Aims and Objectives of Chemistry teaching Objective of teaching Chemistry at secondary/senior secondary level. • Co-relation with other Subjects Journal and Referenced Book. **Assignment:** • Group discussion on importance of Chemistry. • Organise seminar on Contribution of Scientist in Chemistry and preapre a report.

UNIT-2 **TEACHING HOURS (12)**	**Instructional objectives and methods** • Instructional objectives and methods Bloom's Taxonomy (Congnative, effective and psychomotor). • In terms of instructional behavior Methods of Chemistry teaching Subject· lecture method. Demonstration Method, lab based method. • Inductive & deductive method. Problem Solving. Heuristics & Project Method Techniques of Chemistry Teaching Approaches of Chemistry teaching- Inquiry approach, programmed instruction, Group discussion, team teaching, CAL, SEMINARS & WORKSHOP . **Assignment:** • Organise workshop on techniques of teaching Chemistry. • Organise a training program on Bloom's Digital Taxonomy.
UNIT-3 **TEACHING HOURS (12)**	**Planning** • Concept, Meaning and Objectives of Chemistry Teaching Plan (Lesson Plan, Unit Plan, Yearly Plan) and Preparation of these Plans. • Meaning and Concept of Teaching Skills. Micro Teaching - Meaning, Need and Importance, Micro-Teaching Cycle and its features. • Concept, Meaning, Principles and Objectives of Curriculum, Characteristics of good curriculum and Evaluation ·of Chemistry Syllabus at Secondary Level. **Assignment:** • Prepare and present a lesson tHRough power point presentation on any topic of your choice. • Organise a training program on Micro Teaching.
UNIT-4 **TEACHING HOURS (11)**	**Instructional Support System** • Meaning, Objectives, Scope, Characteristics, Types, Preparation, Presentation and Importance of Teaching Learning Material. • Dales' Cone of Experiences. Planning and Importance of Chemistry Laboratories and Its uses. Qualities of good Chemistry Text Books at Secondary Level. • Qualities and Characteristics Chemistry Teacher. Audio-Visual Aids - Meaning, Concept, Utility and Significance of Different types of Audio-Visual Aids in the Teaching of Chemistry. Utilization of Community Recourses in the Teaching of Chemistry Teaching. **Assignment:** • Conduct a training program on use of Different types of Audio-Visual Aids in the teaching ofChemistry. • Make a report on Chemistry Teaching Planning and Importance of Chemistry Laboratories and its uses.

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UNIT-5 **TEACHING HOURS (11)**	**Evaluation** • Meaning & Objective of Evolution. • Types of Test Items and their Construction. • Preparation of Blue-Print and Achievement Test. • Characteristics of a good Test. Concept and Preparation of Diagnostic Test, Remedial Teaching and Enrichment Programme. • Use of ICT: Video clips, Power points presentations, films etc. **Assignment:** • Construction, administration and interpretation of an achievement test of any standard of school. • Make a diagnostic test of your subject and apply it in school, after discussion with concerning teacher and give remedial measure.
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**

CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	**Monthly Test**	**10X6 Test = 60**
2	**Presentation**	**10**
3	**Group Discussion**	**10**
4	**Debate**	**10**
5	**Participation and Presentation in Seminar**	**10**
6	**Report Writing**	**10**
7	**Viva Voce**	**10**
8	**Attendance***	**10**
9	**Co-curricular Activity**	**10**
10	**Team Teaching**	**10**

	EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):
	CCA will be reduced to 30 marks or 15 marks (as per course weightage).
	Formula: Marks obtained/Total marksX30
	For example: $60 \div 160 \times 30 = 11.25$
	PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.
	PROVISO-II: Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course.
	*Attendance in Lectures and Practical
	
	    Percentage **Marks Allotted**
	    75% to 80% 02
	    81% to 85% 04
	    86% to 90% 06
	    91% to 95% 08
	    Above 96% 10

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	**1. ANNUAL** **2. However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	- Anderson, R. G. W. (1978). The Playfair Collection and the teaching of chemistry at the University of Edinburgh, 1713-1858. Brill. - Eilks, I., & Byers, B. (Eds.). (2015). Innovative methods of teaching and learning chemistry in higher education. Royal Society of Chemistry. - Eilks, I., & Hofstein, A. (Eds.). (2015). Relevant chemistry education: From theory to practice. Springer. - Ellison, M. D., & Schoolcraft, T. A. (2008). Advances in teaching physical chemistry. American Chemical Society. - Herron, J. D. (1996). The Chemistry Classroom: Formulas for Successful Teaching. American Chemical Society, Product Services Office, 1155 16th Street NW, Washington, DC 20036 (cloth: ISBN-0-8412-3298-8; paperback: ISBN-0-8412-3299-7). - Nadendla, R. R. (2007). Principles of organic medicinal chemistry. New Age International. - Risch, B. (Ed.). (2010). Teaching chemistry around the world. Waxmann Verlag. - Smith, A., & Hall, E. H. (1902). The teaching of chemistry and physics in the secondary school. Longmans, Green, and Company. - Waddington, D. J. (1984). Teaching School Chemistry. New York :UNIPUB, 205 East 42nd Street,NY 10017.

B.Sc.B.Ed. III Year			
COURSE CODE:	BSCBED-354 -IV	**COURSE TYPE: CORE**	
COURSE TITLE:	Pedagogy of Biology		
MAX. MARKS:	**50**	MIN. PASS MARKS:	**20**
THEORY EXAMINATION	35	MIN. PASS MARKS:	14
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15	MIN. PASS MARKS:	6
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives:

- To understand the ability to develop insight on the meaning and nature of biological science.
- To understand the ability to integrate the biological science knowledge with other school subjects.
- Develop the ability be to identify and relate everyday experiences with learning of biological science.
- To understand the ability to appreciate various approaches and methods of teaching-learning of biological science.
- Develop the ability to explore the process skill in science and role of laboratory in teaching- learning.
- Develop the ability to identify the concepts of biological science that are alternatively conceptualized by teachers and students in general.

Learning outcome: After completion of the course, student-teachers will be able -

- Develop insight on the meaning and nature of biological science for determining aims and strategies of teaching- learning.
- Integrate the biological science knowledge with other school subjects. Identify and relate everyday experiences with learning of biological science.
- Appreciate various approaches and methods of teaching- learning of biological science.
- Explore the process skill in science and role of laboratory in teaching- learning.
- To understand meaning, concept and various types of assessment.
- Identify the concepts of biological science that are alternatively conceptualized by teachers and students in general.

UNIT-1 **TEACHING HOURS (12)**	**Basics of Biology Teaching** - Meaning, Nature and Scope of Biology teaching. - Main discoveries and development in Biology - Place and Values of Teaching Biology in School level. - Correlation of Biology and other Subjects. - Objectives of teaching Biology at School Level. **Assignment:** - Group discussion on importance of Biology teaching. - Organise seminar on Contribution of main discoveries and development in Biology and preapre a report.

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UNIT-2 **TEACHING HOURS (12)**	**Instructional objectives and methods** • Bloom's Taxonomy (Cognitive, effective and psychomotor), In terms of Instructional behavior. • Methods of Biology teaching Subject- lecture method, Demonstration Method, Inductive & deductive method, Problem Solving, Heuristics & Project Method. Inquiry approach programmed Instruction, Group discussion Self Study team teaching, Seminar and workshops. **Assignment:** • Organise workshop on techniques of Biology teaching. • Organise a training program on Bloom's Digital Taxonomy.
UNIT-3 **TEACHING HOURS (12)**	**Planning** • Concept, Meaning and Objective of Biology Teaching Plan (Lesson Plan, Unit Plan, Yearly Plan) and Preparation of these Plans. Meaning and Concept of Teaching Skills. Micro Teaching - Meaning, Need and Importance, Micro-Teaching Cycle and its features. • Concept, Meaning, Principles and Objectives of Curriculum, Characteristics of good curriculum and Evaluation of Biology Syllabus at Secondary Level. **Assignment:** • Prepare and present a lesson tHRough power point presentation on any topic of your choice. • Organise a training program on Micro Teaching.
UNIT-4 **TEACHING HOURS (11)**	**Instructional Support System** • Meaning, Objectives, Scope, Characteristics, Types, Preparation, Presentation and Importance of Teaching Learning Material. • Dales' Cone of Experiences. Planning and Importance of Biology Laboratories and Its uses. • Qualities of good Biology Text Books at Secondary Level. • Qualities and Characteristics Biology Teacher. • Audio-Visual Aids - Meaning, Concept, Utility and Significance of Different types of Audio-Visual Aids in the Teaching of Biology. • Utilization of Community Recourses in the Teaching Biology Teaching. • Use of ICT: Video clips, Power points presentations, films etc. **Assignment:** • Conduct a training program on use of Different types of Audio-Visual Aids in the teaching of Biology. • Make a report on Biology Teaching Planning and Importance of *Chemistry* Laboratories and its uses.
UNIT-5 **TEACHING HOURS(11)**	**Evaluation** • Meaning and Objectives of Evaluation. Types of Test Items and their Construction. • Preparation of Blue-Print and Achievement Test. • Characteristics of a good Test. Concept and Preparation of Diagnostic Test, Remedial Teaching and Enrichment Programme. **Assignment:** • Construction, administration and interpretation of an achievement test of any standard of school. • Make a diagnostic test of your subject and apply it in school, after discussion with concerning teacher and give remedial measure.

TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**

CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	Details of Continuous and Comprehensive Assessment (CCA) are as follows:

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	Monthly Test	10X6 Test = 60
2	Presentation	10
3	Group Discussion	10
4	Debate	10
5	Participation and Presentation in Seminar	10
6	Report Writing	10
7	Viva Voce	10
8	Attendance*	10
9	Co-curricular Activity	10
10	Team Teaching	10

EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):
CCA will be reduced to 30 marks or 15 marks (as per course weightage).
Formula: Marks obtained/Total marksX30
For example: 60÷160X30 =11.25
PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.
PROVISO-II: Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course.
*Attendance in Lectures and Practical

Percentage	Marks Allotted
75% to 80%	02
81% to 85%	04
86% to 90%	06
91% to 95%	08
Above 96%	10

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary

	competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	**1. ANNUAL** **2. However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• Agarwal, D.D. (2004). Modern methods of Teaching Biology. Saruk &Sons: New Delhi. • Miller, David F. & blaydes, Gllenn W. (1938). Methods and materials for teaching biological sciences. Mc GRAW Hill book company Inc: New York and London. • Choudhary, S. (2010). Teaching of Biology. APH Publishing Corporation: New Delhi. • Sood, J.K. (1987). Teaching of Life Science. Kohli publishers: Chandigarh. • Yadav, M.S. (2000). Modersn Methods of Teaching Science. Anmol Publishers: New Delhi. • Bhar, Suraj prakash (2006). Teacher Training Lotus Press: New Delhi. • Singh, Veena (2007). Teaching of Biology. Adhyanyan Publishers & Distributors: New Delhi. • मंगल, एस.के. (2010). जैविक विज्ञान शिक्षण. लायल बुक डिपोः मेरठ. • भूषण, शैलेन्द्र (2008). जीव विज्ञान शिक्षण. विनोद पुस्तक मन्दिरः आगरा. • कुलश्रेष्ठ, एस.पी. (2005). जीव विज्ञान शिक्षण. लायल बुक डिपोः मेरठ. • माहेश्वरी, बी.के. (2003). जीव विज्ञान शिक्षण. सूर्या पब्लिकेशनः मेरठ. • रावत एवं अग्रवाल (2014). नवीन विज्ञान शिक्षण. श्री विनोद पुस्तक मन्दिरः आगरा. • श्रीमाली, भूषण एवं रिहानी (2013). विज्ञान शिक्षण. राजस्थान हिन्दी ग्रन्थ अकादमीः जयपुर

B.Sc.B.Ed.III Year			
COURSE CODE:	BSCBED-354 -V	**COURSE TYPE: CORE**	
COURSE TITLE:	**Pedagogy of Physics**		
MAX. MARKS:	**50**	MIN. PASS MARKS:	**20**
THEORY EXAMINATION	35	MIN. PASS MARKS:	14
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15	MIN. PASS MARKS:	6
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives:
- To understand the need for teaching-learning of Physics in secondary classes.
- To develop a critical understanding about the aims and objectives of Physics in a Democratic and Secular country.
- To understand the nature of Physics curriculum and its pedagogical issues.
- To understand Critique and develop suitable evaluation mechanisms in Physics.
- To develop the ability to organize co-curricular activities and community resources for promoting Physics learning.
- To understand the Approaches to teaching of Physics
- To understand the Concept of Teaching Skills

Learning outcome: After completion of the course, student-teachers will be able -
- Gain insight on the meaning and nature of Physics science for determining aims and strategies of teaching-learning.
- Identify and relate everyday experiences with learning Physics;
- Appreciate various approaches of teaching-learning of Physics;
- Use effectively different activities/demonstrations/laboratory experiences for teaching-learning of Physics;
- Integrate in Physics knowledge with other school subjects;

UNIT-1 TEACHING HOURS (12)	**Nature and Scope of Physics** • Meaning, Concept, Nature, Scope Physics Teaching. • Contribution of Indian scientist – Sir C.V.Raman, J.C.Bose, S.N.Bose, H.J.Bhabha, M.N.Saha. • Correlation of Physics with other School Subjects. **Assignment:** • Organise workshop on Contribution of Indian scientist. • Write a report on Objectives of Physics Teaching at different level of School.
UNIT-2 TEACHING HOURS (12)	**Teaching-learning of Physics** • Aims and general objectives of teaching physics, Bloom's Digital Taxonomy (Cognitive, Effective and Psychomotor) in terms of Instructional Behaviour, the objectives of school education; writing specific objectives of various content areas in Physics. • Approaches to teaching of Physics – Analytic-Synthetic, Inductive-Deductive, Heuristic, Problem Solving, Project and Laboratory. • Using various techniques of teaching Physics viz-oral, written drill, assignment, Team teaching, supervised study

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	andprogrammed learning. **Assignment:** • Prepare a lesson plan based on team teaching and execute it in school. • Make any two teaching aids with the low cost material.
UNIT-3 **TEACHING HOURS (12)**	**Planning** • Concept, Meaning and Objectives of Physics teaching Plan (Lesson Plan, Unit Plan, Yearly Plan) and Preparation of these plans • Meaning and Concept of Teaching Skills, Maxims of Teaching • Micro Teaching-Meaning, Need and Importance of Micro Teaching Cycle and its Features • Concept, Meaning, Principles and Objectives of Curriculum, Characteristics of good Curriculum. • Dale cone of experience. **Assignment:** • Organsie training program on Micro Teaching. • Prepare a working model based on Dale cone of experience.
UNIT-4 **TEACHING HOURS (11)**	**Teaching-learning Resources in Physics** • Meaning, Objectives, Scope, Characteristics, Types, Preparation, presentation and Importance of Teaching - Learning Material. • Planning and Importance of Physics Laboratories and its uses. • Qualities of Physics Text Books at Secondary Level. • Audio-Visual Aids- Meaning, Concept, Utility and Significance of Different types of Audio-Visual Aids in the teaching of Physics. **Assignment:** • Conduct a training program on use of Different types of Audio-Visual Aids in the teaching of Physics • Make a report on Physics Teaching Planning and Importance of Physics Laboratories and its uses.
UNIT-5 **TEACHING HOURS (11)**	**Assessment and Evaluation** • Meaning, concept and construction of Achievement test, diagnostic test and remedial teaching. • Types of Questions, Characteristics of a good test. • Blue print: Meaning, concept, need and construction. • Continuous and Comprehensive Evaluation: Meaning, concept, importance and limitations.Models of Teaching. **Assignment:** • Construction, administration and interpretation of an achievement test of any standard of school. • Make a diagnostic test of your subject and apply it in school, after discussion with concerning teacher and give remedial measure.

TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**

CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	**Monthly Test**	**10X6** **Test = 60**
2	**Presentation**	**10**
3	**Group Discussion**	**10**
4	**Debate**	**10**
5	**Participation and Presentation in Seminar**	**10**
6	**Report Writing**	**10**
7	**Viva Voce**	**10**
8	**Attendance***	**10**
9	**Co-curricular Activity**	**10**
10	**Team Teaching**	**10**

EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):
CCA will be reduced to 30 marks or 15 marks (as per course weightage).
Formula: Marks obtained/Total marksX30
For example: 60÷160X30 =11.25
PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.
PROVISO-II: Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course.
*Attendance in Lectures and Practical

Percentage	Marks Allotted
75% to 80%	02
81% to 85%	04
86% to 90%	06
91% to 95%	08
Above 96%	10

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	1. **ANNUAL** 2. **However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• Mangal, S.K (2005). Teaching of Physics. Arya book depot: New Delhi. • Joshi, S.R (2008). Teaching of science. A.P.H Publishing Corporation: New Delhi. • Das, R.C, (2000). Science teaching in schools. Sterling Publishers private limited: New Delhi. • Prasad, J. (1999). Practical aspects in teaching of science. Kanishka publisher: New Delhi. • Nanda, V.K. (1997). Science education today. Anmol publications Pvt. Ltd.: New Delhi. • Bhan, Suraj Prakash. (2006). Teacher training. Lotus press: New Delhi. • राठौड़, मुदित. (२००६). भौतिक विज्ञान शिक्षण. शिक्षा प्रकाशनः जयपुर. • भटनागर, ए.बी. (२०००). भौतिक विज्ञान शिक्षण. सूर्या पब्लिकेशन्सः मेरठ. • नेगी, जे.एस. (२००८). भौतिक विज्ञान शिक्षण. विनोद पुस्तक मन्दिरः आगरा. • शर्मा, आर.सी. (२००७). आधुनिक विज्ञान शिक्षण. धनपतराय पब्लिशिंग कम्पनी (प्रा.) लि. • सिंह, विजयपाल (२००५–०६). भौतिक विज्ञान शिक्षण. राधा प्रकाशन मन्दिरः आगरा–०२. • त्यागी, एस.के.(२०००). भौतिक विज्ञान शिक्षण. साहित्य प्रकाशनः आगरा • कुलश्रेष्ठ, एस.पी. शैक्षिक तकनीकी एवं उसके मूल आधार. विनोद पुस्तक मन्दिर. आगरा–०२.

B.Sc. B.Ed. III Year			
COURSE CODE:	**BSCBED-355 a I**		COURSE TYPE : CORE
COURSE TITLE :	**Paper-I: Solid State Physics, Solid State Devices and Electronics**		
MAX.MARKS:	50	MIN.PASS MARKS	20
THEORY EXAMINATION:	40	MIN.PASS MARKS	16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS	4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR		
EXAMINATION	TERM END EXAMINATION		MONTHLY TEST
DURATION	3 HR		1 HR

OBJECTIVE:

- This course aims to develop the fundamental, theoretical and experimental knowledge of solid state physics, solid state devices and electronics by learning various topics viz. crystal structure, Thermal properties of solids, band structure and motion of electron, circuit analysis, network theorems, P-N diode equation, semiconductor diode, rectifiers, filters, transistors and transistor amplifiers and their analysis. Students will also learn logic gates, amplifiers with feedback and oscillators. The course helps them to develop skills to design electronic circuits for various applications.

Learning Outcomes: After completion of the course, student-teachers will be able to-
- Understand thermal properties and band structure.
- Apply law of motion and semiconductors.
- To explain Semiconductor devices.
- Explain the overview of crystalline and glassy forms, liquid crystals, glass transition.
- Discuss on general principles of operation, classification, distortion of Small Signal Amplifiers.

UNIT-1 TEACHING HOURS(15)	**Overview:** Crystalline and glassy forms, liquid crystals, glass transition. **Structure:** Crystal structure, periodicity, lattices and bases, Miller indices, unit cell, Wigner-seitz cell, different crystal system, allowed rotations, lattice types, lattice planes, common crystal structures. **Laue's theory of X-ray diffraction**, Bragg's law, Laue patterns. **Bonding:** Potential between a pair of atoms, Lennard-Jones potential, concept of cohesive energy, covalent, Van der walls, ionic, and metallic crystals. **Magnetism:** Atomic magnetic moment, magnetic susceptibility, **Dia**-, **Para**- and **Ferro**-**magnetism**, Ferromagnetic domains, hysteresis.

UNIT-2 **TEACHIGN HOURS(15)**	**Thermal properties:** Lattice vibrations, simple harmonic oscillator, second order expansion of Lennard-Jones potential about the minimum, vibrations of one-dimensional monatomic chain under harmonic and nearest neighbour interaction approximation, concept of phonons, density of modes (1-D), **Dulong-Petit law**, **Einstein** and **Debye model**; lattice specific heat, low temperature limit. **Band structure:** Electrons in periodic potential, nearly free electron model (qualitative), energy bands, energy gap, **metals**, **insulators**, **semiconductors**. **Motion of electrons:** Free electrons, conduction electrons, electron collisions, mean free path, conductivity and Ohm's law, Density of states, Fermi energy, Fermi velocity, and Fermi-Dirac distribution.
UNIT-3 **TEACHING HOURS(10)**	**Semiconductors:Intrinsic semiconductors**, electrons and holes, Fermi level, Temperature dependence of electron and hole concentrations, Doping, impurity states, **n and p type semiconductors**, conductivity, mobility, Hall effect, Hall coefficient. **Semiconductor devices:** Metal-semiconductor junction, p-n junction, majority and minority carriers, diode, Zener and tunnel diodes, light emitting diode, transistor, and **solar cell**. Advanced Materials: Superconductors, fullerenes, carbon nanotubes, graphenes, and nanomaterials.
UNIT-4 **TEACHING HOURS(20)**	**Circuit analysis:** Networks- some important definition, loop and nodal equation, Kirchhofs laws, driving points and transfer impedance, four terminal netwok parameters. Networks theorems- Superposition, Thevenin, Norton, Maximum power transfer and Miller theorems **Rectification and Power supply:** Half wave and full wave rectifier, Ripple factor, efficiency and regulation, bridge rectifier, filters, Voltage regulation and voltage stabilization, Zener diode, voltage, voltage multiplier circuit, **characteristics of a transistor in CB, CE and CC mode**, graphical analysis of the CE configuration, low frequency equivalent circuits, h-parameters, bias stability, thermal runaway. **Field effect transistors:** Basic construction of **JFET** and **MOSFET**, Drain and transfer characterstics of JFET, operating regions and pinch off voltage.
UNIT-5 **TEACHING HOURS(15)**	**Small Signal Amplifiers:** General principles of operation, classification, distortion, RC coupled amplifier, gain, frequency response, input and output impedance, multistage amplifiers, transformer coupled amplifiers, Equivalent circuits at low, medium and high frequencies, emitter follower, low frequency common-source and common-drain amplifier, Noise in electronic circuits. **Operational amplifier:** Characteristics of OP-AMP, differential amplifier, CMRR, inverting and non-inverting configuration, Application of OP-AMP: Unity gain buffer, Adder, Subtractor, Integrator and Differentiator. **Digital circuit:** Number systems, **logic fundamentals**, AND, OR, NOT, NOR, NAND, XOR gates, Boolean theorems, circuit realization using DTL and TTL logic.

TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The Teaching and Learning Strategies may be change as per requirement of the students and their capabilities.**	

CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**		
	S. No.	CCA- Components	Max. Marks Allocation
	1.	Monthly test	20*3 Test=60
	2.	Quizzes and Assignments	10
	3.	Viva-voce	10
	4.	Seminar/Symposia	10
	5.	Report writing	10
	6.	Workshop	10
	7.	Review of literature	10
	8.	Creativity/Innovation	10
	9.	Experimental Skill	10
	10.	Co-curricular activity	10
	11.	Attendance	10
	Total 160 marks equivalent reduced to CCA original marks 30.		

Exam Pattern	**Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals. semester.r.**
PERIODICAL REVISE OF SYLLABUS	1. ANNUAL **2.** HOWEVER, THE UNIVERSITYmay revise the syllabus at any time during the running year after giving a notice for a period one months.
SELECTED READINGS	• Kittel, C., & Mc Euen, P. (1976). Introduction to solid state physics (Vol. 8). New York: Wiley. • Millman, J., & Grabel, A. (1987). Microelectronics. McGraw-Hill, Inc. • Ryder, J. D. (1964). Electronic fundamentals and applications. (Book on solid state, vacuum and gaseous forms of electronic devices). Englewood Cliffs, N. J., Prentice-Hall. • Singh, N. B., Singh, R. J., & Singh, N. P. (1994). Organic Solid-State Reactivity. Tetrahedron, 50(22), 6441-6493. • Srivasatava, J. P. (2014). Elements of solid-state physics. New Delhi: PHI Learning Pvt. Ltd. • Stanley, W. D. (1989). Electronic Devices: Circuits and Applications. Prentice Hall. • Streetman, B. G., & Banerjee, S. (1995). Solid state electronic devices (Vol. 4). Englewood Cliffs, NJ: Prentice hall.

B.Sc. B.Ed. III YearI			
COURSE CODE:	**BSCBED-355 a II**	COURSE TYPE : CORE	
COURSE TITLE :	**Paper-II: Quantum Mechanics and Statistical Physics**		
MAX.MARKS:	50	MIN.PASS MARKS	20
THEORY EXAMINATION:	40	MIN.PASS MARKS	16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS	4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR		
EXAMINATION	TERM END EXAMINATION	MONTHLY TEST	
DURATION	3 HR	1 HR	

OBJECTIVE:

- This course will enable the students to develop the basic knowledge of quantum mechanics and its application to various problems. It also deals with the techniques of wave mechanics like ScHRödinger equation and its solution. The student develops the understanding of quantum nature of e. m. radiations or light and wave nature associated with microscopic particles, the notion of quantum states, operators etc. In addition, it will also give exposure to students about statistical mechanics which has applications in various fields including Astrophysics, Semiconductors, Plasma Physics, Bio-Physics, Chemistry and in many other directions.

Learning Outcomes: After completion of the course, student-teachers will be able to:-

- Understand the Origin of the quantum theory.
- Get familiar with the statistical basis of thermodynamics and laws of universal.
- Explain the Quantum Mechanics and Maxwellian distribution of speeds in an ideal gas.
- Discuss on the statistical basis of thermodynamics.
- Apply the Wave-particle duality and uncertainty principle.
- Apply the principle of quantum mechanics in further study.

UNIT-1 TEACHING HOURS(13)	**Origin of Quantum theory:** Failure of classical Physics to explain the phenomenon such as black body spectrum. Planck's radiation law. Photoelectric effect and Einstein explanation. Compton Effect, **"de-Broglie" hypothesis**, evidence for diffraction and interference of particles. **Uncertainly principle and its consequences**: diffraction at a single slit, particle in a box and its applications (i) Non existence of electron in nucleus, (ii) Ground state energy of H-atom (iii) Ground slate energy of harmonic oscillator. Energy-time uncertainty, BoHR's quantization of angular momentum and its application to hydrogen atom, limitations of BoHR's theory.
UNIT-2 TEACHIGN HOURS(10)	**Schrodinger Equation:** Time dependent and Time independent form. Physical significance of the wave function & its interpretation. Probability current density, Operators in quantum mechanics, Linear and Hermitian operators. **Expectation values of dynamical variables**, the position, momentum, energy, fundamental postulates of quantum mechanics, eigen function and eigen value, degeneracy. Orthogonality of eigen functions, commutation relations. EHRenfest theorem, concept of group and phase velocities, wave packet.

UNIT-3 TEACHING HOURS(12)	**Applications of quantum mechanics:Particle in a one dimensional and tHRee-dimensional box**, *particle in finite well*, **harmonic oscillator**, **Reflection and transmission by a step potential and by a rectangular potential barrier**. **Hydrogen atom:** Time independent ScHRödinger equation for hydrogen atom in spherical co-ordinates, Natural occurrence of n, 1 and m quantum numbers, the related physical quantities, comparison with BoHR's theory, Wave functions, Probabilistic interpretation.
UNIT-4 TEACHING HOURS(15)	**The statistical basis of thermodynamics:** Probability and thermodynamic probability, principle of equal a-priori probabilities, *probability distribution* and its narrowing with increase in number of particles, *Macro-state and Microstate*, the expressions for average properties, Constraints, accessible and inaccessible states, distribution of particles with a given total energy into a discrete set of energy states. The mono-atomic ideal gas and barometric relation. **Some universal laws:** The mu space representation, division of mu space into energy sheets and into phase cells of arbitrary size, application to one-dimensional harmonic oscillator and free particles, Equilibrium between two systems in thermal contact, bridge with macroscopic physics, Probability and entropy, Boltzmann entropy relation, Statistical interpretation of second law of thermodynamics, Boltzmann canonical distribution law and its applications, rigorous form of **equipartition of energy**. Partition function and its applications.
UNIT-5 TEACHING HOURS(15)	**Maxwellian distribution of speeds in an ideal gas**, **Distribution of speeds and of velocities**, experimental verification, distinction between mean, rms and most probable speed values, Doppler broadening of spectral lines. **Transition to quantum statistics:** h'as a natural constant and its implications, cases of particle in a one-dimensional box and one-dimensional harmonic oscillator, indistinguishability of particles and its consequences, **Bose-Einstein and Fermi-Dirac statistics**, applications to liquid helium, free electrons in a metal and photons in blackbody chamber, Fermi level and Fermi energy.
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The Teaching And Learning Strategies may be change as per requirement of the students and their capabilities.**
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10

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	3.	Viva-voce	10
	4.	Seminar/Symposia	10
	5.	Report writing	10
	6.	Workshop	10
	7.	Review of literature	10
	8.	Creativity/Innovation	10
	9.	Experimental Skill	10
	10.	Co-curricular activity	10
	11.	Attendance	10
	Total 160 marks equivalent reduced to CCA original marks 30.		
Exam Pattern	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.		
PERIODICAL REVISE OF SYLLABUS	1. **ANNUAL** 2. **However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one months.**		
SELECTED READINGS	• Reif, F. (2009). Fundamentals of statistical and thermal physics. Waveland Press. • Huang, K. (2009). Introduction to statistical physics. CRC press. • Mandel, L., & Wolf, E. (1965). Coherence properties of optical fields. Reviews of modern physics, 37(2), 231. • Richtmyer, F. K., Kennard, E. H., & Cooper, J. N. (1955). Introduction to modern physics (Vol. 747). New York: McGraw-Hill. • Ghatak, A. K., & Lokanathan, S. (2004). Quantum mechanics: theory and applications. Macmillan. • Lifshitz, E. M., & LD and Sykes Landau (JB). (1965). Quantum Mechanics; Non-relativistic Theory. Pergamon Press.		

PHYSICS PRACTICALS-III
Duration: 4 HR   MAX.MARKS: 50   Min. Marks: 20
Any twelve of the following experiments are to be performed. Few more experiments may be set at the institutional level. In examination two experiments are to be performed taking at least one from each section.   The distribution of marks in the practical examination will be as follows: (i) Two experiments   30 Marks   For each experiment, distribution of marks will be as follows: Figure: 2   Formula/Theory: 2   Observation: 7   Calculation and Result: 3   Precautions: 1   (ii) Viva voce   10   (iii) Records   10   Total   50 Marks

LIST OF EXPERIMENTS

- Study the characteristic of a given transistor PNP/NPN (CE, CB and CC configuration) and determine alpha and beta values.
- Study the characteristic of junction diode & Zener diode.
- Designs a Zener regulated power supply and study the regulation with various loads.
- Study of Half wave & Full wave rectification and application of L and P section filters.
- Study the characteristics of a field effect transistor (FET) and design and study of amplifier of finite gain.
- Study the characteristics of a unijunction transistor (UJT).
- Determination of Stefan's constant.
- Study the frequency responses of a transistor amplifier (bipolar/FET) obtain the input and output impedance of the amplifier.
- To study hysteresis by B-H curve using CRO.
- Using discrete component, study OR, AND, NOT logic gates, compare with TTL integrated circuits IC's.
- Application of operational amplifier as: (i) Inverter (ii) Non-Inverter (iii) differentiator (iv) Integrator.
- Design and study of an R-C phase shift oscillator.
- Study of a RC transmission line at 50 Hz.
- Study of LC transmission line at fixed and variable frequency.
- Study of RC circuits as integrating and differentiating systems with square input.
- To study the Networks theorems.
- To study the characteristics of a Thermister.

B.Sc. B.Ed-III Year				
COURSE CODE:	**CODE: BSCBED-355 b I**		COURSE TYPE : CORE	
COURSE TITLE :	**Paper I: Organic Chemistry**			
MAX.MARKS:	50	MIN.PASS MARKS	20	
THEORY EXAMINATION:	40	MIN.PASS MARKS	16	
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS	4	
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPENTIVE SESSION			
EXAMINATION	TERM END EXAMINATION		MONTHLY TEST	
DURATION	03 HR		1 HR	

Objective:

- To learn aboutChemistry of hydroxy compounds, Carbonyl compounds, Carboxylic Acids and its derivatives.
- To be familiar with chemistry of Nitrogen containing compounds , Biomolecules ,polymer and Drugs.
- To learn various techniques of spectrometric identification (U.V & I.R.) of organiccompounds.

Learning outcomes: - After completion of the course, student-teachers will be able to-

- Develop an understanding of chemistry of hydrocarbons and their halogenated derivatives.
- **Get familiar with chemistry of Nitrogen containing compounds, *Biomolecules,polymer and Drugs***
- Apply the principles of Alcohols classification and nomenclature in real life situation.
- Apply the knowledge of Ultraviolet (UV) and Infrared (IR) absorption spectroscopy to explain natural physical phenomena.
- Define the characteristics of carbonyl compounds, Carboxylic Acids and its derivatives.

UNIT-1 **TEACHING HOURS(15)**	**Chemistry of hydroxy compounds** **Alcohols** classification and nomeniclature .Monohydric alcohols-nomenclature, methods of formation by reduction of aldehydes, ketones, carboxylic acids and esters. Hydrogen bonding. Acidic nature. Reactions of alcohols. **Dihydric alcohols**-nomenclature, methods of formation, chemical reactions of vicinal glycols, oxidative cleavage [$Pb(OAc)_4$ and HlO_4] and pinacol-pinacolone rearrangement. **Trihydric alcohols**- nomenclature and methods of formation, chemical reactions of glycerol. **Phenols**: Nomenclature, structure and bonding. Preparation of phenols, physical properties and acidic character. Acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion. Reactions of phenols-electrophilic aromatic substitution, acylation and carboxylation. Mechanism of Fries rearrangement, Claisen rearrangement, Gatterman synthesis, Hauben-Hooesch reaction, Lederer-Manasse reaction and Reimer-Tiemann reaction. **Ethers and Epoxides:** Nomenclature of ethers and methods of their formation, physical properties, Chemical reactions, cleavage and auto oxidation, Ziesel's method.Synthesis of epoxides. Acid and base-catalyzed ring opening of epoxides, orientation of epoxide ring opening, reactions of Grignard and Organolithium reagents with epoxides.
UNIT-2 **TEACHIGN HOURS (15)**	**Carbonyl compounds** **Aldehydes and Ketones:** Nomenclature and structure of carbonyl group.Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, synthesis of aldehydes and ketones using 1, 3-dithianes, synthesis of ketones from nitriles and from carboxylic acid, Physical properties. **Mechanism of nucleophilic additions** to carbonyl group with particular emphasis on Benzoin, Aldol, Perkin and Knoevenagel condensations, Condensation with ammonia and its derivatives, Witting reaction, Mannich reaction. **Use of acetals as protecting group,** Oxidation of aldehydes, Baeyer-villiger oxidation of ketones, Cannizzaro reaction, MPV, Clemmensen, Wolff-kishner, $LiAlH4$ and $NaBH_4$ reductions, Halogenation of enolizable ketones. Introduction to unsaturated aldehydes and ketones.

UNIT-3 **TEACHING HOURS (14)**	**Carboxylic Acids and its derivatives** **Carboxylic Acids:** Nomenclature, structure and bonding, physical properties, acidity of carboxylic acids, effects of substituents on acid strength. Preparation of carboxylic acids. Reactions of carboxylic acids. Hell-Volhard-Zelinsky reaction. Synthesis of acid chlorides, esters and amides. Reduction of carboxylic acids. Mechanism of decarboxylation. Methods of formation and chemical reactions of unsaturated monocarboxylic acids. **Dicarboxylic acids**: Methods of formation and effect of heat and dehydrating agents. **Carboxylic Acid Derivatives**: Structure and nomenclature of acid chlorides, esters, amides and acid anhydrides. Relative stability of acyl derivatives. Physical properties, interconversion of acid derivatives by nucleophilic acyl substitution. Preparation of carboxylic acid derivatives, chemical reactions, mechanisms of esterification and hydrolysis (acidic and basic).
UNIT-4 **TEACHING HOURS(15)**	**Nitrogen containing compounds** **Nitroalkanes and Nitroarenes**: Preparation of nitroalkanes and nitroarenes.Chemical reactions of nitroalkanes. **Mechanisms of nucleophilic** substitution in nitroarenes and their reductions in acidic, neutral and alkaline media. Picric acid. Halonitroarenes: Reactivity. **Amines**: Structure and nomenclature of amines, physical properties.Stereochemistry of amines, Separation of a mixture of primary, secondary and tertiary amines, Structural features effecting basicity of amines, Amines salts as phase-transfer catalysts, Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles), reductive amination of aldehydic and ketonic compounds, Gabriel-phthalimide reaction, Hofmann bromamide reaction. Reactions of amines: Electrophilic aromatic substitution in aryl amines, reaction of amines with nitrous acid. Synthetic transformation of aryl diazonium salts, azo coupling. *Biomolecules ,polymer and Drugs :* Biomolecules:- carbohydrates ,proteins, vitamins, nuclic acids . Polymers : -Types of polymerization ,Natural and synthetic polymers and their uses. Drugs :-antacids, antihistamines , analgesics , antipyretics, antibiotics, and antifertility *Chemistry in everyday life: **-** in field of medicines,in food, in cleanising and sanitization.*

UNIT-5 **TEACHING HOURS(16)**	***Electromagnetic Spectrum: Absorption Spectra*** ***Ultraviolet (UV) absorption spectroscopy:*** *absorption laws (Beer-Lambertlaw), molar absorptivity, types of electronic transitions, effect of conjugation. Concept of cHRomophore and auxocHRome. BathocHRomic, hypsocHRomic, hypercHRomic and hypocHRomic shifts. UV spectra of conjugated enes and enones. Woodward Fieser rules for calculation of absorption maxima in dienes and unsaturated carbonyl compounds.* ***Infrared (IR) absorption spectroscopy:*** *molecular vibrations, Hooke's law, selection rules, intensity and position of IR bands, fingerprint region, characteristic absorption of various functional groups and interpretation of IR spectra of simple organic compounds.*

TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The Teaching and Learning Strategies may be change as per requirement of the students and their capabilities.**

CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10
Total 160 marks equivalent reduced to CCA original marks 30.		

Exam Pattern	**Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.**

PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. However, the Universitymay revise the syllabus at any time during the running session after giving a notice for a period one months.**

SELECTED READINGS	- Atkins, R. C., & Carey, F. A. (1997). *Organic chemistry: a brief course.* McGraw-Hill Science, Engineering & Mathematics. - Atkins, R. C., & Carey, F. A. (1997). *Organic chemistry: a brief course.* McGraw-Hill Science, Engineering & Mathematics**.** - Bahl, A., & Bahl, B. S. (1968). *A textbook of organic chemistry.* S. Chand & Company. - Bruckner, R. (2001). *Advanced organic chemistry: reaction mechanisms.* Elsevier. - Kalsi, P. S. (2000). *Organic reactions and their mechanisms.* New Delhi: New Age International. - Kalsi, P. S. (2007). *Organic Reactions: Stereochemistry and Mechanism.* New Delhi: New Age International. - Kalsi, P. S. (2008). *Stereochemistry conformation and mechanism.* New Delhi: New Age International. - Lowry, T. H., & Richardson, K. S. (1987). *Mechanism and theory in organic chemistry* (pp. 60-71). New York: Harper & Row.

B.Sc. B.Ed-III Year			
COURSE CODE:	**BSCBED-355 b II**	COURSE TYPE : CORE	
COURSE TITLE :	**Paper-II: Physical Chemistry**		
MAX.MARKS:	50	MIN.PASS MARKS	20
THEORY EXAMINATION:	40	MIN.PASS MARKS	16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS	4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE SESSION		
EXAMINATION	TERM END EXAMINATION	MONTHLY TEST	
DURATION	03 HR	1 HR	

Objective:

- To impart concepts in chemistry of Elementary Quantum Mechanics , *Molecular Orbital Theory , Photochemistry and physical properties of matter.*
- To learn *Fundamentals of* various techniques of spectrometric identification (Rotational and VibrationalSpectrum, Raman Spectrum, Electronic Spectrum) of organic compounds.
- The objective of this course is to provide practical knowledge and illustrative experiments about synthesis and characterization of inorganic complexes and Organic compounds, estimation of metal ions.

Learning outcomes: - After completion of the course, student-teachers will be able to:-

- Understand the Elementary Quantum Mechanics and Chemical Bonding.
- Get familiar with Molecular Orbital Theory.
- Define the Rotational and Vibrational Spectrum.
- Apply the Fundamentals of Spectroscopyin real life situation.

UNIT-1 TEACHING HOURS(15)	**Elementary Quantum Mechanics** • Black-body radiation, Planck's radiation law, photoelectric effect, heat capacity of solids, BoHR's model of hydrogen atom (no derivation) and its defects, Compton effect, De Broglie hypothesis, the Heisenberg's uncertainty principle, Sinusoidal wave equation, Hamiltonian operator, ScHRodinger wave equation and its importance, physical interpretation of the wave function, postulates of quantum mechanics, particle in one dimensional box. • ScHRodinger wave equation for H-atom, separation into tHRee equations (without derivation), quantum numbers and their importance, hydrogen like wave functions, radial wave functions, angular wave functions.
UNIT-2 TEACHIGN HOURS (14)	*Molecular Orbital Theory* *Basic ideas, criteria for forming M.O from A.O, construction of M.O's byLCAO-H_2^+, ion, calculation of energy levels from wave functions, physical picture of bonding and anti bonding wave functions, concept of orbitals and their characteristics. Hybrid orbitals - sp, sp^2, sp^3, calculation of coefficients of A.O.'s used in these hybrid orbitals. Introduction to valence bond model of H_2, comparison of M.O. and V.B. models.*

UNIT-3 **TEACHING HOURS (15)**	***Fundamentals of Spectroscopy-I*** • ***Spectroscopy:*** *Introduction: electromagnetic radiation, regions of thespectrum, basic features of different spectrometers, statement of the Born-Oppenheimer approximation, degrees of freedom.* • ***Rotational and Vibrational Spectrum:*** *Diatomic molecules, Energy levels of a rigid rotor(semi-classical principles), selection rules, spectral intensity, distribution using population distribution (Maxwell-Boltzmann distribution) determination of bond length, qualitative description of non-rigid rotor, isotope effect.* • ***Vibrational Spectrum:*** *Infrared spectrum: energy levels of simple harmonicoscillator, selection rules, pure vibrational spectrum, intensity, determination of force constant and qualitative relation of force constant and bond energies, effect of anharmonic motion and isotope on the spectrum, idea of vibrational frequencies of different functional groups.*
UNIT-4 **TEACHING HOURS(15)**	***Fundamentals of Spectroscopy-II*** • ***Raman Spectrum****: Concept of polarisability, pure rotational and purevibrationl Raman spectra of diatomic molecules, selection rules, energy levels and the respective transitions.* • ***Electronic Spectrum:*** *Concept of potential energy curves for bonding andantibonding molecular orbitals, qualitative description of selection rules andFrank-Condon principles.Qualitative description andtheir energy levels and the respective transitions.*
UNIT-5 **TEACHING HOURS (16)**	*Photochemistry and physical properties of matter* • ***Photochemistry:*** *Interaction of radiation with matter, difference betweenthermal and photochemical processes. Law of photochemistry: Grothus-drapper law, Stark-Einstein law, Jablonski diagram depicting variousprocesses occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), quantum yield, photosensitized reactions-energy transfer processes (simple examples).* • ***Physical properties of matter****: Optical activity, polarization (Clausius–Mossotti equation), orientation of dipoles in an electric field, dipole, moment, induced dipole moment, measurement of dipole moment temperature method and refractivity method, dipole moment and structure of molecules, magnetic properties-paramagnetism, diamagnetism and ferromagnetics.*
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The Teaching and Learning Strategies may be change as per requirement of the students and their capabilities.**

CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	Details of Continuous and Comprehensive Assessment (CCA) are as follows:		
	S. No.	CCA- Components	Max. Marks Allocation
	1.	Monthly test	20*3 Test=60
	2.	Quizzes and Assignments	10
	3.	Viva-voce	10
	4.	Seminar/Symposia	10
	5.	Report writing	10
	6.	Workshop	10
	7.	Review of literature	10
	8.	Creativity/Innovation	10
	9.	Experimental Skill	10
	10.	Co-curricular activity	10
	11.	Attendance	10
	Total 160 marks equivalent reduced to CCA original marks 30.		

Exam Pattern	**Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.**
PERIODICAL REVISE OF SYLLABUS	1. **ANNUAL** 2. **However, the Universitymay revise the syllabus at any time during the running session after giving a notice for a period one months.**
SELECTED READINGS	- Banwell, C. N., & McCash, E. M. (1994). *Fundamentals of molecular spectroscopy* (Vol. 851). New York: McGraw-Hill. - Chandra, A. K. (1994). *Introductory quantum chemistry*. Tata McGraw-Hill Education. - Levine, I. N., Busch, D. H., & Shull, H. (2009). *Quantum chemistry* (Vol. 6). Upper Saddle River, NJ: Pearson Prentice Hall. - Lewis, D., & Glasstone, S. (1960). *Elements of physical chemistry*. Macmillan. - Linderberg, J., & ÖHRn, Y. (2004). *Propagators in quantum chemistry*. John Wiley & Sons. - Lowe, J. P., & Peterson, K. (2011). *Quantum chemistry*. Elsevier. - Szabo, A., & Ostlund, N. S. (2012). *Modern quantum chemistry: introduction to advanced electronic structure theory*. Courier Corporation.

CHEMISTRY PRACTICALS-3

Duration:4 HR	MAX.MARKS: 50	Min. Marks: 20

Note: The students should be given exposure of any research labs and instrumentation center/reputed university-lab/industry/ government labs of northern region.

Inorganic Chemistry

Ex.1. Synthesis of an inorganic compound and gravimatric analysis   15

Organic Chemistry

Ex.2 Synthesis of Organic compounds   15

Physical Chemistry

Ex.4 Perform one of the experiments mentioned in the syllabus.   10

Ex.5 Vive-Voce   05

Ex.6 Practical-Record   05

Total   50 Marks

LIST OF EXPERIMENTS

B.Sc.B.Ed. Year III				
COURSE CODE:	BSCBED-355 c I		COURSE TYPE : CORE	
COURSE TITLE :	Development Biology			
MAX.MARKS:	50	MIN.PASS MARKS		20
THEORY EXAMINATION:	40	MIN.PASS MARKS		16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS		4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR			
EXAMINATION	TERM END EXAMINATION		MONTHLY TEST	
DURATION	3 HR		1 HR	

Objective :
- To learn about the comprehend the modern concepts of developmental biology.
- To learn about the developmental sequences in vertebrates.
- To learn about the Compare the development of organs and systems.

Learning Outcome: After completion of the course, student-teachers will be able**:**
- Comprehend the modern concepts of developmental biology.
- Understand the developmental sequences in vertebrates.
- Compare the development of organs and systems.

UNIT-1 TEACHING HOURS (15)	• Historical perpective , aims and scope of development bilogy, definition and phase of development, theories of development, epigensist and preformation, mosaic, regulative, gradient, spemanns, theory of organizers, Gemetogensis, origin of primordial germ cell(PGC), spermatogenesis, morphology of mature sperm, types of sperm, Oogenesis, General feature of mature ovum, polarity of egg. Symmetry of egg. Types of egg.
UNIT-2 TEACHING HOURS (14)	• Reproductive cycles (estrous and menstrual cycle). Events of fertilization, Mechanism of sperm transfer, Polyspermy preventing mechanism. Errors of fertilization and significance of fertilization, parthenogenesis, evolution of viviparity.
UNIT-3 TEACHING HOURS (16)	• Cleavage- Definiton, types, pattern and planes of cleavage, morulation, blastulation, types of blastula, gastrulation, Types of gastrulation mechanism, fate maps (with suitable examples), morphogenetic cell movement and their significance in gastrulation. Embryonic Induction, organizers, Competence. • Differentiation and organogenesis- differentiation, growth and organogenesis, development defects (teratology), senescence and ageing. Brief idea of animal tissue culture, Invitro fertilization, stem cells and culture media.
UNIT-4 TEACHING HOURS (15)	• Development of frog upto formation of advanced tadpole. • Metamorphosis of tadpole. • Hormonal control of metamorphosis.

UNIT-5 TEACHING HOURS (15)	• Embryogenesis of chick upto Neurulation • Extra Embryonic membranes in chick and salient feature of development of chick development up to 72 HR. • Placentation in mammals :- definition types, Classification on the basis of morphology and histology. Functions of placenta. • Regeneration :- Regenration mechanism in animal, steps of limb regeneration in Amphibians.
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:** | S. No.	CCA- Components	Max. Marks Allocation
---	---	---
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10	 Total 160 marks equivalent reduced to CCA original marks 30.
EXAMINATION PATTERN	**Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.**
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one months.**
SELECTED READINGS	• Arora, Mohan (1985). *Chordate Embryology*-Atma Ram & Sons. • Balinsky B.I. (1976). *Introduction to Embryology*-(W.B. Saunders, Philadelphia, • Hopper, A.F. and N.H. Hart (1981). *Foundations of Animal Development*. New Yark: Oxford University Press. • MacBride, E. W., & Sir, J. G. K. (1919). *Text-book of Embryology.* (Vol. 2). Macmillan and Company.

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- Marshall, A. M. (1893). *Vertebrate embryology: a text-book for students and practitioners*. GP Putnam's sons.
- McEwen R.S. (1999). *Vertebrate Embryology*. New Delhi: Oxford & IBM Publishing CO.
- McEwen, R. S. (1923). *Vertebrate embryology*. H. Holt.
- Rugh R. (1998). *Laboratory manual of Vertebrate Embryology*- Allied Pacific Pvt. Ltd.
- Sastry K.V. & Shukla Vinita (2008). *Developmental Biology*. Rastogi Publications,
- Shumway, W. (2002). *Introduction to vertebrate embryology*. Daya Books.

B.Sc.B.Ed. Year III			
COURSE CODE:	**BSCBED-355 c II**	COURSE TYPE : CORE	
COURSE TITLE :	**Environmental Studies, Ethology and Economic Zoology**		
MAX.MARKS:	50	MIN.PASS MARKS	20
THEORY EXAMINATION:	40	MIN.PASS MARKS	16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS	4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR		
EXAMINATION	TERM END EXAMINATION	MONTHLY TEST	
DURATION	3 HR	1 HR	

Objectives :

- Tolearn about to understand the energy sources, flow of energy and conservation;

- To learn about the understand the recycling of minerals and nutrients in ecosystem;

- To learn about the understand the dynamics of population; to understand causes of pollution;

- Tolear about the comprehend origin of life, animal behavior and economic importance of animals with wild life protection.

Learning Out Comes : After completion of the course, student-teachers will be able**:**

- To enable students to understand the energy sources, flow of energy and conservation;
- To understand the recycling of minerals and nutrients in ecosystem;
- To understand the dynamics of population; to understand causes of pollution;
- To comprehend origin of life, animal behavior and economic importance of animals with wild life protection.

UNIT-1 TEACHING HOURS (15)	- Environment: - Atmosphere, lithosphere and hydrosphere as habitats and ecological factors. - Abiotic factors: - Light and Temperature as ecological factors, limiting factors, - Liebig's law of minimum and Shelford Law of tolerance - Ecosystem: Types, structure, functions and example, Dynamics of Ecosystem, Ecological Pyramids, energy in ecosystem, productivity, - Biochemical cycle- water, nitrogen and sulphur cycles regarding of organic nutrients. - Elementary-statistics: central tendency, test of significance.
UNIT-2 TEACHIGN HOURS (14)	- Air pollution: sources, acid rain, photochemical smog, prevention and control - Water pollution: sources, prevention and control, eutrophication. - Noise pollution: sources, prevention and control. - Soil pollution: sources, prevention and control - Thermal pollution.

UNIT-3 TEACHING HOURS (15)	• Depletion of ozone layer. • Natural Disaster – Earthquake, Tsunami • Natural Resources and conservation – Non-Renewable and Renewable • Biomagfications
UNIT-4 TEACHING HOURS (16)	• Behavior: - Innate (tropism, Texas, reference instincts) and Acquired (learning and reasoning) • Motion: Classification of directional movements: - kinesis, tropism & taxes • Communication: - Definition, types of signal (touch, sound, Chemical, and visual), meta-comunication) phenomenon • Societies: characteristics and advantage with special reference to honey bee, and monkey
UNIT-5 TEACHING HOURS (15)	• Economic Importance of Invertebrates (Apiculture, Aquaculture, Sericulture). • Insects as pests and their management (Locust, Termite, and Caterpiller) • Economic Importance of vertebrates (Fish culture and Poultry culture.) • Wild life of India, causes of depletion of wild life, modes of wild life conservation, Red data book. Environmental legislations (Wildlife Protection Act, Environment act. Bio divergent act). Wild life scenario in and around central foot hills of the Arawali and the thar.
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**
CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10

	6.	Workshop	10
	7.	Review of literature	10
	8.	Creativity/Innovation	10
	9.	Experimental Skill	10
	10.	Co-curricular activity	10
	11.	Attendance	10
	Total 160 marks equivalent reduced to CCA original marks 30.		

EXAMINATION PATTERN	**Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.**
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. HOWEVER, THE UNIVERSITYmay revise the syllabus at any time during the running year after giving a notice for a period one months.**
SELECTED READINGS	- Agarwal, S. K. (2008). *Fundamentals of ecology*. APH Publishing. - Bailer, A. J. (2020). *Statistics for environmental biology and toxicology*. Routledge. - Chapman E (1988).*Ecology: Principle and Applications*– CambridgeUniversity Prss - Coleman, D. C., Callaham, M. A., & Crossley Jr, D. A. (2017). *Fundamentals of soil ecology*. Academic press. - Dash, M. C. (2001). *Fundamentals of ecology*. Tata McGraw-Hill Education. - Kormondy, E. J., & Brown, D. E. (1998). *Fundamentals of human ecology*. Pearson College Division. - Kumar HD (1986). *Modern concept of ecology* Vikas Publication House. - Nobel, P. S. (2003). *Environmental biology of agaves and cacti*. Cambridge University Press. - Odum, E. P., & Barrett, G. W. (1971). *Fundamentals of ecology* (Vol. 3, p. 5). Philadelphia: Saunders. - Pawar.V. S, (1998). *Mammalian Endrocrinology and Animal Behavior*. Hindi Edition, Jaipur: College Book Centre. - Sharma PD (1991).*Ecology and Environment*. Jaipur: Rastogi Publication. - Soni, K.C. (1999). Animal Ecology and Biostatistics. Hindi Edition, Jaipur: College Book Centre. - Woodward, F. I., & Sheehy, J. E. (2017). *Principles and measurements in environmental biology*. Elsevier. - Verma, P. S., & Agarwal, V. K. (2003). *Environmental Biology: Principles of Ecology*. Chand. - Vaccari, D. A., Strom, P. F., & Alleman, J. E. (2006). *Environmental biology for engineers and scientists* (Vol. 7, p. 242). New York: Wiley-Interscience.

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PRACTICAL

Duration:4 hours   **Max.Marks: 50**

Objectives: -
- To develop the skills of staining and mounting of embryos of chick/frog/insect as per UGC guidelines: to understand the development patterns of chick and frog. To enable students to analyses the physico-chemical and biological factors of water and soil sample; to identify and estimate quantitatively the aquatic organism and their adaptation; to observe the population growth patterns.

Practical work based of Paper I and II Course content-
- Study of different types of eggs (Insect, Frog, Hen)

- Study of eggs, cleavage, blastula, gastrula, neurula, tail bud, hatching, mature, tadpole larval metamorphic stages of toadle/forglet.

- Study of embryological slides of various stages of frog.

- Study of embryological slides of various stages of chick.

- Study of development of chick with the help of charts /CD/s /Video/ MM etc.

- Whole mounts: 18 HR, 24 HR, 33 HR, 48 HR, 56HR, 72HR, and 96 HR, of incubation period embryos.

- Study of primitive streak stage in living embryo after removal of the blastoderm from the egg or though multimedia film etsc

- Study of the embryo at various stages of incubation in vivo by making a window in the egg shell.

- Frog embryology – Study of spawn, identification of different stages tHRough model/charts/multimedia etc

- Simulation of an ecosystem in the laboratory.

- Determination of oxygen cotent of water sample by Winkler's method.

- Determination of chloride content of water sample

- Determination of sulphates content of water sample

- Determination of dissolved CO_2 content of water

- Determination of total solid content of water

- Determination of pH of soil sample

- Determination of water content in a given simple of soil

- Detection of salts i.e. phosphates, sulphates, nitrates and chlorides in a given sample of water.

- Exercise on mean, median, mode and test of significance

- Study and maintenance of Aquarium.

- Study of insect pests with respect to marks of identification, nature of damage and economic importance.

- Study of pest control appliances.

- Life cycle of honey bee, mouth parts, thoracic appendages (legs and wings) & sting apparatus of honey bee.

- Study of bee products, bee pests, bee enemies.

- Communication in honey bee.

- Study of life cycle of Bombyx mori.
- Study of any five equipments in sericulture.
- Submission of field visit report along with at least five photographs/sketch of insect pests.
- Visit of poultry culture/sericulture/apiculture.

Guidelines/Instructions for Practical Examination
MAX.MARKS: 50   **Time allowed: 4 HR.**

S. No.	Exercise	Marks
1.	Temporary mounting * one (Staining, identification, sketch)	**3**
2.	Simulated ecosystem	**3**
3.	Permanent slides –four (Identification with reasons)	**8**
4.	Applied Zoology/Ethology	**8**
5.	Ecological experiment	**6**
6.	Statistical exercise	**5**
7.	Practical record and slides	**5**
8.	Viva	**4**
9.	Project report and assignment	**8**

B.Sc.B.Ed. III Year			
COURSE CODE:	**BSCBED-355 d I**		COURSE TYPE : CORE
COURSE TITLE :	**Structure, Development and Reproduction in Flowering Plants**		
MAX.MARKS:	50	MIN.PASS MARKS	20
THEORY EXAMINATION:	40	MIN.PASS MARKS	16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS	4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR		
EXAMINATION	TERM END EXAMINATION		MONTHLY TEST
DURATION	3 HR		1 HR

Objective:
- To acquaint the students with the morphology, shape anatomy and classification of flowering plants.
- To acquaint students with the structure and processes of embryology associated with angiosperm plants.
- To acquaint the students with the basic anatomical plan of floral plants.

Learning Out Come:- After completion of the course, student-teachers will be able:
- To acquaint students with the morphology, anatomy, reproduction and classification offlowering plants.
- To acquaint students with the structure, development and processes associated with Angiosperm embryology;
- To acquaint students with basic body plan of a flowering plant.

UNIT-1 TEACHING HOURS (16)	• **The basic body plan of a flowering plant; Types of Plant Tissue and Tissue System.** *Anatomy of root, stem, leaves of monocots and dicots.* • **The shoot system:** The shoot apical meristems and its histological organization, vascularization of primary shoot in monocotyledons and dicotyledons, formation of internodes, branching pattern, monopodial sympodial growth, cambium and its functions, formation of secondary xylem, a general account of wood structure in relation to conduction of water and minerals, characteristics of growth rings, **sapwood and heart wood**, secondary phloem-structure, function relationships, periderm
UNIT-2 TEACHIGN HOURS (16)	• **Leaf:** Origin, development, arrangement and diversity in size and shape; internal structure in relation to photosynthesis and water loss, adaptations to water stress, stomatal types and trichomes, senescence and abscission. • **The Root System:** The root apical meristem and its organization, differentiation of primary and secondary tissues and their roles, structural modifications for storage, respiration, reproduction and for interaction with microbes.
UNIT-3 TEACHIN G HOURS (15)	• **Flower:** A modified shoot, development, structure and function of anther and pistil, Development of male and female gametophytes, **Types of***Embryo*,and ovules, Embryosac, micro and megasporogenesis, Types of pollination, attractions and rewards for pollinators.*Types of Inflorescence and flower.*

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UNIT-4 TEACHING HOURS (14)	• **Pollen-pistil interaction:** Sexual incompatibility, Genetic, physiological and biochemical basis of rejection reaction, methods to overcome incompatibility. **Fertilization: Double fertilization, Apomixis, Parthenocarpy**
UNIT-5 TEACHING HOURS (14)	• **Embryo: Embryo development in Dicots and monocots**, structure and function of suspensor, **Polyembryony.** • **Endosperm:** Types, Development, Structure and Functions of Endosperm, Haustorial and Ruminate Endosperm. • **Fruits: Development and types of fruits.**
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:** | S. No.	CCA- Components	Max. Marks Allocation
---	---	---
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10	 Total 160 marks equivalent reduced to CCA original marks 30.
EXAMINATION PATTERN	**Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.**
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one months.**
SELECTED READINGS	• Johri, B.M. (1984). Embryology of Angiosperms.Berlin: Springer-Verlag. • Pandey, A.K. (1997). Introduction to Embryology of Angiosperms. New Delhi: CBS Publishers &Distributors. • Shivanna, K.R. (2003). Pollen Biology and Biotechnology. New

	Delhi: Oxford & IBH Publishing Co.
	• Singh, P.C. Pande, D.&Jain,K. (2005).A Textbook of Botany: Structure, Development and Reproduction in Angiosperms. Meerut: Rastogi Publications.
	• Paula Rudall, (2007).Anatomy of flowering plants:an introduction to structure and development. New York: Cambridge University Press Cambridg,
	• Bouman, (1978).Development of ovule and seed coat structure in angiosperms.New Delhi: Today &Tomorrow's Printers & Publishers,

B.Sc.B.Ed. Year III			
COURSE CODE:	**BSCBED-355 d II**	COURSE TYPE : CORE	
COURSE TITLE :	**Plant Physiology**		
MAX.MARKS:	50	MIN.PASS MARKS	20
THEORY EXAMINATION:	40	MIN.PASS MARKS	16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS	4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR		
EXAMINATION	TERM END EXAMINATION	MONTHLY TEST	
DURATION	3 HR	1 HR	

Objective :

- To inform the students about the sub-cell physiological phenomena in plants.
- To educate the students about the relation of water in plants.
- To explain the working mechanism of plants to the students from the physiological point of view.
- To explain the development, differentiation and various aspects of physiology in angiosperm plants.

Learning Out Comes -After completion of the course, student-teachers will be able:

- To acquaint students with the sub-cellular physiological phenomena in plants;
- To understand the water relations in plants;
- To understand the functioning of plant from the physiological point of view;
- To understand various facets of growth, differentiation and physiology of flowering in angiosperms.

UNIT-1 TEACHING HOURS (16)	**Plant-water relations**: Importance of water to plant life; physical properties of water; **diffusion and osmosis; DPD** and **water potential concept, absorption and transport of water,***Ascent of sap*. **Transpiration and mechanism of opening and closing of stomata. Factors affecting transpiration.** **Translocation of organic substances**: **mechanism of phloem transport;** source – sink relationship; factors affecting translocation.
UNIT-2 TEACHIG N HOURS (16)	**Photosynthesis:** Historical aspects; **photosynthetic pigments**; action spectra and enhancement effect; **concept of two photosystems; photophosphorylation; C3cycle; C4 cycle,** *Chemosynthesis,* **CAM cycle, photorespiration;** factors influencing photosynthesis; **C3& C4 plants.** Significance of photosynthesis.
UNIT-3 TEACHING HOURS (15)	**Respiration: Aerobic and anaerobic respiration**; respiratory substrates; **Glycolytic pathway of glucose degradation to pyruvic acid; tricarboxylic acid cycle; electron transport mechanism (chemi – osmotic theory);** redox potential; **oxidative phosphorylation**, *Respiratory Quotient (R.Q.)*, pentose phosphate pathway. Factors affecting respiration.

UNIT-4 TEACHING HOURS (14)	• **Mineral nutrition**: criteria of essentiality of elements; essential **macro and micro elements and their role**; mineral uptake; deficiency and toxicity symptoms; water culture technique; foliar nutrition. • **Nitrogen and lipid metabolism:** Biology of nitrogen – fixation; importance of nitrate reductase and its regulation; ammonium assimilation; structure and function of lipids; fatty acid biosynthesis, oxidation; saturated and unsaturated fatty-acids; storage and mobilization of fatty acids.
UNIT-5 TEACHING HOURS (14)	• **Growth and development:** Definitions; **phases of growth and development; Growth Curve, kinetics of growth; Seed dormancy,** seed germination and factors of their regulation; **plant movements; the concept of photoperiodism,***Vernalisation,* **physiology of flowering; florigen concept; biological clocks; physiology of senescence, fruit ripening; plant hormones auxins, gibberellins, cytokinins, abscisic acid and ethylene,** history of their discovery, biosynthesis and mechanism of action, **photomorphogenesis; phytocHRomes and cryptocHRomes, their discovery, physiological role and mechanism of action.**
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The Teaching and Learning Strategies may be change as per requirement of the students and their capabilities.**
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:** | S. No.	CCA- Components	Max. Marks Allocation
---	---	---
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10	 Total 160 marks equivalent reduced to CCA original marks 30.
PERIODICAL REVISE OF SYLLABUS	1. ANNUAL 2. **However,the Unviersity may revise the syllabus at any time during the running year after giving a notice for a period one months**.
SELECTED	• Hopkins W.G. 1995, Introduction to Plant Physiology, John

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READINGS	Willey & Sons, New York USA. • Salisbury F.B. & Ross C.W. 1992 Plant physiology, Widsworth Publishing Co. California, U.S.A. • Taiz L. & Zeiger E, 1998, Plant Physiology (Second Edition) Sinauer Associates Inc. Publishing U.S.A.

BOTANY-PRACTICALS:-III		
Duration: 4 hours	MAX.MARKS: 50	Min. Pass Marks : 20

S. No.	Questions	Marks
1.	Experiment	4
2.	Exercise -Morphology & Anatomy	4
3.	SoiI Water tests and Field Exercise	4
4.	Experiments in tissue culture	5
5.	Phyto chemical tests (two)	5
6.	Spots (six). Two from each paper	12
7.	Viva-voce	8
8.	Records	8

Total = 50

Practical List

The following experiments are to be conducted:

1. Anatomy of primary and secondary growth in monocots and dicots using hand sections (or prepared slides). Structure of secondary phloem and xylem. Growth rings in wood. Microscopic study of wood in T.S., T.L.S. and R.L.S. Anomalous Sec. growth in *Boerhaavia, Nyctanthus* and *Dracaena*
2. Anatomy of leaf and Peel mount for stomatal types/trichomes.
3. Anatomy of the root. Primary and secondary structure.
4. Examination of a wide range of flowers available in the locality and methods of their pollination.
5. Structure of anther, microsporogenesis (using slides) and pollen grains (using whole mounts). Pollen viability using in vitro pollen germination.
6. Structure of ovule and embryo sac development (using serial sections).
7. Simple experiments to show vegetative propagation: leaf cuttings in Bryophyllum, Sansevieria, Begonia; stem cuttings in rose, salix, money plant, sugarcane and Bougainvillea.
8. Germination of non-dormant and dormant seeds.
9. To demonstrate osmosis using egg membrane, onion/tomato peels, potato osmoscope.
10. To study the effect of temperature and alcohol on the permeability of membranes.
11. To demonstrate plasmolysis.
12. To compare the water holding capacity of soils (clay, peat and sand).
13. To demonstrate transpiration pull.
14. To compare the rates of transpiration in different environmental conditions.
15. To demonstrate the evolution of oxygen during photosynthesis.
16. To compare the rates of photosynthesis under different environmental conditions.
17. To demonstrate the necessity of light, CO_2 and chlorophyll for photosynthesis.
18. Separation of photosynthetic pigments by paper cHRomatography.
19. Demonstration of aerobic respiration.
20. Demonstration of anaerobic respiration.
21. To demonstrate the liberation of CO_2 during aerobic respiration.

B.Sc. B.Ed. III Year			
COURSE CODE:	**BSCBED-355E-I**	COURSE TYPE :CORE	
COURSE TITLE :	**Complex Analysis**		
MAX.MARKS:	75	MIN.PASS MARKS	30
THEORY EXAMINATION:	60	MIN.PASS MARKS	24
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15	MIN.PASS MARKS	6
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR		
EXAMINATION	TERM END EXAMINATION	MONTHLY TEST	
DURATION	3 HR	1 HR	

Objective:

- The objective of this course is to introduce and develop a clear understanding of the fundamental concepts of Complex Analysis such as analytic functions, Cauchy-Riemann relations and harmonic functions and to make students equipped with the understanding of the fundamental concepts of complex variable theory. In particular, to enable students to acquire skill of contour integration to evaluate complicated real integrals via residue calculus.

Learning Outcomes: This course will enable the students to:

- Visualize complex numbers as points of R..and stereographic projection of complex plane on the Riemann sphere.
- Understand the significance of differentiability and analyticity of complex functions leading to the Cauchy-Riemann equations.
- Learn the role of Cauchy-Goursat theorem and Cauchy integral formula in evaluation of contour integrals.
- Apply Liouville's theorem in fundamental theorem of algebra.
- Understand the convergence, term by term integration and differentiation of a power series.
- Learn Taylor and Laurent series expansions of analytic functions, classify the nature of singularity, poles and residues and application of Cauchy Residue theorem.

UNIT-1 TEACHING HOURS (10)	**Complex Plane and functions** Complex numbers and their representation, algebra of complex numbers; Complex plane, Open set, Domain and region in complex plane; Stereographic projection and Riemann sphere; Complex functions and their limits including limit at infinity; Continuity, Linear fractional transformations and their geometrical properties.
UNIT-2 TEACHIGN HOURS (12)	**Analytic Functions and Cauchy-Riemann Equations** Differentiability of a complex valued function, Cauchy-Riemann equations, Harmonic functions, necessary and sufficient conditions for differentiability, Analytic functions; Analyticity and zeros of exponential, trigonometric and logarithmic functions; Branch cut and branch of multi-valued functions. Construction of an analytic function, conformal mapping, bilinear transformation, and its properties, elementary maps. $F(z) = \frac{1}{2}(z+1/z), z^2, 2z, \sin z$ and $\log z$

UNIT-3 TEACHING HOURS (12)	**Cauchy's Theorems and Fundamental Theorem of Algebra** Line integral, Path independence, Complex integration, Green's theorem, Anti-derivative theorem, Cauchy-Goursat theorem, Cauchy integral formula, Cauchy's inequality, Derivative of analytic function, Liouville's theorem, Fundamental theorem of algebra, Maximum modulus theorem and its consequences.
UNIT-4 TEACHING HOURS (10)	**Power Series** Sequences, series and their convergence, Taylor series and Laurent series of analytic functions, Power series, Radius of convergence, Integration and differentiation of power series, Absolute and uniform convergence of power series.
UNIT-5 TEACHING HOURS (16)	**Singularities and Contour Integration** Meromorphic functions, Zeros and poles of meromorphic functions, Nature of singularities, Picard's theorem, Residues, Cauchy's residue theorem, Argument principle, Rouche's theorem, Jordan's lemma, Evaluation of proper and improper integrals.
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10

Total 160 marks equivalent reduced to CCA original marks 30.

EXAMINATION PATTERN	**Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.**
PERIODICAL REVISE OF	**1.ANNUAL** **2.However, the Universitymay revise the syllabus at any time during**

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SYLLABUS	the running year after giving a notice for a period one months.
SELECTED READINGS	• Ahlfors, L. V. (1973). Complex Analysis.Mcgraw Hill • Conway, J. B. (2012). Functions Of One Complex Variable Ii (Vol. 159). Springer Science & Business Media. • Stein, E. M., &Shakarchi, R. (2003). Princeton Lectures In Analysis. Princeton University Press. • Stein, E. M., &Shakarchi, R. (2005). Real Analysis, Princeton Lectures In Analysis Iii. • Stein, R. Shakarchi (2003) Complex Analysis: Princeton Lectures In Analysis. Princeton University Press • Purohit And Goyal (2005). Complex Analysis, Jph. • Vasishtha, A. R. (2010).Complex Analysis: Krishna Prakashan Media (P) Ltd., Meeruth, 11thed, • Rudin, W. (2006). Real And Complex Analysis. Tata Mcgraw-Hill Education. • Rudin, W. (1970). Real And Complex Analysis P. 2. Mcgraw-Hill. • Lars V. Ahlfors (2017). Complex Analysis (3rd edition). McGraw-Hill Education. • Joseph Bak & Donald J. Newman (2010). Complex Analysis (3rd edition). Springer. • James Ward Brown & Ruel V. Churchill (2009). Complex Variables and Applications (9th edition). McGraw-Hill Education. • John B. Conway (1973). Functions of One Complex Variable. Springer-Verlag. • Copson, E. T. (1970). Introduction to Theory of Functions of Complex Variable. Oxford University Press. • Theodore W. Gamelin (2001). Complex Analysis. Springer-Verlag. • George Polya & Gordon Latta (1974). Complex Variables. Wiley. • Priestley, H. A. (2003). Introduction to Complex Analysis. Oxford University Press. • Titchmarsh, E. C. (1976). Theory of Functions (2nd edition). Oxford University Press.

B.Sc. B.Ed. III Year				
COURSE CODE:	**BSCBED-355e-II**		COURSE TYPE : CORE	
COURSE TITLE :	**Mechanics**			
MAX.MARKS:	75	MIN.PASS MARKS		30
THEORY EXAMINATION:	60	MIN.PASS MARKS		24
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15	MIN.PASS MARKS		6
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR			
EXAMINATION	TERM END EXAMINATION		MONTHLY TEST	
DURATION	3 HR		1 HR	

Objective:

- This course is intended to provide a treatment of topics in mechanics where the students will be able to apply the techniques used in deriving arrange of important results. The objective is to provide the student with knowledge of the mechanics and an appreciation of their application to real world problems.

Learning Outcomes: This course will enable the students to:

- Familiarize with subject matter, which has been the single centre, to which were drawn mathematicians, physicists, astronomers, and engineers together.

- Understand necessary conditions for the equilibrium of particles acted upon by various forces and learn the principle of virtual work for a system of coplanar forces acting on a rigid body.

- Determine the centre of gravity of some materialistic systems and discuss the equilibrium of a uniform cable hanging freely under its own weight.

- Deal with the kinematics and kinetics of the rectilinear and planar motions of a particle including the constrained oscillatory motions of particles.

- Learn that a particle moving under a central force describes a plane curve and know the Kepler's laws of the planetary motions, which were deduced by him long before the mathematical theory given by Newton.

UNIT-1 TEACHING HOURS (12)	**Statics** Equilibrium of a particle, Equilibrium of a system of particles, Necessary conditions of equilibrium, Moment of a force about a point, Moment of a force about a line, Couples, Moment of a couple, Equipollent system of forces, Work and potential energy, Principle of virtual work for a system of coplanar forces acting on a particle or at different points of a rigid body, Forces which can be omitted in forming the equations of virtual work.

UNIT-2 TEACHIGN HOURS (12)	**Centres of Gravity and Common Catenary** Centres of gravity of plane area including a uniform thin straight rod, triangle, circular arc, semicircular area and quadrant of a circle, Centre of gravity of a plane area bounded by a curve, Centre of gravity of a volume of revolution; Flexible strings, Common catenary, Intrinsic and Cartesian equations of the common catenary, Approximations of the catenary.	
UNIT-3 TEACHING HOURS (10)	**Rectilinear Motion** Simple harmonic motion (SHM) and its geometrical representation, SHM under elastic forces, Motion under inverse square law, Motion in resisting media, Concept of terminal velocity, Motion of varying mass.	
UNIT-4 TEACHING HOURS (12)	**Motion in a Plane** Kinematics and kinetics of the motion, Expressions for velocity and acceleration in Cartesian, polar and intrinsic coordinates; Motion in a vertical circle, projectiles in a vertical plane and cycloidal motion.	
UNIT-5 TEACHING HOURS (14)	**Central Orbits** Equation of motion under a central force, Differential equation of the orbit, (p, r) equation of the orbit, Apses and apsidal distances, Areal velocity, Characteristics of central orbits, Kepler's laws of planetary motion *Generalised coordinates; D'Alembert's principle and Lagrange's equations; Hamilton equations; moment of inertia; motion of rigid bodies in two dimensions.* *Equation of continuity; Euler's equation of motion for inviscid flow; stream-lines, path of a particle; potential flow; two-dimensional and axisymmetric motion; sources and sinks, vortex motion; Navier-stokes equation for a viscous fluid.*	

TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The Teaching and Learning Strategies may be change as per requirement of the students and their capabilities.**

CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)

Details of Continuous and Comprehensive Assessment (CCA) are as follows:

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10

	5.	Report writing	10
	6.	Workshop	10
	7.	Review of literature	10
	8.	Creativity/Innovation	10
	9.	Experimental Skill	10
	10.	Co-curricular activity	10
	11.	Attendance	10
	Total 160 marks equivalent reduced to CCA original marks 30.		
EXAMINATION PATTERN	**Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.**		
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one months.**		
SELECTED READINGS	- Biarez, J., &Hicher, P. Y. (1994). Elementary Mechanics Of Soil Behaviour: Saturated - Remoulded Soils. Aa Balkema. - De Gennes, P. G. (1985). Wetting: Statics And Dynamics. Reviews Of Modern Physics, 57(3), 827. - Hansson, S. O. (2012). A Textbook Of Belief Dynamics: Theory Change And Database Updating. Springer. - Loney, S. L. (1914). The Elements Of Statics And Dynamics. University Press. - Nguyen, Q. S. (2000). Stability And Nonlinear Solid Mechanics. - Poinsot, L. (1847). The Elements Of Statics. University Press. - Synge, J. L. (1960). Classical Dynamics. In Principles Of Classical Mechanics And Field Theory/Prinzipien Der Klassischen Mechanik Und Feldtheorie (Pp. 1-225). Springer, Berlin, Heidelberg. - Loney, S. L. (2006). An Elementary Treatise on the Dynamics of a Particle and of Rigid Bodies. Read Books. - Srivatava, P. L. (1964). Elementary Dynamics. Ram Narin Lal, Beni Prasad Publishers - Allahabad. - Synge, J. L. & Griffith, B. A. (1949). Principles of Mechanics. McGraw-Hill. - Ramsey, A. S. (2009). Statics. Cambridge University Press. - Ramsey, A. S. (2009). Dynamics. Cambridge University Press. - Varma, R. S. (1962). A Text Book of Statics. Pothishala Pvt. Ltd.		

Phase-I: Internship (4 weeks)

	Assessment is based on the following activities –	
Planning	Content Analysis and mode of transaction (Assignment in teaching subject)	**5**
	Creating and maintaining teaching learning material for the school (which can become valuable resource for the regular teachers of the school). a) TLM in any teaching subject	**5+5=10**
	Make lesson plan using 10- different methods in which 5 must involve,student could develop their own method (fusion based) with the help on teacher educator.	**5**
Planning & Execution	Identify a problem of action research and draft proposal on it.	**5**
	*Innovative Micro Teaching (5 Skills) (Teaching Subjects at secondary to senior secondary level)	5
Execution	One-week,regular observation of regular teacher (at the beginning of practice teaching.)	**5**
	Delivery of Four lessons based on model of teaching. (After each lesson of practice teaching student teacher need to discuss with subject teacher on their pedagogy and new practices it must be seconded.)	5
Assessment & Evaluation	Draft a report based on: - continuously and comprehensively evaluating students' learning for feedback into curriculum and pedagogic practice.	5
Regularity and involvement in different school activities	Observation of day-to-day * school activities and report of an in- depth study of four activities.	5
	TOTAL MARKS	**50**

* Note: Any of the above activity may be replaced as per the need of the course

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SUGGESTED SCHOOL ACTIVITIES: -

Select any one activity from each group given below: -

A Group: -
- Organization of cultural activities,
- Organization of literary activities
- Organization of games/sports.
- Framing of time table.
- Water resource management tHRough traditional methods.
- Prepare a report after interview of effective/good teachers.

B Group-
- Attending and organizing morning assembly
- Maintenance of classroom discipline
- Review of School Records
- Guidance and Counseling
- Gardening

CGroup -
- Organizing science fair,exhibition,science club,nature study
- Maintenance of School library
- Maintenance of School laboratories.
- Health and hygiene.
- Study on role of community for school improvement
- School mapping

D Group-
- Sensitization for environmental problems.
- Cleaning campaigning in school.
- School climate/Environment (any one aspect)
- Voluntary services.
- Mass awareness of social evils and taboos.
- Any other activity/s decided by the institute.

FOURTH YEAR

Course code	Title of the course	EVALUATION			
		External	Internal	Practical	Total
BSCBED-450	Environmental Studies*	70	30	-	100
BSCBED-451	Assessment for Learning	70	30	-	100
BSCBED-452	Agriculture	35	15	-	50
BSCBED-453	**Pedagogy of school subject-II**				
BSCBED-453 I	1. Mathematics	35	15	-	50
BSCBED-453 II	2. General Science	35	15	-	50
BSCBED-453 III	3. Chemistry	35	15	-	50
BSCBED-453 IV	4. Biology	35	15	-	50
BSCBED-453 V	5. Physics	35	15	-	50
BSCBED-454	**Content: (PCB & PCM)**				
BSCBED-454 a I	1. Physics I	40	10	50	100
BSCBED- 454 b I	2. Chemistry I	40	10	50	100
BSCBED- 454 c I	3. Zoology I	40	10	50	100
BSCBED- 454 d I	4. Botany I	40	10	50	100
BSCBED- 454 e I	5. Mathematics I	80	20	-	100
CCA					25
Prayer, Yoga, Meditation & Festival etc					25
BSCBED- 455	**Internship (16 weeks)**				200
Total					750

*Marks of Compulsory Subject shall not be added in the Total Marks.
Internship (16Weeks) included in Total Marks.

B.Sc.B.Ed. IV Year			
COURSE CODE:	BSCBED-450	**COURSE TYPE: CORE**	
COURSE TITLE:	**Environmental Studies (Comp.)**		
MAX. MARKS:	**50**	MIN. PASS MARKS:	**20**
THEORY EXAMINATION	35	MIN. PASS MARKS:	14
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15	MIN. PASS MARKS:	6
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives:

- To create the awareness about environmental problems among people.
- To impart basic knowledge about the environment and its allied problems.
- To develop an attitude of concern for the environment.
- To motivate public to participate in environment protection and environment improvement.
- To acquire skills to help the concerned individuals in identifying and solving environmental problems.
- Make enable to striving to attain harmony with Nature.

Learning outcome: After completion of the course, student-teachers will be able -

- To understand background of EVS as a composite area of study that draws upon the science, social science and environs mental education.
- To develop understanding about various ecosystems and biodiversity.
- Helping student to develop the ability to plan comprehensive units for environmental management and conservation.
- Understanding about the issues of conservation and environmental regeneration have been infused at appropriate places in all the textbooks.
- To analyze and understand environment concerns tHRough the process of inquiry.
- To develop a sense of awareness about the environment hazards and its causes and remedies.

UNIT-1 TEACHING HOURS (12)	**Introduction to Environmental Studies** - Environmental studies: Historical background, Concept, Nature and Scope of EVS. - Natural and Social Environment: Concept, its Components, and Relationship, Man & Environment, Man on Environment. - Disciplinary and Multidisciplinary approach of EVS. **Assignment:** - Visit a natural or man made site (park/forest/zoo/KVK/forest department etc) then discuss with student about their perception on natural environmental and its relation with social environmental. - Conduct awareness campaigning for plantation of Tulsi, Neem, and Khejri etc.

UNIT-2
TEACHING HOURS (12)
	Eco-systems
	• Concept of an Ecosystem.
	• Structure and function of an Ecosystem.
	• Producers, Consumers and decomposers.
	• Energy flow in Ecosystem.
	• Ecological Succession.
	• Food Chain, Food webs and Ecological pyramids.
	• Introduction, Types, Characteristic Features, Structure and Function of the following Ecosystem-
	  ▪ Forest Ecosystem.
	  ▪ Grassland Ecosystem.
	
	Assignment:
	• Celebrate Important relevant days related to environmental conservation (such as earth day, world environmental days etc) in school or out of school with the help of students and make a systematic report on entire activities or work
	• Make a bulletin board material on "Role of Individual in prevention of Pollution" and analyze its impact on students and teachers of schools.

UNIT-3 **TEACHING HOURS (12)**	**Biodiversity Its Conservation** • Introduction – Definition: Genetic, Species and Ecosystem Diversity. • Value of Biodiversity & Biodiversity at Global, National & Local levels. • Hot-Spots of Bio-diversity. • THReats to Bio-diversity: Habitat loss, poaching of Wild life, Man Wild life Conflicts. • Conservation of Bio-diversity: In-situ and Ex-situ conservation of Bio-diversity. **Assignment:** • Conduct an activity in school, in which ask students to get opinion of their grandparents in changing life style and their merits and demerits/or collect their ideas on local products which can be helpful in healthy life style the pupil teacher will compile their experiences and draft a report then present it in class. • Conduct a seminar in your village/ district /town in which invite local people of various socio-economic/socio cultural background to present their experiences on sustainable agriculture.
UNIT-4 **TEACHING HOURS (11)**	**Environmental Issues** • Meaning, Concept, Process, Effects and Preventive. Action of Acid rain, Global warming and cooling. • Natural & Manmade disasters. • Meaning, Concept, Effects and Preventive action of • Water pollution. • Air Pollution. • Noise Pollution. • Land or Soil pollution.

	Assignment:
	• Conduct an orientation programme in rural / urban school on waste management.
	• Organize a planned Visit to urban or rural area to study about waste produced by human, after visiting the site, present your report in local community to create awareness for resolution of the problem.
UNIT-5 TEACHING HOURS (11)	**Environmental Conservation & Management** • Meaning, Concept and Importance of Environmental Conservation & Management. • Role of women in Conservation: Chipko Movement, Khejri Movement. • Consumerism and waste generation and its management. • Agricultural/Urban waste: their impact and management. **Assignment:** • Analyze the direct or indirect message of Traditional Culture/folk songs of your area for social or natural environment enhancement. • Plant at least one tree and cultivate it tHRoughout the years.
TUTORIALS	**One tutorial class once a week (12)**
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**
CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

Details of Continuous and Comprehensive Assessment (CCA) are as follows:

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	**Monthly Test**	**10X6 Test = 60**
2	**Presentation**	**10**
3	**Group Discussion**	**10**
4	**Debate**	**10**
5	**Participation and Presentation in Seminar**	**10**
6	**Report Writing**	**10**
7	**Viva Voce**	**10**
8	**Attendance***	**10**
9	**Co-curricular Activity**	**10**
10	**Team Teaching**	**10**

	EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):
	CCA will be reduced to 30 marks or 15 marks (as per course weightage).
	Formula: Marks obtained/Total marksX30
	For example: $60 \div 160 \times 30 = 11.25$
	PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.
	PROVISO-II: Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course.
	*Attendance in Lectures and Practical
	
	                        Percentage **Marks Allotted**
	                    75% to 80% 02
	                    81% to 85% 04
	                    86% to 90% 06
	                    91% to 95% 08
	                    Above 96% 10

Examination Pattern	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	**1. ANNUAL** **2. However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• Bahuguna, Sundarlal (1996). Dharti ki Pukar. Radhakrishna Publication: Delhi. • Kaushik,A. and Kaushik, C.P.(2004). Perspectives in Environmental studies. New Age International(P) Ltd. Publishers: New Delhi. • Goel, M.K. (2006). Paryavaran Addhyayan. Vinod Pustak Mandir: Agra. • Rathore, H.C.S., Bhattacharya, G. C., Singh, S.K., Singh, M. and Gardia,A.(2008). Society and Environmental Ethics. Seema Press: Varanasi. • Sharma,P.D.(2001).Ecology And Environment. Rajson Printers: New Delhi. • Shukla, C.S.(2007). Paryavaran Shiksha. Alok Prakashan: Lucknow. • Singh, S.K. (2008) Environmental Education and Ethics. Amrit Prakashan: Varanasi. • Singh, S.K. (2010). Fundamentals of Environmental Education.Sharda Pustak Bhawan: Allahabad. • Srivastava, P. (2005). Paryavaran Shiksha, Madhya Pradesh Hindi Granth Academy: Bhopal. • NCERT (2004). Environmental Education in Schools. NCERT: New Delhi. • NCERT (2011). Teachers' Handbook on Environmental Education for the Higher Secondary Stage, DESM, NCERT: New Delhi. • Ram,P.S. and Singh,R.(2013). Paryawaran Shiksha Ke Ubharate Aayam. Sharda Pustak Bhawan: Allahabad

B.Sc.B.Ed. IV Year			
COURSE CODE:	**BSCBED-451**	**COURSE TYPE:**	**CORE**
COURSE TITLE:	**Assessment for Learning**		
MAX. MARKS:	**100**	MIN. PASS MARKS:	**40**
THEORY EXAMINATION	70	MIN. PASS MARKS:	28
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	30	MIN. PASS MARKS:	12
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives:
- To Understand Concept of Measurement Assessment and Evaluation.
- To Understand Types of Measurement and Evaluation.
- Make to Know about Continuous and Comprehensive Evaluation.
- To Understand Evaluation Tools.
- Make to Know about Characteristics of Good Evaluation.
- Make to Know about analysis process of Students.

Learning Outcomes: After completion of the course, students will be able to:
- To understand assessing children's progress, both in terms of their psychological development and the criteria provided by the curriculum.
- To provide broad outlook to go beyond the limited context of syllabus-based achievement testing, achievement scores in a subject linked with the child's overall development.
- Introduce student teachers to the history of evaluation and current practices.
- Understand the different dimensions of learning and related Evaluation procedures, tools and techniques. Analyse, Manage and interpret assessment data.
- Understanding the policy perspectives on examination and evaluation and their implementation practices. Assessment for culturally responsive in diverse classroom.
- Develop critical understanding of issues in evaluation and explore realistic, comprehensive and dynamic assessment process which is culturally responsive for use in the classroom.
- Develop enabling processes which lead to better learning and more confident and creative learners.

UNIT-1 **TEACHING HOURS (24)**	**Concept of Evaluation** • Meaning & concept of Assessment, Measurement & Evaluation and their Interrelationship, Purpose of Evaluation (Prognostic, Monitoring of Learning, Providing Feedback, Promotion, Diagnosing). Principles of Assessment. • Functions of Measurement and Evaluation, Steps of Evaluation Process, Types of Measurement, Tools of Measurement and Evaluation. Techniques of Evaluation. **Assignment:** • Observe the teaching learning process in class room and prepare a report and feedback on it. • Conduct a group discussion on differnce between Assessment, Measurement and Evaluation.

UNIT-2 **TEACHING HOURS (24)**	**Type of Evaluation** • Classification of Assessment: Base on purpose (Prognostic, Formative, Diagnostic and Summative), Scope (Teacher made, Standardized) Attribute measured (Achievement, Aptitude, Attitude, etc.), Nature of information gathered (Qualitative, Quantitative) Mode of response (Oral and written), Nature of interpretation (norm referenced, criteria referenced). • Item Analysis. **Assignment:** • Presentation of papers on examination and evaluation policies. • Prepare a diagnostic test of any subject and apply it on students and give suggestions for improvement.
UNIT-3 **TEACHING HOURS (24)**	**Continuous and Comprehensive Evaluation** • Meaning, concept need and process and characteristics of CCE. • Assessment of Attitude and Values, Interest, Intelligence, Personality, self–concept items and procedures for their assessment. • Grading: Concept, types and Application, Indicators for grading. **Assignment:** • Prepare a plan for continuous and comprehensive evaluation of students. • To assess self concept of the students in class room and provide them feedback for it.
UNIT-4 **TEACHING HOURS (22)**	**Evaluation Tools** • Use of projects, Assignments, Worksheet, Practical Work, and Performance based activities, seminars and reports as assessment devices. • Self, Peer and Teacher Assessment. • Commercialization of assessment. • Construction an Achievement test • Typology of questions. **Assignment:** • Organise a group activity (like competition/story telling/reading/writing) and get it assessed by self, peer and teacher. • Draft a feedback form about overall performance of students from parents and teacher, evaluate its effectiveness too.
UNIT-5 **TEACHING HOURS (22)**	**Evaluation Tools** • Construction and Selection of items, Guidelines for Construction of test items, assembling the test items, Guideline for administration. • Characteristics of Good Evaluation System– Reliability, Validity, Objectivity, Comparability, Practicability. • Analysis and interpretation of student's performance processing test, performance, calculation of percentage (Measures of Position), Central tendency measurement, Co-efficient of Correlation, Product Moment and Rank difference, Graphical Representations. **Assignment:** • Determination of Reliability or Validity of any self made test. • Construction, administration and interpretation of self made achievement text.

TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**

CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)

Details of Continuous and Comprehensive Assessment (CCA) are as follows:

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	**Monthly Test**	**10X6 Test = 60**
2	**Presentation**	**10**
3	**Group Discussion**	**10**
4	**Debate**	**10**
5	**Participation and Presentation in Seminar**	**10**
6	**Report Writing**	**10**
7	**Viva Voce**	**10**
8	**Attendance***	**10**
9	**Co-curricular Activity**	**10**
10	**Team Teaching**	**10**

EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):
CCA will be reduced to 30 marks or 15 marks (as per course weightage).
Formula: Marks obtained/Total marksX30
For example: $60 \div 160X30 = 11.25$
PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.
PROVISO-II: Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course.
*Attendance in Lectures and Practical

Percentage	Marks Allotted
75% to 80%	02
81% to 85%	04
86% to 90%	06
91% to 95%	08
Above 96%	10

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	**1. ANNUAL** **2. However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• अस्थाना, विपिन (२००९). मनोविज्ञान और शिक्षा में मापन एवं मूल्यांकन. अग्रवाल प्रकाशनः आगरा. • पाल, हंसराज एवं शर्मा, मंजूलता (२००९). मापन, आकलन एवं मूल्यांकन. शिक्षा प्रकाशनः जयपुर. • पाण्डेय, श्रीधर (२०१०). शिक्षा में मापन मूल्यांकन. भवदीय प्रकाशनः फैजाबाद. • शर्मा, ज्योति (२००९).शैक्षिक मापन एवं मूल्यांकन. अग्रवाल प्रकाशनः आगरा. • Ecclestone, Kathryn (2010). Transforming formative assessment in lifelong learning. Mc Graw Hill. Eng. • गुप्ता, एस. पी.(२०१०). आधुनिक मापन एवं मूल्यांकन. प्रयागराज : शारदा पुस्तक मन्दिर.

B.Sc.B.Ed. IV Year				
COURSE CODE:	**BSCBED-452**		**COURSE TYPE: CORE**	
COURSE TITLE:	**Agriculture (Specialization)**			
MAX. MARKS:	**50**	MIN. PASS MARKS:	**20**	
THEORY EXAMINATION	35	MIN. PASS MARKS:	14	
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15	MIN. PASS MARKS:	6	
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**			
EXAMINATION	**TERM END EXAMINATION**		**MONTHLY TEST**	
DURATION	**03 HR**		**01 HR**	

Objectives:

Learning outcomes: - On completion of the course, the student teacher will be able to
- Understand the meaning and scope of agriculture.
- Understand all about seeds, imported weed, manures etc.
- Acquire skills to practices of seed sowing, planting materials etc.
- Understand practices of different ornamental and horticulture crops.
- Recognise different field practices like earthing, hoeing, weeding watering etc.
- Inculcate healthy values related to work culture.

UNIT-1 TEACGING HOURS (10)	Agriculture: Meaning, definition, scope, history, branches and objectives
UNIT-2 TEACGING HOURS (12)	Soil Science: Definition of pedology, soil management, soil erosion, soil conservation practices; structure of soil, soil profile; soil fertility and productivity, essential plant nutrients. Fertilizers and manures including bio-fertilizers. Identification of manures and fertilizers
UNIT-3 TEACGING HOURS (12)	Irrigation: Definition, method of irrigation, systems of irrigation, drainage, irrigation pattern of India.
UNIT-4 TEACGING HOURS (12)	Horticulture: Definition, branches of horticulture, layout of orchards, propagation by seeds and by vegetative means; Pot filling technique; Planning, planting and maintaining lawn; Practice related to landscaping. .
UNIT-5 TEACGING HOURS(12)	Agricultural practices: Preparation of land, selection of seeds, watering, thinning, hoeing and weeding, harvesting of crop, identification of important agricultural tools, trees and crop plants. Minor project preparation on agriculture.

	Practicum/Field Work(any two of the following)
	1. Identification of an agronomy of following crops: Wheat, Bajra,Maize, Rose etc. 2. Agricultural Processes:Irrigation, TrainingandPruning,Hoeing and Weeding,SeedBed
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**
CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	Details of Continuous and Comprehensive Assessment (CCA) are as follows:

SR.NO.	CCA: COMPONENT	MAXIMUM MARKS
1	**Monthly Test**	**10X6 Test = 60**
2	**Presentation**	**10**
3	**Group Discussion**	**10**
4	**Debate**	**10**
5	**Participation and Presentation in Seminar**	**10**
6	**Report Writing**	**10**
7	**Viva Voce**	**10**
8	**Attendance***	**10**
9	**Co-curricular Activity**	**10**
10	**Team Teaching**	**10**

EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):
CCA will be reduced to 30 marks or 15 marks (as per course weightage).
Formula: Marks obtained/Total marksX30
For example: 60÷160X30 =11.25
PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.
PROVISO-II: Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course.
*Attendance in Lectures and Practical

Percentage	Marks Allotted
75% to 80%	02
81% to 85%	04
86% to 90%	06
91% to 95%	08
Above 96%	10

Examination Pattern	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	**1. Annual** **2. However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• Bleasdale, J. K. A. (1973). *Plant physiology in relation to horticulture*. Macmillan International Higher Education. • Dubey, D. K. (2008). *Fruit Production in India.*Meerut: Rama Publishing House. • Edmond, J. B., Senn, T. L., Andrews, F. S., &Halfacre, R. G. (1975). *Fundamentals of horticulture* (No. 4th ed.). McGraw-Hill, Inc. • Panda, S. C. (2005). *Agronomy*. Agrobios. Varanasi:Kushal Publications and Distributors. • Sing, Jaiveer (2002).*Plant Propagation & Nursery Husbandry*. Meerut: Rama Publishing House. • Singh, J. (2014). *Basic Horticulture*. New Delhi" Kalyani publishers.

B.Sc.B.Ed. IV Year			
COURSE CODE:	**BSCBED-453-I**	**COURSE TYPE:**	**CORE**
COURSE TITLE:	**Pedagogy of Mathematics**		
MAX. MARKS:	**50**	MIN. PASS MARKS:	**20**
THEORY EXAMINATION	35	MIN. PASS MARKS:	14
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15	MIN. PASS MARKS:	6
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives:

- Understand the need for teaching-learning of Mathematics in secondary classes.
- Develop a critical understanding about the aims and objectives of Mathematics in a Democratic and Secular country.
- Understand the nature of Mathematics curriculum and its pedagogical issues.
- Critique and develop suitable evaluation mechanisms in Mathematics
- Develop the ability to organize co-curricular activities and community resources for promoting Mathematics learning.
- Understand the Approaches to teaching of mathematics
- Understand the Concept of Teaching Skills

Learning outcome: After completion of the course, student-teachers will be able -

- Develop insight into the meaning, nature, scope and objective of mathematics education.
- Learn important mathematics: mathematics is more than formulas and mechanical procedures.
- See mathematics as something to talk about, to communicate tHRough, to discuss among them-selves to work together on; Pose and solve meaningful problems.
- Appreciate the importance of mathematics laboratory in learning mathematics.
- Stimulate curiosity, creativity and inventiveness in mathematics.
- Develop competencies for teaching-learning mathematics tHRough various measures.

UNIT-1 **TEACHING HOURS (12)**	**Nature and Scope of Mathematics** - Meaning, Nature and Scope of Mathematics teaching. - History of mathematics teaching and contribution of mathematician with reference to–Bhaskaracharya, Aryabhatta, Ramanujan, Euclid, Pythogores etc. - Importance of Aims and Objectives of Mathematics Teaching. - Co-relation with other subjects of Mathematics. **Assignment:** - Prepare a model of Pythagoras Theorem/Cube, Cuboid, and Cone etc. - Organise seminar on contribution of mathematician.

UNIT-2 **TEACHING HOURS (12)**	**Aims and Objectives of Teaching School Mathematics** • Aims and general objectives of teaching mathematics, Bloom's Digital Taxonomy (Cognitive, Effective and Psychomotor) in terms of Instructional Behaviour, the objectives of school education; writing specific objectives of various content areas in mathematics like algebra, geometry, trigonometry, etc. • Approaches to teaching of mathematics – Analytic-Synthetic, Inductive-Deductive, Heuristic, Problem Solving, Project and Laboratory etc. • Using various techniques of teaching mathematics viz-oral, written, drill, assignment, team teaching, supervised study and programmed learning. **Assignment:** • Organise workshop on techniques of teaching mathematics. • Organise a training program on Bloom's Digital Taxonomy.
UNIT-3 **TEACHING HOURS (12)**	**Planning** • Concept, Meaning and Objectives of Mathematics teaching Plan (Lesson Plan, Unit Plan, Yearly Plan) and Preparation of these plans. • Meaning and Concept of Teaching Skills. • Micro Teaching-Meaning, Need and Importance of Micro Teaching Cycle and its Features. • Concept, Meaning, Principles and Objectives of Curriculum, Characteristics of good Curriculum. • Dale cone of experiences. **Assignment:** • Prepare and present a lesson tHRough power point presentation on any topic of your choice. • Organise a training program on Micro Teaching.
UNIT-4 **TEACHING HOURS (11)**	**Teaching-learning Resources in Mathematics** • Meaning, Objectives, Scope, Characteristics, Types, Preparation, Presentation and Importance of Teaching Learning Material. • Planning and Importance of Mathematics Laboratories and its uses. • Qualities of Mathematics Text Books at Secondary Level. • Audio-Visual Aids- Meaning, Concept, Utility and Significance of Different types of Audio-Visual Aids in the teaching of Mathematics. **Assignment:** • Conduct a training program on use of Different types of Audio-Visual Aids in the teaching of Mathematics. • Make a report on Mathematics Teaching Planning and Importance of Mathematics Laboratories and its uses.

UNIT-5 TEACHING HOURS (12)	**Assessment and Evaluation** • Meaning, concept and construction of Achievement test, diagnostic test and remedial teaching. • Types of Questions, Characteristics of a good test. • Blue print: Meaning, concept, need and construction. • Continuous and Comprehensive Evaluation: Meaning, concept, • importance and limitations. • Models of Teaching. **Assignment:** • Construction, administration and interpretation of an achievement test of any standard of school. • Make a diagnostic test of your subject and apply it in school, after discussion with concerning teacher and give remedial measure.
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**
CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	**Monthly Test**	**10X6 Test = 60**
2	**Presentation**	10
3	**Group Discussion**	10
4	**Debate**	10
5	**Participation and Presentation in Seminar**	10
6	**Report Writing**	10
7	**Viva Voce**	10
8	**Attendance***	10
9	**Co-curricular Activity**	10
10	**Team Teaching**	10

EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):
CCA will be reduced to 30 marks or 15 marks (as per course weightage).
Formula: Marks obtained/Total marksX30
For example: 60÷160X30 =11.25
PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.

	PROVISO-II: Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course.
	***Attendance in Lectures and Practical**
	Percentage Marks Allotted
	75% to 80% 02
	81% to 85% 04
	86% to 90% 06
	91% to 95% 08
	Above 96% 10
EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	1. **ANNUAL** 2. **However,the Unviersity may revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• धाकड़, परशुराम एवं त्रिवेदी, शिल्पा (2009). गणित शिक्षण विधियाँ. साहित्यागार चोड़ा रास्ताः जयपुर. • मंगल, एस.के. (2005). गणित शिक्षण. आर्य बुक डिपो. नई दिल्ली. • शर्मा, एच.एस. (2005). गणित शिक्षण. राधा प्रकाशन मन्दिरः आगरा. • नेगी, जे.एस. (2007). गणित शिक्षण. विनोद पुस्तक मन्दिर. आगरा. • सिंह,योगेश कुमार (2010). गणित शिक्षण आधुनिक पद्धतियाँ. ए.पी.एच.पब्लिशिंग कॉर्पोरेशनः नई दिल्ली–02. • कुलश्रेष्ठ, अरूण कुमार (2013). गणित शिक्षण. आर. लाल.बुक डिपोः मेरठ

B.Sc.B.Ed. IV Year			
COURSE CODE:	**BSCBED-453-II**	**COURSE TYPE: CORE**	
COURSE TITLE:	**Pedagogy of General Science**		
MAX. MARKS:	**50**	MIN. PASS MARKS:	**20**
THEORY EXAMINATION	35	MIN. PASS MARKS:	14
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15	MIN. PASS MARKS:	6
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives:

- To develop the ability to Students insight on the meaning and nature of General science for determining aims and strategies of teaching- learning.
- To develop the ability to Students appreciate the fact that every child possesses curiosity about his/her natural surroundings.
- Students will be able to identify and relate everyday experiences with learning of science.
- Students will be able to integrate the science knowledge with other school subjects.
- Students will be able to analyze the contents of science with respecttopots, branches, process skills, knowledge organization and other critical issues.
- Students will be able to identify the concepts of science.

Learning outcomes: After completion of the course, student-teachers will be able to:-

- Develop insight on the meaning and nature of General science for determining aims and strategies of teaching-learning.
- Appreciate that science is a dynamic and expanding body of knowledge.
- Appreciate the fact that every child possesses curiosity about his/her natural surroundings.
- Identify and relate everyday experiences with learning of science.
- Appreciate various approaches of teaching- learning of science.
- Explore the process skill in science and role of laboratory in teaching-learning.
- Use effectively different activities /experiments /demonstrations /laboratory experiences for teaching-learning of science.
- Integrate the science knowledge with other school subjects.
- Analyze the contents of science with respecttopots, branches, process skills, knowledge organization and other critical issues.
- Develop process-oriented objectives based on the content themes/units.
- Identify the concepts of science that are alternatively conceptualized by teachers and students in general.

UNIT-1 TEACHING HOURS (12)	**Nature and Scope of General Science Teaching** • Meaning, Nature and Scope of General Science teaching. • Contribution of Scientist:-Har Govind Khurana, J .C.Boss, C.V. Raman. Chander Shekhar, A.P.J.Kalam. • Importance, Aims and Objectives of General Science Teaching. • Co-relation with other Subjects Journal and Referenced Book and daily routine. **Assignment:** • Group discussion on importance of General Science. • Organise seminar on Contribution of Scientist in General Science and preapre a report.
UNIT-2 TEACHING HOURS (12)	**Aims and Objectives** • Bloom's Taxonomy (Cognitive, effective and psycho. motor) In terms of Instructional Behavior. • Quality and responsibilities of Science teacher. • Methods of General Science teaching Subject- lecture method, Demonstration, Lab Method, Problem Solving, Heuristics Project Method, Inductive and deductive Method. • Techniques of General Science Teaching. **Assignment:** • Organise workshop on techniques of teaching General Science. • Organise a training program on Bloom's Digital Taxonomy.
UNIT-3 TEACHING HOURS (12)	**Planning** • Concept Meaning and Objectives Teaching Plan (Lesson Plan, Unit Plan, Yearly Plan) and Preparation of these Plans. • Meaning and Concept of Teaching Skills- micro Teaching - Meaning. Need and Importance. Micro-Teaching Cycle and its features. • Concept, Meaning, Principles and Objectives of Curriculum, Characteristics of good curriculum. • Evaluation of General Science Syllabus at Secondary level **Assignment:** • Prepare and present a lesson tHRough power point presentation on any topic of your choice. • Organise a training program on Micro Teaching.
UNIT-4 TEACHING HOURS (11)	**Teaching-learning Resources in General Science** • Meaning, Objectives, Scope, Characteristics, Types, Preparation, Presentation and Importance of Teaching Learning Material. • Planning and Importance of General Science Laboratories and its uses. • Qualities of General Science Text Books at Secondary Level. • Audio-Visual Aids- Meaning, Concept, Utility and Significance of Different types of Audio-Visual Aids in the teaching of General Science. **Assignment:** • Conduct a training program on use of Different types of Audio-Visual Aids in the teaching of General Science. • Make a report on General Science Teaching Planning and Importance of General Science Laboratories and its uses.

UNIT-5 **TEACHING HOURS (11)**	**Assessment and Evaluation** • Meaning, concept and construction of Achievement test, diagnostic test and remedial teaching. • Types of Questions, Characteristics of a good test. • Blue print: Meaning, concept, need and construction. • Continuous and Comprehensive Evaluation: Meaning, concept, importance and limitations. • Models of Teaching. **Assignment:** • Construction, administration and interpretation of an achievement test of any standard of school. • Make a diagnostic test of your subject and apply it in school, after discussion with concerning teacher and give remedial measure.
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**
CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	**Monthly Test**	**10X6 Test = 60**
2	**Presentation**	**10**
3	**Group Discussion**	**10**
4	**Debate**	**10**
5	**Participation and Presentation in Seminar**	**10**
6	**Report Writing**	**10**
7	**Viva Voce**	**10**
8	**Attendance***	**10**
9	**Co-curricular Activity**	**10**
10	**Team Teaching**	**10**

EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):
CCA will be reduced to 30 marks or 15 marks (as per course weightage).
Formula: Marks obtained/Total marksX30
For example: 60÷160X30 =11.25
PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.
PROVISO-II: Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course.

	*Attendance in Lectures and Practical **Percentage** **Marks Allotted** 75% to 80% 02 81% to 85% 04 86% to 90% 06 91% to 95% 08 Above 96% 10
EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	**1. ANNUAL** **2. However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• Solomon, J., & Aikenhead, G. (1994). STS Education: International Perspectives on Reform. Ways of Knowing Science Series. NY: Teachers College Press. • Lawson, A. E. (1995). Science teaching and the development of thinking. Belmont, CA: Wadsworth. • Ellis, A. B. (1993). Teaching General Chemistry: A Materials Science Companion. American Chemical Society, Distribution Office Department 225, 1155 16th Street, NW, Washington, DC 20036. • Das, R. C. (1990). Science teaching in schools. Sterling Publishers Pvt. Ltd. • Hodson, D. (2009). Teaching and learning about science: Language, theories, methods, history, traditions and values. Brill Sense. • National Research Council. (2007). Taking science to school: Learning and teaching science in grades K-8. National Academies Press. • Staver, J. R. (2008). Teaching science (Vol. 17). APH Publishing. • Psillos, D., & Niedderer, H. (Eds.). (2006). Teaching and learning in the science laboratory (Vol. 16). Springer Science & Business Media. • Venkataih, S (2001.Science Education in 21st Century. Delhi:Anmol Publishers. • Yadav, M.S. (Ed.) (2000).Teaching Science at High Level.Delhi:Anmol PublishersEdger, Marlow & Rao, D.B. (2003). Teaching Scioence Successfully.New Delhi: Discovery Publishing House.

B.Sc.B.Ed. IV Year			
COURSE CODE:	BSCBED-453-III	**COURSE TYPE: CORE**	
COURSE TITLE:	**Pedagogy of Chemistry**		
MAX. MARKS:	**50**	**MIN. PASS MARKS:**	**20**
THEORY EXAMINATION	35	**MIN. PASS MARKS:**	14
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15	**MIN. PASS MARKS:**	6
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives:
- To understand ability to gain insight on the meaning and nature of chemistry.
- To develop ability to determining aims and strategies of teaching-learning.
- To develop ability to use effectively different activities/ demonstration/ laboratory experiences for teaching-learning of chemistry.
- To understand ability to integrate in chemistry knowledge with other school subjects.

Learning outcomes: After completion of the course, student-teachers will be able to:-
- Gain insight on the meaning and nature of chemistry for determining aims and strategies of teaching-learning.
- Appreciate that science is a dynamic and expanding body of knowledge.
- Appreciate the fact that every child possesses curiosity about his/her natural surroundings.
- Identify and relate everyday experiences with learning chemistry.
- Appreciate various approaches of teaching-learning of chemistry.
- Understand the process of science and role of laboratory in teaching-learning situations.
- Use effectively different activities/demonstration/laboratory experiences for teaching-learning of chemistry.
- Integrate in chemistry knowledge with other school subjects.

UNIT-1 **TEACHING HOURS (12)**	**Basic of Chemistry Teaching** • Meaning, Nature and Scope of Chemistry teaching. • Nature of Science with special reference to chemistry. • History and Contribution of Chemistry teaching, history of Chemistry with special reference to India. • Importance Aims and Objectives of Chemistry teaching Objective of teaching Chemistry at secondary/senior secondary level. • Co-relation with other Subjects Journal and Referenced Book. **Assignment:** • Group discussion on importance of Chemistry. • Organise seminar on Contribution of Scientist in Chemistry and preapre a report.

UNIT-2 **TEACHING HOURS (12)**	**Instructional objectives and methods** • Instructional objectives and methods Bloom's Taxonomy (Congnative, effective and psychomotor). • In terms of instructional behavior Methods of Chemistry teaching Subject· lecture method. Demonstration Method, lab based method. • Inductive & deductive method. Problem Solving. Heuristics & Project Method Techniques of Chemistry Teaching Approaches of Chemistry teaching- Inquiry approach, programmed instruction, Group discussion, team teaching, CAL, SEMINARS & WORKSHOP . **Assignment:** • Organise workshop on techniques of teaching Chemistry. • Organise a training program on Bloom's Digital Taxonomy.
UNIT-3 **TEACHING HOURS (12)**	**Planning** • Concept, Meaning and Objectives of Chemistry Teaching Plan (Lesson Plan, Unit Plan, Yearly Plan) and Preparation of these Plans. • Meaning and Concept of Teaching Skills. Micro Teaching - Meaning, Need and Importance, Micro-Teaching Cycle and its features. • Concept, Meaning, Principles and Objectives of Curriculum, Characteristics of good curriculum and Evaluation ·of Chemistry Syllabus at Secondary Level. **Assignment:** • Prepare and present a lesson tHRough power point presentation on any topic of your choice. • Organise a training program on Micro Teaching.
UNIT-4 **TEACHING HOURS (11)**	**Instructional Support System** • Meaning, Objectives, Scope, Characteristics, Types, Preparation, Presentation and Importance of Teaching Learning Material. • Dales' Cone of Experiences. Planning and Importance of Chemistry Laboratories and Its uses. Qualities of good Chemistry Text Books at Secondary Level. • Qualities and Characteristics Chemistry Teacher. Audio-Visual Aids - Meaning, Concept, Utility and Significance of Different types of Audio-Visual Aids in the Teaching of Chemistry. Utilization of Community Recourses in the Teaching of Chemistry Teaching. **Assignment:** • Conduct a training program on use of Different types of Audio-Visual Aids in the teaching ofChemistry. • Make a report on Chemistry Teaching Planning and Importance of Chemistry Laboratories and its uses.

UNIT-5 TEACHING HOURS (11)	**Evaluation** • Meaning & Objective of Evolution. • Types of Test Items and their Construction. • Preparation of Blue-Print and Achievement Test. • Characteristics of a good Test. Concept and Preparation of • Diagnostic Test, Remedial Teaching and Enrichment Programme. • Use of ICT: Video clips, Power points presentations, films etc. **Assignment:** • Construction, administration and interpretation of an achievement test of any standard of school. • Make a diagnostic test of your subject and apply it in school, after discussion with concerning teacher and give remedial measure.
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**

CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)

Details of Continuous and Comprehensive Assessment (CCA) are as follows:

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	**Monthly Test**	**10X6 Test = 60**
2	**Presentation**	10
3	**Group Discussion**	10
4	**Debate**	10
5	**Participation and Presentation in Seminar**	10
6	**Report Writing**	10
7	**Viva Voce**	10
8	**Attendance***	10
9	**Co-curricular Activity**	10
10	**Team Teaching**	10

	EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA) CCA will be reduced to 30 marks or 15 marks (as per course weightage). Formula: Marks obtained/Total marksX30 For example: $60 \div 160X30 = 11.25$ **PROVISO-I:** Provided that a candidate shall be granted a relaxation in th form of exemption from CCA components, however, not more than 3 in a respective course. **PROVISO-II:** Provided further that this will be mandatory for a candidat appear in the monthly test conducted in the respective course. ***Attendance in Lectures and Practical** | **Percentage**	**Marks Allotted** | |---|---| | 75% to 80% | 02 | | 81% to 85% | 04 | | 86% to 90% | 06 | | 91% to 95% | 08 | | Above 96% | 10 |
EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	1. **ANNUAL** 2. **However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• Anderson, R. G. W. (1978). The Playfair Collection and the teaching of chemistry at the University of Edinburgh, 1713-1858. Brill. • Eilks, I., & Byers, B. (Eds.). (2015). Innovative methods of teaching and learning chemistry in higher education. Royal Society of Chemistry. • Eilks, I., & Hofstein, A. (Eds.). (2015). Relevant chemistry education: From theory to practice. Springer. • Ellison, M. D., & Schoolcraft, T. A. (2008). Advances in teaching physical chemistry. American Chemical Society. • Herron, J. D. (1996). The Chemistry Classroom: Formulas for Successful Teaching. American Chemical Society, Product Services Office, 1155 16th Street NW, Washington, DC 20036 (cloth: ISBN-0-8412-3298-8; paperback: ISBN-0-8412-3299-7). • Nadendla, R. R. (2007). Principles of organic medicinal chemistry. New Age International. • Risch, B. (Ed.). (2010). Teaching chemistry around the world. Waxmann Verlag. • Smith, A., & Hall, E. H. (1902). The teaching of chemistry and physics in the secondary school. Longmans, Green, and Company. • Waddington, D. J. (1984). Teaching School Chemistry. New York :UNIPUB, 205 East 42nd Street,NY 10017.

B.Sc.B.Ed. IV Year			
COURSE CODE:	BSCBED-453 -IV	**COURSE TYPE: CORE**	
COURSE TITLE:	Pedagogy of Biology		
MAX. MARKS:	**50**	MIN. PASS MARKS:	**20**
THEORY EXAMINATION	35	MIN. PASS MARKS:	14
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15	MIN. PASS MARKS:	6
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives:

- To understand the ability to develop insight on the meaning and nature of biological science.
- To understand the ability to integrate the biological science knowledge with other school subjects.
- Develop the ability be to identify and relate everyday experiences with learning of biological science.
- To understand the ability to appreciate various approaches and methods of teaching-learning of biological science.
- Develop the ability to explore the process skill in science and role of laboratory in teaching- learning.
- Develop the ability to identify the concepts of biological science that are alternatively conceptualized by teachers and students in general.

Learning outcome: After completion of the course, student-teachers will be able -

- Develop insight on the meaning and nature of biological science for determining aims and strategies of teaching- learning.
- Integrate the biological science knowledge with other school subjects. Identify and relate everyday experiences with learning of biological science.
- Appreciate various approaches and methods of teaching- learning of biological science.
- Explore the process skill in science and role of laboratory in teaching- learning.
- To understand meaning, concept and various types of assessment.
- Identify the concepts of biological science that are alternatively conceptualized by teachers and students in general.

UNIT-1 **TEACHING HOURS (12)**	**Basics of Biology Teaching** - Meaning, Nature and Scope of Biology teaching. - Main discoveries and development in Biology - Place and Values of Teaching Biology in School level. - Correlation of Biology and other Subjects. - Objectives of teaching Biology at School Level. **Assignment:** - Group discussion on importance of Biology teaching. - Organise seminar on Contribution of main discoveries and development in Biology and preapre a report.

UNIT-2 **TEACHING HOURS (12)**	**Instructional objectives and methods** • Bloom's Taxonomy (Cognitive, effective and psychomotor), In terms of Instructional behavior. • Methods of Biology teaching Subject- lecture method, Demonstration Method, Inductive & deductive method, Problem Solving, Heuristics & Project Method. Inquiry approach programmed Instruction, Group discussion Self Study team teaching, Seminar and workshops. **Assignment:** • Organise workshop on techniques of Biology teaching. • Organise a training program on Bloom's Digital Taxonomy.
UNIT-3 **TEACHING HOURS (12)**	**Planning** • Concept, Meaning and Objective of Biology Teaching Plan (Lesson Plan, Unit Plan, Yearly Plan) and Preparation of these Plans. Meaning and Concept of Teaching Skills. Micro Teaching - Meaning, Need and Importance, Micro-Teaching Cycle and its features. • Concept, Meaning, Principles and Objectives of Curriculum, Characteristics of good curriculum and Evaluation of Biology Syllabus at Secondary Level. **Assignment:** • Prepare and present a lesson tHRough power point presentation on any topic of your choice. • Organise a training program on Micro Teaching.
UNIT-4 **TEACHING HOURS (11)**	**Instructional Support System** • Meaning, Objectives, Scope, Characteristics, Types, Preparation, Presentation and Importance of Teaching Learning Material. • Dales' Cone of Experiences. Planning and Importance of Biology Laboratories and Its uses. • Qualities of good Biology Text Books at Secondary Level. • Qualities and Characteristics Biology Teacher. • Audio-Visual Aids - Meaning, Concept, Utility and Significance of Different types of Audio-Visual Aids in the Teaching of Biology. • Utilization of Community Recourses in the Teaching Biology Teaching. • Use of ICT: Video clips, Power points presentations, films etc. **Assignment:** • Conduct a training program on use of Different types of Audio-Visual Aids in the teaching of Biology. • Make a report on Biology Teaching Planning and Importance of *Chemistry* Laboratories and its uses.

UNIT-5 **TEACHING HOURS (11)**	**Evaluation** • Meaning and Objectives of Evaluation. Types of Test Items and their Construction. • Preparation of Blue-Print and Achievement Test. • Characteristics of a good Test. Concept and Preparation of Diagnostic Test, Remedial Teaching and Enrichment Programme. **Assignment:** • Construction, administration and interpretation of an achievement test of any standard of school. • Make a diagnostic test of your subject and apply it in school, after discussion with concerning teacher and give remedial measure.
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey 10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**
CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

Details of Continuous and Comprehensive Assessment (CCA) are as follows:

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	**Monthly Test**	**10X6 Test = 60**
2	**Presentation**	10
3	**Group Discussion**	10
4	**Debate**	10
5	**Participation and Presentation in Seminar**	10
6	**Report Writing**	10
7	**Viva Voce**	10
8	**Attendance***	10
9	**Co-curricular Activity**	10
10	**Team Teaching**	10

	EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):
	CCA will be reduced to 30 marks or 15 marks (as per course weightage).
	Formula: Marks obtained/Total marksX30
	For example: 60÷160X30 =11.25
	PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.
	PROVISO-II: Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course.
	*Attendance in Lectures and Practical

Percentage	Marks Allotted
75% to 80%	02
81% to 85%	04
86% to 90%	06
91% to 95%	08
Above 96%	10

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	**1. ANNUAL** **2. HOWEVER, THE UNIVERSITYmay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• Agarwal, D.D. (2004). Modern methods of Teaching Biology. Saruk &Sons: New Delhi.
	• Miller, David F. & blaydes, Gllenn W. (1938). Methods and materials for teaching biological sciences. Mc GRAW Hill book company Inc: New York and London.
	• Choudhary, S. (2010). Teaching of Biology. APH Publishing Corporation: New Delhi.
	• Sood, J.K. (1987). Teaching of Life Science. Kohli publishers: Chandigarh.
	• Yadav, M.S. (2000). Modersn Methods of Teaching Science. Anmol Publishers: New Delhi.
	• Bhar, Suraj prakash (2006). Teacher Training Lotus Press: New Delhi.
	• Singh, Veena (2007). Teaching of Biology. Adhyanyan Publishers & Distributors: New Delhi.
	• मंगल, एस.के. (2010). जैविक विज्ञान शिक्षण. लायल बुक डिपो: मेरठ.
	• भूषण, शैलेन्द्र (2008). जीव विज्ञान शिक्षण. विनोद पुस्तक मन्दिरः आगरा.
	• कुलश्रेष्ठ, एस.पी. (2005). जीव विज्ञान शिक्षण. लायल बुक डिपो: मेरठ.
	• माहेश्वरी, बी.के. (2003). जीव विज्ञान शिक्षण. सूर्या पब्लिकेशनः मेरठ.
	• रावत एवं अग्रवाल (2014). नवीन विज्ञान शिक्षण. श्री विनोद पुस्तक मन्दिरः आगरा.
	• श्रीमाली, भूषण एवं रिहानी (2013). विज्ञान शिक्षण. राजस्थान हिन्दी ग्रन्थ अकादमीः जयपुर

B.Sc.B.Ed.IV Year			
COURSE CODE:	**BSCBED-453 -V**	**COURSE TYPE: CORE**	
COURSE TITLE:	**Pedagogy of Physics**		
MAX. MARKS:	**50**	MIN. PASS MARKS:	**20**
THEORY EXAMINATION	35	MIN. PASS MARKS:	14
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	15	MIN. PASS MARKS:	6
ATTENDANCE ELIGIBILITY	**80 PERCENT IN RESPECTIVE YEAR**		
EXAMINATION	**TERM END EXAMINATION**	**MONTHLY TEST**	
DURATION	**03 HR**	**01 HR**	

Objectives:
- To understand the need for teaching-learning of Physics in secondary classes.
- To develop a critical understanding about the aims and objectives of Physics in a Democratic and Secular country.
- To understand the nature of Physics curriculum and its pedagogical issues.
- To understand Critique and develop suitable evaluation mechanisms in Physics.
- To develop the ability to organize co-curricular activities and community resources for promoting Physics learning.
- To understand the Approaches to teaching of Physics
- To understand the Concept of Teaching Skills

Learning outcome: After completion of the course, student-teachers will be able -
- Gain insight on the meaning and nature of Physics science for determining aims and strategies of teaching-learning.
- Identify and relate everyday experiences with learning Physics;
- Appreciate various approaches of teaching-learning of Physics;
- Use effectively different activities/demonstrations/laboratory experiences for teaching-learning of Physics;
- Integrate in Physics knowledge with other school subjects;

UNIT-1 TEACHING HOURS (12)	**Nature and Scope of Physics** - Meaning, Concept, Nature, Scope Physics Teaching. - Contribution of Indian scientist – Sir C.V.Raman, J.C.Bose, S.N.Bose, H.J.Bhabha, M.N.Saha. - Correlation of Physics with other School Subjects. **Assignment:** - Organise workshop on Contribution of Indian scientist. - Write a report on Objectives of Physics Teaching at different level of School.
UNIT-2 TEACHING HOURS (12)	**Teaching-learning of Physics** - Aims and general objectives of teaching physics, Bloom's Digital Taxonomy (Cognitive, Effective and Psychomotor) in terms of Instructional Behaviour, the objectives of school education; writing specific objectives of various content areas in Physics. - Approaches to teaching of Physics – Analytic-Synthetic, Inductive-Deductive, Heuristic, Problem Solving, Project and Laboratory. - Using various techniques of teaching Physics viz-oral, written drill, assignment, Team teaching, supervised study and

	• Programmed Learning. **Assignment:** • Prepare a lesson plan based on team teaching and execute it in school. • Make any two teaching aids with the low cost material.
UNIT-3 **TEACHING HOURS (12)**	**Planning** • Concept, Meaning and Objectives of Physics teaching Plan (Lesson Plan, Unit Plan, Yearly Plan) and Preparation of these plans • Meaning and Concept of Teaching Skills, Maxims of Teaching • Micro Teaching-Meaning, Need and Importance of Micro Teaching Cycle and its Features • Concept, Meaning, Principles and Objectives of Curriculum, Characteristics of good Curriculum. • Dale cone of experience. **Assignment:** • Organsie training program on Micro Teaching. • Prepare a working model based on Dale cone of experience.
UNIT-4 **TEACHING HOURS (11)**	**Teaching-learning Resources in Physics** • Meaning, Objectives, Scope, Characteristics, Types, Preparation, presentation and Importance of Teaching - Learning Material. • Planning and Importance of Physics Laboratories and its uses. • Qualities of Physics Text Books at Secondary Level. • Audio-Visual Aids- Meaning, Concept, Utility and Significance of Different types of Audio-Visual Aids in the teaching of Physics. **Assignment:** • Conduct a training program on use of Different types of Audio-Visual Aids in the teaching of Physics • Make a report on Physics Teaching Planning and Importance of Physics Laboratories and its uses.
UNIT-5 **TEACHING HOURS (11)**	**Assessment and Evaluation** • Meaning, concept and construction of Achievement test, diagnostic test and remedial teaching. • Types of Questions, Characteristics of a good test. • Blue print: Meaning, concept, need and construction. • Continuous and Comprehensive Evaluation: Meaning, concept, importance and limitations.Models of Teaching. **Assignment:** • Construction, administration and interpretation of an achievement test of any standard of school. • Make a diagnostic test of your subject and apply it in school, after discussion with concerning teacher and give remedial measure.
TEACHING AND LEARNING STRATEGIES	1. Lectures 2. E-learning 3. Videos 4. Extension Lectures 5. Content Review 6. Self-Learning 7. Group Discussions 8. Field Visit 9. Survey

	10. Documentaries 11. Short Films 12. Team Teaching *** The teaching strategies are subject to change as per requirement of the students and their capabilities.**
CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	Details of Continuous and Comprehensive Assessment (CCA) are as follows:

SR. NO.	CCA: COMPONENT	MAXIMUM MARKS
1	**Monthly Test**	**10X6 Test = 60**
2	**Presentation**	**10**
3	**Group Discussion**	**10**
4	**Debate**	**10**
5	**Participation and Presentation in Seminar**	**10**
6	**Report Writing**	**10**
7	**Viva Voce**	**10**
8	**Attendance***	**10**
9	**Co-curricular Activity**	**10**
10	**Team Teaching**	**10**

EXPLANATION (METHOD TO ASCERTAIN MARKS FOR CCA):
CCA will be reduced to 30 marks or 15 marks (as per course weightage).
Formula: Marks obtained/Total marksX30
For example: 60»160X30 =11.25
PROVISO-I: Provided that a candidate shall be granted a relaxation in the form of exemption from CCA components, however, not more than 3 in a respective course.
PROVISO-II: Provided further that this will be mandatory for a candidate to appear in the monthly test conducted in the respective course.
*Attendance in Lectures and Practical

Percentage	Marks Allotted
75% to 80%	02
81% to 85%	04
86% to 90%	06
91% to 95%	08
Above 96%	10

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISION OF SYLLABUS	1. **ANNUAL** 2. **However,the Unviersity may revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• Mangal, S.K (2005). Teaching of Physics. Arya book depot: New Delhi. • Joshi, S.R (2008). Teaching of science. A.P.H Publishing Corporation: New Delhi. • Das, R.C, (2000). Science teaching in schools. Sterling Publishers private limited: New Delhi. • Prasad, J. (1999). Practical aspects in teaching of science. Kanishka publisher: New Delhi. • Nanda, V.K. (1997). Science education today. Anmol publications Pvt.

Ltd.: New Delhi.

- Bhan, Suraj Prakash. (2006). Teacher training. Lotus press: New Delhi.

- राठौड़, मुदित. (2006). भौतिक विज्ञान शिक्षण. शिक्षा प्रकाशनः जयपुर.

- भटनागर, ए.बी. (2000). भौतिक विज्ञान शिक्षण. सूर्या पब्लिकेशन्सः मेरठ.

- नेगी, जे.एस. (2008). भौतिक विज्ञान शिक्षण. विनोद पुस्तक मन्दिरः आगरा.

- शर्मा, आर.सी. (2007). आधुनिक विज्ञान शिक्षण. धनपतराय पब्लिशिंग कम्पनी (प्रा.) लि.

- सिंह, विजयपाल (2005-06). भौतिक विज्ञान शिक्षण. राधा प्रकाशन मन्दिरः आगरा-02.

- त्यागी, एस.के.(2000). भौतिक विज्ञान शिक्षण. साहित्य प्रकाशनः आगरा

- कुलश्रेष्ठ, एस.पी. शैक्षिक तकनीकी एवं उसके मूल आधार. विनोद पुस्तक मन्दिर. आगरा-02.

B.Sc. B.Ed. Part-IV				
COURSE CODE:	**BSCBED-454 a I**		COURSE TYPE : CORE	
COURSE TITLE :	**Atomic, Molecular and Nuclear Physics**			
MAX.MARKS:	50	MIN.PASS MARKS		20
THEORY EXAMINATION:	40	MIN.PASS MARKS		16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS		4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR			
EXAMINATION	TERM END EXAMINATION		MONTHLY TEST	
DURATION	3 HR		1 HR	

Objective:

- This course aims to introduce various types of spectra for hydrogen, deuteron and alkali atoms. It also gives an introduction to X-ray spectra. Techniques of Molecular spectroscopy are also discussed in this course, which include IR and Raman spectra. In addition, the students enable to understand of the sub atomic particles and their properties. It will emphasize to gain knowledge about the different nuclear techniques and their applications in different branches of Physics and societal application. The acquire knowledge can be applied in the areas of nuclear, medical, archeology, geology and other interdisciplinary fields of Physics and Chemistry.

Learning Outcomes: After completion of the course, student-teachers will be able to:-

- Understand atomic and molecular physics.
- Apply Theory of Nuclear Fission and fusion in further study.
- Explain Structure of Nuclei and Elementary Particles.
- Discuss the Concept of Nuclear Properties and Theory of Nuclear Forces.
- Applies the Concept of Detector and Accelerator.

UNIT-1 TEACHING HOURS(15)	**Atomic Physics:Spectra of hydrogen**, Frank-Hertz experiment and discrete energy states, **Stern-Gerlach experiment**, deuteron and alkali atoms, spectral terms, doublet fine structure, screening constants for alkali spectra for s, p, d and f states, selection rules, **L-S and J-J couplings**, *Spectroscopic notation of atomic states*, Atoms in a magnetic field, **Zeeman effect**, Zeeman splitting. **Weak spectra:** continuous X-ray spectrum and its dependence on voltage, Duane and Hunt's law, Characteristics X-rays, Moseley's law, doublet structure of X-ray spectra, X-ray absorption spectra.
UNIT-2 TEACHIGN HOURS(10)	**Molecular Physics:** Discrete set of electronic energies of molecules, quantisation of vibrational and rotational energies, determination of internuclear distance, **pure rotational and rotational-vibrational spectra**, Dissociation limit for the ground and other electronic states, transition rules for **pure vibrational** and **electronic vibrational spectra**. **Raman effect**, Stokes and anti-Stokes lines, complimentary character of Raman and infrared spectra, experimental arrangements for **Raman spectroscopy**.

UNIT-3 **TEACHING HOURS(15)**	**Structure of Nuclei:** Rutherford theory of alpha paticle scattering, properties of nucleus quadrupole moment and nuclear ellipticity. Quadrapole moment and **nuclear spin parity**, **angular momentum** and **magnetic moment**, nuclear mass and mass spectroscopy. Nuclear potential, **Mass defect and Binding energy**, **Meson theory of Nuclear forces** and **properties of nuclear forces**. **Radioactive decay:Beta decay**, range of alpha particles, Geiger-Nuttall law, Gamow's explanation of alpha decay, **gamma decay**, continuous and discrete spectra. **Elementary Particles:Classification of Elementary Particles**, **Fundamental interactions**, Unified Approach (basic ideas), **The Conservation laws**, **Quarks** (basic ideas), Charmed and Colour Quarks, Higgs Boson, Large Hadron Collider.
UNIT-4 **TEACHING HOURS(10)**	**Nuclear Model:** Liquid drop model, **Semi-emperical mass formula**, condition of stability, Magic Numbers, **Basic assumption of shell model-success and limitations,** Fermi gas model. **Nuclear Fission and Fusion:** Theory of Nuclear Fission, Barrier Penetration-Theory of Spontaneous Fission, Nuclear Fission as a source of Energy, The Nuclear Chain reaction, Condition of controlled Chain Reaction, **The Principle of Nuclear Reactors**, Classification of Reactors, Power of Nuclear Reactors, Uncontrolled chain reaction, Nuclear fusion, Energy released in Nuclear Fusion, **Fusion in stars**. The Plasma: The fourth state of the matter.
UNIT-5 **TEACHING HOURS(15)**	**Accelerators:** Ion sources, Cockcroft-Walton high voltage generators, Van de Graaff generators, Drift tube, Linear accelerators, Wave guide accelerators, Magnetic focusing in Cyclotron, SyncHRocyclotron, Betatron, The electromagnetic induction Accelerator, Electron syncHRotron, Proton SyncHRotron. **Detectors:** Interaction of charged particles and neutrons with matter, working of nuclear detectors, Geiger-Muller counter, proportional counter and scintillation counter, cloud chambers, spark chamber, emulsions.
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**

CONTINUOUS & COMPREHENSIVE ASSESSMENT (CCA)	Details of Continuous and Comprehensive Assessment (CCA) are as follows:		
	S. No.	CCA- Components	Max. Marks Allocation
	1.	Monthly test	20*3 Test=60
	2.	Quizzes and Assignments	10
	3.	Viva-voce	10
	4.	Seminar/Symposia	10
	5.	Report writing	10
	6.	Workshop	10
	7.	Review of literature	10
	8.	Creativity/Innovation	10
	9.	Experimental Skill	10
	10.	Co-curricular activity	10
	11.	Attendance	10
	Total 160 marks equivalent reduced to CCA original marks 30.		
Exam Pattern	**Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals. semester.r.**		
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. However,the Unviersity may revise the syllabus at any time during the running year after giving a notice for a period one months.**		
SELECTED READINGS	• Barrow, G. M., & Barrow, G. M. (1964). The structure of molecules: an introduction to molecular spectroscopy. WA Benjamin. • Brehm, J. J., & Mullins, W. J. (1989). Introduction to the structure of matter: a course in modern physics (p. 960). • Feymann, R., Leighton, R. B., & Sands, M. (1964). The Feymann lectures on physics, Vol. 2. MA. • Haken, H., & Wolf, H. C. (2013). Molecular physics and elements of quantum chemistry: introduction to experiments and theory. Springer Science & Business Media. • Richtmyer, F. K., Kennard, E. H., & Cooper, J. N. (1955). Introduction to modern physics (Vol. 747). New York: McGraw-Hill. • Semat, H. (2012). Introduction to atomic and nuclear physics. Springer Science & Business Media. • Sharma, S. K. (2004). Atomic and nuclear physics. Pearson Education India. • Yang, F., & Hamilton, J. H. (2010). Modern atomic and nuclear physics. World scientific.		

PHYSICS PRACTICALS-IV		
Duration: 4 HR MAX.MARKS: 50		Min. Marks: 20

Any twelve of the following experiments are to be performed. Few more experiments may be set at the institutional level. In examination two experiments are to be performed taking at least one from each section.

The distribution of marks in the practical examination will be as follows:

(i) Two experiments   30 Marks

For each experiment, distribution of marks will be as follows:

Figure: 2
Formula/Theory: 2
Observation: 7
Calculation and Result: 3
Precautions: 1
(ii) Viva voce   10
(iii) Records   10
Total   50 Marks

LIST OF EXPERIMENTS

- Determination e/m by Thomson method.
- Determination e/m by Magnet Method.
- Measurement of Hall coefficient of given material.
- Verification of inverse square law by photo cell.
- Determination of Planck's costant by photo cell.
- Determination of Planck's constant using solar cell.
- To study V-I characteristics of Light Emitting Diode (LED).
- To find the magnetic susceptibility of paramagnetic solution using Quinck's method.
- Study of Magnetic Hysteresis parameters using a CRO.
- Study of characteristics of a GM counter and verification of inverse square law for the same strength of radioactive source.
- Study of resistance characteristics of semi-conductor Material using four probe method.
- Polarization of light by reflection, verify Brewster's law & Law of Malus.
- To determine the value of a High resistance by Leakage method.
- To determine small thickness by using thin film interference.
- The study of frequency response and phase relationship in a series LCR circuit.
- Measurement of magnetic susceptibility.
- Study of statistical distribution: Gaussian and Poisson's spectral distribution using dices.

B.Sc. B.Ed- -IV Year				
COURSE CODE:	BSCBED- 454 b I		COURSE TYPE : CORE	
COURSE TITLE :	Chemistry : Advance Chemistry			
MAX.MARKS:	50	MIN.PASS MARKS		20
THEORY EXAMINATION:	40	MIN.PASS MARKS		16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS		4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE SESSION			
EXAMINATION	TERM END EXAMINATION		MONTHLY TEST	
DURATION	03 HR		1 HR	

OBJECTIVE:

- To learn aboutChemistry the spectral and magnetic properties of transition meteal complexes .
- To be familiar with chemistry of Heterocyclic compounds and *Bioinorganic Chemistry* .
- To learn techniques of Nuclear magnetic resonance (NMR)) spectroscopy   of organic compounds.

Learning outcomes - After completion of the course, student-teachers will be able to-

- Understand the spectral and magnetic properties of transition meteal complexes.
- Get familiar with Heterocycles and Bioinorganic chemistry
- Explain the nuclear magnetic resonance (NMR) spectropy.
- Apply the principles of Acid-base behaviorisoelctric point and electrophoresis in real life.

UNIT-1 TEACHING HOURS (12)	**Electronic spectra of Transition Metal Complexes** Types of electronictransitions, selection rules for d-d transitions, spectroscopic ground states, spectro chemical series, Orgel-energy level diagram for d^1 to d^9 states, discussion of the electronic spectrum of $[Ti(H_2O)_6]^{3+}$ complex ion.
UNIT-2 TEACHIGN HOURS (12)	**Magnetic Properties of Transition Metal Complexes** Types of magneticbehaviour, methods of determining magnetic susceptibility, spin-only formula, L-S coupling, correlation of μs and μeff values, orbital contribution to magnetic moments, application of magnetic moment data for 3d metal complexes
UNIT-3 TEACHING HOURS (12)	**Heterocyclic Chemistry** Introduction: Molecular orbital picture andaromatic characteristic of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution. Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole.
UNIT-4 TEACHING HOURS (12)	*Bioinorganic Chemistry* *Essential and trace elements in biological processes, metalloporphyrins with special reference to hemoglobin and myoglobin. Biological role of alkali and alkaline earth metals ions with special reference to Ca^{2+}. Nitrogen fixation.*

UNIT-5 TEACHING HOURS (15)	**Nuclear magnetic resonance (NMR) spectroscopy**	
	Proton magneticresonance (^{I}H-NMR) : spectroscopy, nuclear shielding and deshielding, chemical shift and molecular structure, area of signals and proton counting, splitting of signals, spin-spin coupling and coupling constant, interpretation of NMR spectra of simple organic molecules such as ethyl bromide, ethanol, acetaldehyde, 1, 1, 2-tribromoethane, ethyl acetate, toluene and acetophenone.	
	Problems pertaining to the structure elucidation of simple organic compounds using UV, IR and NMR spectroscopic techniques.	

TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The TEACHING AND LEARNING STRATEGIES may be change as per requirement of the students and their capabilities.**

CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)

Details of Continuous and Comprehensive Assessment (CCA) are as follows:

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10

Total 160 marks equivalent reduced to CCA original marks 30.

Exam Pattern	**Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals. semester.r.**
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. However,the Unviersity may revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• Abraham, R. J., Fisher, J., & Loftus, P. (1998). *Introduction to NMR spectroscopy* (Vol. 2). New York: Wiley. • Anslyn, E. V., & Dougherty, D. A. (2006). *Modern physical organic chemistry*. University science books. • Chambers, R. D. (2004). *Fluorine in organic chemistry*. CRC press. • Colthup, N. (2012). *Introduction to infrared and Raman spectroscopy*. Elsevier.

- Gordon, P. F., & Gregory, P. (2012). *Organic chemistry in colour*. Springer Science & Business Media.
- Kalsi, P. S. (2007). *Organic reactions stereochemistry and mechanism (THRough Solved Problems)*. New Age International.
- Kumar, N., & Kumbhat, S. (2016). *Essentials in nanoscience and nanotechnology*. Weilly & Sons.
- Levenson, M. (2012). *Introduction to Nonlinear Laser Spectroscopy 2e*. Elsevier.
- Niemantsverdriet, J. W. (2007). *Spectroscopy in catalysis: an introduction*. John Wiley & Sons.
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- Pavia, D. L., Lampman, G. M., Kriz, G. S., & Vyvyan, J. A. (2008). *Introduction to spectroscopy*. Cengage Learning.
- Pradeep, T. (2007). *NANO: The Essentials-Understanding Nanoscience and Nanotechnology*. McGraw Hill.
- Schwarzenbach, R. P., Gschwend, P. M., & Imboden, D. M. (2016). *Environmental organic chemistry*. John Wiley & Sons.
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- Smith, M. B. (2020). *March's advanced organic chemistry: reactions, mechanisms, and structure*. John Wiley & Sons.

CHEMISTRY PRACTICALS-3

Duration:4 HR   MAX.MARKS: 50   Min. Marks: 20

Note: The students should be given exposure of any research labs and instrumentation center/reputed university lab/industry/government labs of northern region.

Inorganic Chemistry

Ex. 1Estimation of given substance by volumetrically ,iodometrically and total hardness of water.   15

Organic Chemistry

Ex.2 Prepartion and determination of an Organic compounds

15

Physical Chemistry

Ex.4 Perform one of the experiments mentioned in the syllabus.

10

Ex.5 Vive-Voce

05

Ex.6 Practical-Record   05

Total   50 Marks

LIST OF EXPERIMENTS

A.Inorganic Chemistry
- Quantitative estimation of one metal volumetrically from a given mixture.
- To estimate magnesium volumetrically from a mixture containing Ba^{2+} and Mg^{2+} Ions/ Zn^{2+} and Mg^{2+} ions.
- To estimate copper iodometrically from a given mixture containing Pb^{2+} and Cu^{2+} ions.
- Estimation of Glucose with the help of Fehling's solution.
- Determination of Total hardness of water.

B.Organic Chemistry
- Two stage preparation: p-nitroacetanilide from Aniline and p-Bromoacetanilide from Aniline.
- Determination of Iodine value of an oil/fat.
- Separation of two component mixture using water or $NaHCO_3$ solution & identification of the two components. Preparation of one derivative

C. Physical Chemistry

 Colorimetry
- Determination of formula of complex by Job's method.
- Verification of Beer-Lambert law for $KMnO_4/K_2Cr_2O_7$and determine the concentration of the given solution of the substance.

 Polarimetry
- Determination of the specific rotation of a given optically active compound and determination of the concentration of given solution of an optically active substance

 Solvent Extraction
- Separation and estimation of Mg (II) and Zn (II)

 Ion Exchange Method
- Separation and estimation of Mg (II) and Zn (II)

B.Sc.B.Ed. Year IV				
COURSE CODE:	**BSCBED- 454 c I**		COURSE TYPE : CORE	
COURSE TITLE:	**Molecular Genetics,Biotechnology and Biostatistics**			
MAX.MARKS:	50	MIN.PASS MARKS		20
THEORY EXAMINATION:	40	MIN.PASS MARKS		16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS		4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR			
EXAMINATION	TERM END EXAMINATION		MONTHLY TEST	
DURATION	3 HR		1 HR	

Objective :

- Tolearn about the comrehend the modern concepts and applied aspects of molecular genetics.

- To learn about get familiar with the molecular structure of DNA and its cellular activities.

Learning Outcomes - After completion of the course, student-teachers will be able:

- To Comrehend the modern concepts and applied aspects of molecular genetics.

- Get familiar with the molecular structure of DNA and its cellular activities.

UNIT-1 TEACHIN G HOURS (12)	• Introduction, concept and development of Molecular Genetics & Genetic engineering. • Nucletic acids: DNA (prokaryotic and eukaryotic)- Structure, forms, chemical composition functions and units of DNA, Genetic Code, Replication of DNA
UNIT-2 TEACHIGN HOURS (15)	• RNA: Genetic RNA, non-genetic RNAs (mRNA, tRNA, and rRNA) – Structure and functions. • Gene mutation: nature of mutation, types of mutation and causes of mutation. • DNA repair: mismatch repair, direct repair, base-excision, nucleotide-excision repair and other types of DNA repair. Genetic diseases and faulty DNA repair.
UNIT-3 TEACHING HOURS (15)	• Gene expression: Transcription and translation of prokaryotes and eukaryotes. • Regulation of gene expression in prokaryotes (Lac and tryptophan operon) • Gene cloning,DNA Amplification by PCR, Tools and techniques of gene transfer, gene mapping, Human Genome Project, Clones, transgenic Animal, gene library.
UNIT-4 TEACHING HOURS (15)	• Introduction historical perspective, animal cell hybridoma, major areas and future prospects of biotechnology, Medicine and Biotechnology, Microbes in medicine. Antibiotics, vaccine, Antibodies, Antigens, Environmental biotechnology: use of micro-organisms in metal and petroleum recovery, pest control, waste treatment, processing of industrial waste.Degradation of xenobiotic compounds including pesticides and surfactants and oil pollutants. Food and drink biotechnology, ferment food, dairy product, food preservation, microbial spoilage, alcoholic beverages, Vinegar, monoclonal antibodies and their applications.

UNIT-5 TEACHING HOURS (12)	• Introduction and understanding of concepts of descriptive and inferential statistics, frequency distribution, graphical presentation, mean, mode, median, standard deviation, standard error of mean. • Productivity distribution, correlation and regression. Test of Significance, chi Square and t-test. Biostatistical analysis of gene distribution in population.
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The Teaching and Learning Strategies may be change as per requirement of the students and their capabilities.**
CONTINUOUS &COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10

Total 160 marks equivalent reduced to CCA original marks 30.

EXAMINATION PATTERN	**Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals. semester.**
PERIODICAL REVISE OF SYLLABUS	**1. ANNUAL** **2. However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one months.**
SELECTED READINGS	• Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., & Walter, P. (2015). *Molecular biology of the cell*. Garland Science. *New York*, 1227-1242. • Blomquist, G. J., & Bagnères, A. G. (Eds.). (2010). *Insect hydrocarbons: biology, biochemistry, and chemical ecology*. Cambridge University Press. • Conklin, K. F., Doerfler, W., Grafstron, R. H., Groudine, M., Hamilton, D. L., Jaenisch, R.& Langner, K. D. (2012). *DNA methylation: biochemistry and biological significance*.

Springer Science & Business Media.

- Gupta, P. K. (2005). *Cell and molecular biology*. Rastogi Publications.
- Karp, G. (2007). *Cell and Molecular Biology*. John Wiley & Sons Incorporated.
- Karp, G. (2009). *Cell and molecular biology: concepts and experiments*. John Wiley & Sons.
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- Lodish, H., Berk, A., Kaiser, C. A., Krieger, M., Scott, M. P., Bretscher, A.& Matsudaira, P. (2008). *Molecular cell biology*. Macmillan.
- Rosen, F. S., Steiner, L., & Unanue, E. (1989). *Macmillan dictionary of immunology*.
- Tripathi, G. (2010). *Cellular and Biochemical Science*. IK International Pvt Ltd.
- Wilson, E. B. K., & Walker, J. (2005). *Biochemistry and Molecular Biology. Kuudes painos*.
- Animal biotechnology, M.M. Ranga, Agrobios India.
- Industrial Biotechnology, G.Read, presscott and Dunns, Chapman and Hall.
- Advances Biotechnology, Manjula k.saxena and B.B.S. Kapoor, madhupublications
- Biostatistics, Veer bala Rastogi
- Introduction to Biostatistics, Dr. Pranab Kumar Bangerjee. S. Chand.

ZOOLOGY-PRACTICALS

Duration: 4 HR.   **Max. Marks - 50**

Objectives: To develop the molecular and biotechnological techniques and to develop skills of preparing media, separation of nucleic acids and culture of animal cells.

Course Contents-

- Study of DNA by Fulgent reaction in the salivary gland cHRomosomes.

- Isolation of genomic DNA

- Molecular separations by cHRomatography, electrophoresis, precipitation etc.

- Isolation of milk protein from the milk sample.

- Separation of serum by using centrifuge

- Estimation of protein by Biuret Method.

- Separation of plasma by centrifugation.

- Separation of biomolecules by Course and gel cHRomatography.

- Preparation and use of culture media for microbes.

- Preparation and use of culture media for animal tissues.

- Media preparation media sterilization and inoculation.

- Cell culture techniques-Design and functioning of tissue culture laboratory, cell proliferation measurements, culture media preparation and cell harvesting methods.

- Isolation and staining of bacteria.

- Determination of pH value of different water samples, blood urine and saliva.

- Qualitative tests for carbohydrates.

- Qualitative test for proteins.

- Qualitative test for lipids.

- Effects of temperature on the activity of enzyme.
- Biostastistics – Construction of frequency tables, Histogram, polygons, pie charts. Exercise on mean, median and mode. Test of significance :- t-test and chi square test.

- Chart, model Power point/multimedia presentation preparation related to evidence of evolution Human /Horse evolution, Geographical time scale etc.

- Students are expected to visit different laboratories (RRL, CSIR, ICMR, Science centers etc).

MAX.MARKS: 50 Time Allowed: 4 Marks. S. No.	Exercise*	Marks
1.	Molecular Biology Experiment	4
2.	Biotechnological Experiment	4
3.	Biochemical tests	4
4.	Biostastistics	4
5.	Bacteriological experiment	5
6.	Instrumentation-major	7
7.	Instrumentation - minor	3
8.	Practical record	5
9.	Viva	4
10.	Project report	10

Guidelines/Instructions for Practical Examination

B.Sc.B.Ed. Year IV				
COURSE CODE:	**BSCBED- 454 d I**		COURSE TYPE : CORE	
COURSE TITLE:	**Genetic Engineering, Molecular Biology, Ecology & Economic Botany**			
MAX.MARKS:	50	MIN.PASS MARKS		20
THEORY EXAMINATION:	40	MIN.PASS MARKS		16
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	10	MIN.PASS MARKS		4
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR			
EXAMINATION	TERM END EXAMINATION		MONTHLY TEST	
DURATION	3 HR		1 HR	

Objective :
- To learn about understand plant tissue culture, genomics and proteomics
- To learn about get familiar with concept of cellular totipotencey
- To learn about explain the concept of genetic engineering
- To learn about implement the application of biotechnology in real life.

Learning Outcomes : After completion of the course, student-teachers will be able:
- To understand plant tissue culture, genomics and proteomics
- To get familiar with concept of cellular totipotencey
- To explain the concept of genetic engineering
- To implement the application of biotechnology in real life.

UNIT-1 TEACHING HOURS (15)	Tools and Techniques in Plant Tissue Culture *(Electrophoresis, Centrifugation, CHRomatography, Colorimetery, Spectrophotometery, ELISA,Laminar air flow chamber, autoclave, Hot air oven, Incubator)*Media Preparations , Solid media, Liquid media, sterilization techniques, sterilization of glasswares and medium ,Aseptic manipulation and Culture maintenance, Inoculation and Sub culture.Concept of Cellular totipotency, Methods of application of micro propagation, Haploid production, Zygotic embryo culture, Endosperm Culture, Somatic embryogenesis and Synthetic Seeds.
UNIT-2 TEACHIGN HOURS (12)	An Overview of Genetic Engineering, Tools & Techniques of genetic engineering, recombinant DNA technology , **Methods and applications in agriculture, horticulture, pharmaceuticals**, Genetic markers, **PCR**. Concept of genomics and proteomics, **application of biotechnology**.
UNIT-3 TEACHING HOURS (12)	**Atmosphere (gaseous composition), Climatic factors, Edaphic factors,** , *Global warming, Green house effect, Acid rains, Alnino effect, ozone depletion*, Population ecology with special reference to Growth Curves, ecotypes, ecads and plant Indicators.Ecological succession.
UNIT-4 TEACHING HOURS (12)	**Ecosystem,Structure and function, Abiotic & biotic components, food chain, food Web, ecological pyramids, energy flow, biogeochemical cycles of carbon, nitrogen & phosphorous.**

	Economic Botany: - Origin, Cultivation and value added products of following: **Cereals: Rice, Wheat and Maize, Oil Yielding Plants: Mustard, Groundnut and Coconut, Fibre Yielding Plants: Cotton, Sun-hemp Spices : Cardamom, Fennel, Cumin, Coriander, Medicinal plants : Opium, Cinchona, Sarpagandha. Beverages : Tea & Coffee.**
UNIT-5 TEACHING HOURS (18)	
TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The Teaching and Learning Strategies may be change as per requirement of the students and their capabilities.**

CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	**Details of Continuous and Comprehensive Assessment (CCA) are as follows:**

S. No.	CCA- Components	Max. Marks Allocation
1.	Monthly test	20*3 Test=60
2.	Quizzes and Assignments	10
3.	Viva-voce	10
4.	Seminar/Symposia	10
5.	Report writing	10
6.	Workshop	10
7.	Review of literature	10
8.	Creativity/Innovation	10
9.	Experimental Skill	10
10.	Co-curricular activity	10
11.	Attendance	10

Total 160 marks equivalent reduced to CCA original marks 30.

EXAMINATION PATTERN	Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.
PERIODICAL REVISE OF SYLLABUS	1. ANNUAL **2.** However the Unviersitymay revise the syllabus at any time during the running year after giving a notice for a period one months.
SELECTED READINGS	• Vasil. I.K. and Thorpe, T.A. 1994, Plant Cell and Tissue Culture, Kluwer • Academic Publishers, The Netherlands. • Kochar, S.L. 1998. Economic Botany in Tropics 2nd edition. Macmillan India Ltd. New Delhi. • Simpson. B.B. and Conner-Ogorzaly, M. 1986. Economic Botany – Plants in Our World, Mc. Graw Hill, New Delhi.

BOTANY-PRACTICALS:-III

Duration: 4 hours	MAX.MARKS: 50	Min. Pass Marks : 20

	Total = 50

Practical List

1. Basic requirements of a tissue culture laboratory.
   a) Common Glassware,
   b) test tubes, culture tubes and screw-capped tubes,
   c) Petridish
   d) Pipette
   a) Pipette
   b) Pasteur pipette
   c) Erlenmeyer
   d) flask
   e) Volumetric flask
   f) Cleaning glassware
   g) Inoculation needle and inoculation loop
   h) Bunsen burner (Spirit-lamp),
   i) water baths
   j) Autoclaves.
   k) laminar air flow
   l) Incubator
   m) Hot air oven
   n) Colony counter
   o) pH meter
   p) Electric balance
   q) Spectro photometer
   r) Centrifuse
   s) binocular Microscope.

1. Method of using balance Preparation of temporary cotton plug Preparation of permanent cotton plugs. Preparation of culture media
   a) Preparation of liquid medium (broth)
   b) Preparation of Solid media (PDA medium and plates)
   c) Preparation of agar slants.
   d) Preparation of agar deep tubes.

2. Methods of Sterilization.

3. Demonstration of the techniques of micro-propagation by using different explants, e.g. axillary buds, shoot meristems etc.

4. To determine the minimum size of quadrate by species area curve method.

5. To determine the minimum number of quadrate to be laid down in field under study.

6. To study the vegetation structure tHRough profile diagram

7. To determine moisture content and water holding capacity of different types of soil

8. To determine the dust holding capacity of different types to leaves.

9. Fib**res:** Study of cotton flowers, sectioning of the cotton ovules/developing seeds to trace the origin and development of cotton fibres. Microscopic study of cotton and test for cellulose. Sectioning and staining of jute stem to show the location and development of fibres.

10. Microscopic structure. Tests for lignocellulose.

11. **Spices:** Examine Coriander, Fennel and Cumin (hand sections) and opened fruits of cardamom and describe them briefly.

12. **Preparation of an illustrated inventory of 5 medicinal plants used in indigenous systems of medicine or allopathy:** Write their botanical andcommon names, parts and diseases/disorders for which they are prescribed

B.Sc. B.Ed. IV Year			
COURSE CODE:	**BSCBED-454e-I**	COURSE TYPE : CORE	
COURSE TITLE :	**Numerical Analysis and Optimization Techniques**		
MAX.MARKS:	100	MIN.PASS MARKS	40
THEORY EXAMINATION:	80	MIN.PASS MARKS	32
CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	20	MIN.PASS MARKS	8
ATTENDANCE ELIGIBILITY	80 PERCENT IN RESPECTIVE YEAR		
EXAMINATION	TERM END EXAMINATION	MONTHLY TEST	
DURATION	3 HR	1 HR	

Objective:

- This course is designed to introduce the basic concepts of Numerical Mathematics in order to solve the problems arising in various fields of application, for example in science, engineering and economics etc. that do not possess analytical solutions or difficult to deal with analytically. This course addresses development, analysis and application of different numerical methods to solve the problems, viz. system of linear & nonlinear equations, interpolation and numerical integration.

Learning Outcomes: This course will enable the students to:

- Obtain numerical solutions of algebraic and transcendental equations.
- Find numerical solutions of system of linear equations and check the accuracy of the solutions.
- Learn about various interpolating and extrapolating methods.
- Solve initial and boundary value problems in differential equations using numerical methods.
- Apply various numerical methods in real life problems.
- To solve linear programming problems (LPP) by simplex method.
- To solve assignment and transportation problems.
- Understand and apply the programming concepts of C++ which is important for mathematical investigation and problem solving.

UNIT-1 TEACHING HOURS (12)	**Numerical Methods for Solving Algebraic and Transcendental Equations** Round-off error and computer arithmetic, Local and global truncation errors, Algorithms and convergence; Bisection method, False position method, Fixed point iteration method, **Newton-Raphson's** method and secant method for solving equations. **Numerical Methods for Solving Linear Systems:** Lower and upper triangular (LU) decomposition of a matrix and its applications, **Gauss elimination method, Gauss-Jordan method,** Gauss-Jacobi, Gauss-Seidel methods.

UNIT-2 TEACHIGN HOURS (12)	**Interpolation** Lagrange and Newton interpolations, Piecewise linear interpolation, Cubic spline interpolation, Finite difference operators, Gregory-Newton forward and backward difference interpolations. **Newton's formula for forward and backward interpolation divided differences and simple differences, Newton's general interpolation formula, Lagrange's interpolation formula, error in interpolation.**	
UNIT-3 TEACHING HOURS (12)	**Numerical Differentiation and Integration** First order and higher order approximation for first derivative, Approximation for second derivative; Numerical integration: Trapezoidal rule, Simpson's rules and error analysis, **Newton's cotes quadrature formula, gauss quadrature formula.** **Initial and Boundary Value Problems of Differential Equations:** Euler's method, Runge-Kutta methods, Higher order one step method, Multi-step methods; Finite difference method, Shooting method, Real life examples.	
UNIT-4 TEACHING HOURS (12)	*Linear programming problems, basic solution, basic feasible solution and optimal solution; graphical method and simplex method of solutions; duality. Transportation and assignment problems.*	
UNIT-5 TEACHING HOURS (12)	*Computer programming:* • *Binary system; arithmetic and logical operations on numbers; octal and hexadecimal systems; conversion to and from decimal systems; algebra of binary numbers.* • *Elements of computer systems and concept of memory; basic logic gates and truth tables, Boolean algebra, normal forms.* *Representation of unsigned integers, signed integers and reals, double precision reals and long integers. Algorithms and flow charts for solving numerical analysis problems.*	

TEACHING AND LEARNING STRATEGIES	1. Lecture method 2. Problem Solving method 3. Graphical method 4. Seminar/Symposia 5. Review of literature 6. Report writing **7.** Group Discussion **8.** Videos/Animation **9.** Self-Learning/e-Learning **10.** Workshops/Experiments. *** The Teaching and Learning Strategies may be change as per requirement of the students and their capabilities.**

CONTINUOUS COMPREHENSIVE ASSESSMENT (CCA)	S. No.	CCA- Components	Max. Marks Allocation
	1.	Monthly test	20*3 Test=60
	2.	Quizzes and Assignments	10
	3.	Viva-voce	10
	4.	Seminar/Symposia	10
	5.	Report writing	10

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	6.	Workshop	10
	7.	Review of literature	10
	8.	Creativity/Innovation	10
	9.	Experimental Skill	10
	10.	Co-curricular activity	10
	11.	Attendance	10

Total 160 marks equivalent reduced to CCA original marks 30.

EXAMINATION PATTERN	**Term-end examinations are organized by the university in the prescribed format to enable the scholars to achieve success in contemporary competitions and to achieve their goals.**
PERIODICAL REVISE OF SYLLABUS	1. **ANNUAL** 2. **However, the Universitymay revise the syllabus at any time during the running year after giving a notice for a period one month.**
SELECTED READINGS	• Sastry, S. S. (2012). Introductory Methods Of Numerical Analysis. Phi Learning Pvt. Ltd. • Ralston, A., & Rabinowitz, P. (2001). A First Course In Numerical Analysis. Courier Corporation. • Gautschi, W. (1997). Numerical Analysis. Springer Science & Business Media. • Phillips, G. M., & Taylor, P. J. (Eds.). (1996). Theory And Applications Of Numerical Analysis. Elsevier. • Hildebrand, F. B. (1987). Introduction To Numerical Analysis. Courier Corporation. • Ortega, J. M. (1990). Numerical Analysis: A Second Course. Society For Industrial And Applied Mathematics. • Gerald, C. F. (2004). Applied Numerical Analysis. Pearson Education India. • Conte, S. D., & De Boor, C. (2017). Elementary Numerical Analysis: An Algorithmic Approach. Society For Industrial And Applied Mathematics. • Brian Bradie (2006), A Friendly Introduction to Numerical Analysis. Pearson. • Gerald, C. F. & Wheatley, P.O. (2008). Applied Numerical Analysis (7th edition), Pearson Education, India. • Hildebrand, F. B. (2013). Introduction to Numerical Analysis: (2nd edition). Dover Publications. • Jain, M. K., Iyengar, S. R. K. & Jain, R. K. (2012). Numerical Methods for Scientific and Engineering Computation (6th edition). New Age International Publishers. • Robert J. Schilling & Sandra L. Harris (1999). Applied Numerical Methods for Engineers Using MATLAB and C. Thomson-Brooks/Cole. • Nell Dale & Chip Weems (2013).Programming and Problem Solving with C++ (6th edition). Jones & Bartlett Learning.

Internship (16 weeks)
TEACHING PRACTICE AND PRACTICAL WORK

Planning & Execution	Preparation,administration& analysis of diagnostic test (s) followed by remedial teaching any selected lesson.	**10**
Execution	Execution of action research project	**10**
	Observation and preparation of report	**10**
	Working with community project of social welfare. (submission of report)	**10**
	Exhibition of TLM in school prepared by student teacher	**10**
	Regular classroom teaching delivery of 70 lessons	**5+5=10**
Assessment & Evaluation	Two Criticism Lesson in teaching subject	**10+10=20**
	5 Lessons to be observe by teacher educator.	**5+5=10**
	Final Lesson (External evaluation)	**50**
Regularity & involvement in different school activities	Student teachers function in liaison with the regular teachers in the school in all day-to-day functioning along with teaching-learning by mentor teachers	**05**
	Participating in various 'out of classroom activities' in school Organizing events	**5**
	Participation in any two co-curricular activity and preparation of report	**10**
	Study (and preparation) of school calendar,time table,assessment schedule,library and laboratory.	**5**
	Portfolio,including detailing of teaching-learning plans,resources used,assessment tools,student observations and records.	**10**
	observations of work done by the students during the internship programme.(Seeking reactions of students,headmasters/ principals/ cooperating teachers and supervisors)	**05**
	Preparation and maintenances of feedback diary	**10**
	A journal by student teacher in which he/she records one's experiences,observations,and reflections.	**10**
	TOTAL MARKS	**200**