CENTRAL UNIVERSITY OF TAMIL NADU

CURRICULUM

INTEGRATED TEACHER EDUCATION PROGRAM (ITEP)
SECONDARY STAGE-SCIENCE STREAM
B.Sc.B.Ed

DEPARTMENT OF EDUCATION

2023 - 2024
(updated)

CENTRAL UNIVERSITY OF TAMIL NADU

DEPARTMENT OF EDUCATION

Regulations and Syllabus for the Four-Year Integrated Teacher Education Programme (ITEP) (Secondary Stage, Science Stream)

B.Sc.B.Ed. Mathematics

1. Title

As envisaged in NEP 2020 Four-Year Integrated B.Ed., a dual-major holistic bachelor's degree in Education rolled out nationwide from 2023-2024 onwards with the nomenclature Integrated Teacher Education Programme (ITEP). Central University of Tamil Nadu (CUTN) is sanctioned with ITEP Secondary Stage, Science Stream. The program title is Bachelor of Science in Mathematics and Bachelor of Education (B.Sc.B.Ed. Mathematics). The Rules and Regulations of Choice Based Credit System of the Central University of Tamil Nadu apply to this programme.

2. Equivalence

This Integrated Teacher Education Prgramme (ITEP) falls under the Science Stream and is named ITEP B.Sc. B.Ed. Mathematics. This is equivalent to B.Sc. (Mathematics) and B.Ed. The programme contents are related to Mathematics, Physics, and Chemistry offered in B.Sc.B.Ed. and are equivalent to a B.Sc. (Mathematics) Programme. Mathematics is the major component, and Physics and Chemistry are the Minor components. The programme contents related to Education components in B.Sc.B.Ed. are equivalent to that of B.Ed. programme. This degree B.Sc.B.Ed has been conceived as per the NCTE regulations 2021 and as recommended by the Ministry of Education, Government of India. Students who pass this programme can pursue a Master's Degree in Mathematics and /or a Master's Degree in Education.

3. Objectives of the B.Sc.B.Ed. Programme

On completion of the program, the student will be able to:

- ✓ develop competencies and skills needed to become an effective Mathematics teacher
- ✓ develop insight into the meaning, nature, scope, and objectives of Mathematics and Science Education
- ✓ promote logical thinking, international understanding
- ✓ protect human rights and the rights of the child

- ✓ become a competent and committed teacher
- ✓ be sensitive to emerging issues such as environment, population, gender equality, and legal literacy
- ✓ inculcate rational thinking and scientific temper among the students
- ✓ develop critical awareness about the social realities among the students
- ✓ develop innovative, novel teaching methods
- ✓ develop classroom managerial skills.

4. Duration

The duration of the program shall be four academic years organized in a semester pattern with two semesters a year. Each semester will consist of 40 hours of weekly instruction, excluding admission and examination. The student teacher shall be permitted to complete the programme within six years from the date of admission.

5. Eligibility for Admission

The admission guidelines for the program are as follows;

A Pass in the Higher Secondary (Plus two) examination or the equivalent of any recognized board in India with subjects Maths, Physics, and Chemistry. Community-wise marks eligibility is 60% for the general category, 55% for OBC (Non-creamy layer), and 50% for SC/ST/PWD candidates. Those appearing for the Higher Secondary Examination are also eligible to apply but must satisfy prescribed age criteria when applying. Shall attend the common entrance exam prescribed by NCTE.

6. Intake and Admission Procedure

The annual intake for the program shall be 50 students, as sanctioned by NCTE. Admission shall be regulated through selection based on marks in the qualifying examination NCET or performance in a specially designed selection test or both as per the admission policies of CUTN from time to time.

7. Medium of Instruction

The medium of instruction shall be English

8. Multiple Entry and Multiple Exit

As per NEP 2020, If a student teacher wishes to exit from the first year/second year, he/she will be given a certificate/diploma in ITEP subject to the accumulation of minimum credits prescribed. If a student teacher wishes to exit from the third year, he/she will be given a Bachelor of Science in Mathematics. Multiple entry provision during the programme will be depending upon the availability of the seats and subjected to the CUTN norms.

9. Methods of Transaction

The following are the suggestive methods of curriculum transaction

- ✓ Lectures-cum-discussion
- ✓ Lecture-cum-demonstration
- ✓ Use of narratives based on research and documentation
- ✓ Project reviews
- ✓ Case studies
- ✓ Use video clips and transcripts of classroom teaching
- ✓ Success stories/ innovations
- ✓ Observation in schools and other field sites
- ✓ Recording of observations and experiences
- ✓ Interviews with school personnel
- ✓ Panel or group discussion on issues
- ✓ Individual projects
- ✓ Journal writing
- ✓ Using library and ICT resources.

10. Attendance

Students of the program must secure a minimum of 80% attendance in theory courses and 90% for field-based experience or school internship to appear in the End Semester Examination (ESE). Relaxation in the attendance shortage will be permitted as per NCTE and CUTN norms. If any student fails to complete the minimum prescribed attendance even with the allowed relaxation, he/she will not be permitted to attend end-semester examinations. She/He shall be asked to redo the course by enrolling for it the next time when it is offered and as per the CUTN norms.

11. Course Outline

ITEP B.Sc.B.Ed. Mathematics curriculum is developed in line with the suggestive curriculum framework for the secondary stage by NCTE. The total credits of the programme is 203. The Science curriculum is a single major course with two minors. Mathematics is the major (64 credits), and Physics (12 credits) and Chemistry (12 credits) are minors. The courses related to Mathematics are offered across eight semesters. Languages, Physics, and Chemistry are offered in the first four semesters.

The curriculum structure of the ITEP B.Sc.B.Ed. is adapted from NCTE's ITEP Curriculum Framework, 2023. This consists of Foundations of Education, Disciplinary/Inter-disciplinary Courses, Stage-Specific Content cum Pedagogy, Ability Enhancement and Value-Added Courses, School Experience, and Community Engagement and Service. The credit arrangement is in tune with the National Curriculum Framework.

Apart from the above, the coaching classes related to teacher eligibility tests will be arranged for VI and VIII semester student teachers as a value-added programme.

12. Type of Courses:

Details of courses and schemes of study, duration, etc., are provided in Tables 1 and 2. Courses of study are organized under the following categories. The nomenclature of the categories has been adapted from the CBCS guidelines of UGC and NCTE.

- ✓ Core Courses (Major and Minor)
- ✓ Ability Enhancement Compulsory Course (AECC)
- ✓ Pedagogy Courses (Discipline-Specific Electives)
- ✓ Engagement with the Field (Skill Enhancement Course)
- ✓ Enhancing Professional Competencies (Skill Enhancement Course)
- ✓ Electives
- ✓ Internships
- ✓ Extension Activities

Table 1 gives an overview of courses placed across eight semesters.

Table 1: Panorama of the Eight Semesters

S. No.	Course	Number of Credits per Semester								Total
		I	II	III	IV	V	VI	VII	VIII	
	AECC									
1	English	3	3							6
2	Language (Tamil/Hindi)			3	3					6
	Foundations of Education									
3	Child Development and Educational Psychology	4								4
4	Philosophical and Sociological Foundations of Education - I		4							4
5	Curriculum Planning and Development			2						2
6	Assessment and Evaluation				2					2
7	Educational Policy Analysis								2	2
8	Inclusive Education								2	2
9	Evolution of Indian Education								4	4
10	Philosophical and Sociological Foundations of Education - II								4	4
11	Perspectives on School Leadership and Management								2	2
12	Mathematics	4	10	8	8	16	18			64
13	Physics	4 +2	4 +2							12
14	Chemistry			4+ 2	4 +2					12
	Stage-Specific Content cum Pedagogy									
15	Pedagogy Course in Mathematics I & II					4	4			8
16	Pedagogy Course in Physical Science I & II					4	4			8
	School Experience									
17	School Observation				2					2
18	Creating Teaching Learning Material&Learning to Function as Tr.						2			2
19	Summer Internship in Maths							2		2
20	School-based Research Project							4		4
21	Pre-Internship Practice (2 Weeks)							2		2
22	Internship in Teaching (12 Weeks)							10		10
23	Post Internship (2 Weeks)							2		2
	Ability Enhancement and Value-Added Courses									
24	Art Education (Performance and Visual)	2								2
25	ICT in Education			2						2

26	Teacher and Society			2						2
27	Citizenship Education, Sustainability and Environmental Education					3				3
28	Understanding India								2	2
29	Mathematical and Quantitative Reasoning								2	2
	Online Course									
30	MOOC - SWAYAM						4			4
	Elective Course			3					3	6
31	Guidance and Counseling									
32	Gender Education									
33	Emerging Technologies in Education									
34	Educational in the Digital Domain									
35	Education for Sustainable Development									
36	Educational Leadership									
	Skill Enhancement Course									
37	Yoga and Fitness	2								2
38	Disaster Risk Reduction	3								3
39	Health Education and Nutrition		3							3
40	Cyber Security				4					4
	Community Engagement and Service									
41	Community Engagement and Service								2	2
	Total Credits	**24**	**26**	**26**	**25**	**27**	**32**	**20**	**23**	**203**

This four-year programme consists of eight semesters. The Semester-wise course outline is given in the following Table 2.

Table 2: Semester-wise Course Outline

Year	Paper	Course Code	Course Type	Marks CA + TEE	Credits Lecture / Tutorial / Practical	Sub Total
I	**Semester I**					24
	English	EDU10111	AECC	40+60	3:0:0	
	Child Development and Educational Psychology	EDU10112	MAJOR	40+60	2:0:2	
	Differential and Integral Calculus	EDU10113	MAJOR	40+60	4:0:0	
	General Physics I	EDU10114	MINOR	40+60	4:0:0	
	General Physics Practical I	EDU10115	MINOR	60+40	0:0:2	
	Art Education (Performance and Visual)	EDUVA01	VAC	100 + 0	0:0:2	
	Yoga and Fitness		SEC		2:0:0	
	Disaster Risk Reduction		SEC		3:0:0	
	Semester II					26
	English	EDU10211	AECC	40+60	3:0:0	
	Philosophical and Sociological Foundations of Education - I	EDU10212	MAJOR	40+60	3:1:0	
	Vector Analysis	EDU10213	MAJOR	40+60	4:0:0	
	Mathematical Statistics	EDU10214	MAJOR	40+60	4:0:0	
	General Physics II	EDU10215	MINOR	40+60	4:0:0	
	General Physics Practical II	EDU10216	MINOR	60+40	0:0:2	
	Basic Computing Lab	EDU10217	MAJOR	60+40	0:0:2	
	Health Education and Nutrition		SEC		3:0:0	
For the student teacher exiting after one year –Certificate in ITEP(Secondary Stage, Science Stream) with 50 credits						
II	**Semester III**					
	Language (Tamil /Hindi)	EDU10311T/EDU10311H1/EDU10311H2	AECC	40+60	3:0:0	26
	Curriculum Planning and Development	EDU10312	MAJOR	40+60	2:0:0	
	Sequence and Series	EDU10313	MAJOR	40+60	4:0:0	
	Abstract Algebra	EDU10314	MAJOR	40+60	4:0:0	
	General Chemistry I	EDU10315	MINOR	40+60	4:0:0	
	General Chemistry Practical I	EDU10316	MINOR	60+40	0:0:2	
	ICT in Education	EDUVA02	VAC	100+0	0:0:2	
	Teacher and Society	EDUVA03	VAC	40+60	2:0:0	

	Elective (Guidance and Counseling / Gender Education/ Emerging Technologies in Education)	EDUEC01/ EDUEC02/ EDUEC03	EC	40+60	3:0:0	
	Semester IV					25
	Language (Tamil/Hindi)	EDU10411T/EDU10411H1/EDU101411H2	AECC	40+60	3:0:0	
	Assessment and Evaluation	EDU10412	MAJOR	100+0	0:0:2	
	Linear Algebra	EDU10413	MAJOR	40+60	4:0:0	
	Optimization Techniques	EDU10414	MAJOR	40+60	4:0:0	
	General Chemistry II	EDU10415	MINOR	40+60	4:0:0	
	General Chemistry Practical II	EDU10416	MINOR	60+40	0:0:2	
	School Observation	EDU10417	MAJOR	100+0	0:0:2	
	Cyber Security		SEC		4:0:0	
For the student teacher exiting after two years- Diploma in ITEP (Secondary Stage, Science Stream) with 101 credits						
III	**Semester V**					27
	Statics and Dynamics	EDU10511	MAJOR	40+60	4:0:0	
	Real Analysis	EDU10512	MAJOR	40+60	4:0:0	
	Differential Equations	EDU10513	MAJOR	40+60	4:0:0	
	Pedagogy Course in Mathematics I	EDU10514	MAJOR	40+60	3:1:0	
	Pedagogy Course in Physical Science I	EDU10515	MAJOR	40+60	3:1:0	
	Number Theory	EDU10156	MAJOR	40+60	4:0:0	
	Citizenship Education, Sustainability, and Environmental Education	EDUVA04	VAC	100+0	2:1:0	
	Semester VI					32
	Complex Analysis	EDU10611	MAJOR	40+60	4:0:0	
	Numerical Analysis	EDU10612	MAJOR	40+60	4:0:0	
	Mathematical Modeling	EDU10613	MAJOR	40+60	4:0:0	
	Pedagogy Course in Mathematics II	EDU10614	MAJOR	40+60	3:1:0	
	Pedagogy Course in Physical Science II	EDU10615	MAJOR	40+60	3:1:0	
	Creating Teaching Learning Material (TLM) and Learning to function as a Teacher	EDU10616	MAJOR	100+0	0:0:2	
	Graph theory	EDU10617	MAJOR	40+60	4:0:0	

	Scientific Computing Lab	EDU10618	MAJOR	60+40	0:0:2	
	MOOC-SWAYAM	EDUON061/62/63/64 (likewise, the course number will be added in the subsequent year with new courses)	ON		0:0:4	
For the Students exiting after three years, B.Sc. Mathematics with 160 credits						
	Semester VII					
IV	Pre-Internship (2 Weeks)	EDU10711	MAJOR	100+0	0:0:2	20
	Internship in Teaching (12 Weeks)	EDU10712	MAJOR	100+0	0:0:10	
	School-Based Research Project	EDU10713	MAJOR	100+0	0:0:4	
	Post Internship 2 (Weeks)	EDU10714	MAJOR	100+0	0:0:2	
	Summer Internship in Mathematics	EDU10715	MAJOR	100+0	0:0:2	
	Semester VIII					23
	Evolution of Indian Education	EDU10811	MAJOR	40+60	3:1:0	
	Philosophical and Sociological Foundations of Education - II	EDU10812	MAJOR	40+60	4:0:0	
	Educational Policy Analysis	EDU10813	MAJOR	40+60	2:0:0	
	Inclusive Education	EDU10814	MAJOR	40+60	2:0:0	
	Perspective on School Leadership and Management	EDU10815	MAJOR	40+60	2:0:0	
	Community Engagement and Service	EDU10816	MAJOR	100+0	0:0:2	
	Understanding India	EDUVA05	VAC	40+60	2:0:0	
	Mathematical and Quantitative Reasoning	EDUVA06	VAC	40+60	2:0:0	
	Elective (Education in the Digital Domain/Education for Sustainable Development/Educational Leadership)	EDUEC04/EDUEC05/EDUEC06	EC	40+60	3:0:0	
For students after completing four years – UG in ITEP (Secondary stage, Science Stream) with 203 credits						
	Grand Total					**203**

Table 3 gives a summary of the courses that are aligned with NEP 2020.

Table 3: Summary of the Courses

S.No.	Course Type	Number of Courses	Credits
1	Education - Major	15	46
2	Internship	6	22
3	Mathematics - Major	17	64
4	Physics - Minor	4	12
5	Chemistry - Minor	4	12
6	AECC	4	12
7	SEC	4	12
8	VAC	6	13
9	ON	1	4
10	EC	2	6
	Total	**63**	**203**

12. Scheme of Evaluation

The result in each course will be determined based on Continuous Internal Assessment (CIA) and performance in the End Semester Examination, which will be in the ratio of 40:60 (40 Continuous Assessment and 60 Term End Exam) in case of a theory assessment and 60:40 (60 Continuous Assessment and 40 Term End Exam) in case of practical assessment. The passing minimum in ITEP B.Sc.B.Ed. Mathematics shall be 50% in theory and 50% in Practicum components separately, and an overall 50%. The student who fails in either theory or practical examination he/she must clear the same in the subsequent supplementary examination.

Rubrics are used to assess activities like assignments and seminar presentations to be more objective. The rubrics are given in Tables 4 and 5.

Table 4. Rubric for Assignment

Sl. No.	Criteria	100%	75%	50%	25%	0%
1	**Content 50%**	Ideas are detailed, well-developed, and supported with specific evidence & facts and examples	Ideas are detailed, Developed and supported with evidence and facts primarily specific.	Pictures are presented but not mainly developed or supported;	The content is not sound.	Not attended
2	**Organization 50%**	Includes title, introduction, statement of the main idea with illustration, and conclusion.	Includes title, introduction, statement of main idea, and conclusion.	organizational tools are weak or missing	No organization	Not attended

Table 5. Rubric for Seminar

Sl. No.	Criteria	100%	75%	50%	25%	0%
1	**Knowledge and Understanding 50%**	Exceptional knowledge of facts, terms, and concepts	Detailed knowledge of facts, terms, and concepts	Considerable knowledge of facts, terms, and concepts	Minimal knowledge of facts, terms, and concepts	Not Attended
2	**Presentation 50%**	Well Communicated with logical sequences, examples, and references	Communicated with sequences	Just Communicated	No coherent communication	Not Attended

It shall be noted that the evaluation guidelines as prescribed in the academic ordinance of the University will be strictly followed. The grading system of the CUTN is given in Table 6. A 10-point grade system is followed.

Table 6: Grading System

Sl. No.	Range of Marks in %	Letter Grade	Grade Point	Description
1	90 – 100	O	10	Outstanding
2	80 - 89	A+	9	Excellent
3	70 - 79	A	8	Good
4	60 - 69	B+	7	Above Average
5	50 – 59	B	6	Average
6	Below 50	RA	-	Reappear

Department of Education

A. Vision

Vision Statement of the Department

Excellence in Education

B. Mission

Mission Statements of the Department

M1	To provide Leaders in School and Teacher Education
M2	To develop and disseminate Innovative Best Practices in Teaching, Learning, and Research
M3	To integrate ICT Tools in Teaching, Learning, and Research

EDUCATION

C. Program Educational Objectives (PEO)

After five years of successful completion of the program, the student will be able to

PEO1	Shows continuous improvement in the Teaching Profession
PEO2	Integrates ICT tools in Teaching
PEO3	Develops Innovative Practices
PEO4	Becomes a Reflective Teacher
PEO5	Demonstrates quality in Teaching

D. PEO to Mission Statement Mapping

	PEO1	PEO2	PEO3	PEO4	PEO5
M1	3	3	3	3	3
M2	3	3	3	3	3
M3	3	3	3	3	3

E. Graduate Attributes of Integrated B.Sc.B.Ed. Program

1. **Disciplinary Knowledge:** Content and pedagogical knowledge synchronized with the curriculum frameworks and policies
2. **Communication Skills:** Possess clarity in conveying the ideas
3. **Critical Thinking:** Capacity to apply analytical thought in the teaching and learning process
4. **Problem-Solving:** Participate in educational problem solving and apply the knowledge in day-to-day professional endeavors.
5. **Cooperation:** Appreciate collaboration and cooperation among stakeholders of education.
6. **ICT Skills:** Selecting and integrating appropriate ICT skills for professional development.
7. **Ethics:** Doing what is right for society
8. **Self-Directed Learning:** Developing autonomy and self-regulation in teaching-learning and professional development.
9. **Reasoning:** Ability to interpret and draw the conclusion from qualitative/quantitative data with open-mindedness
10. **Creativity:** Ability to produce new ideas
11. **Societal and Environmental Concern:** Performing an act or solving a problem with respect to societal and environmental concern
12. **Lifelong Learning:** Understands the need for learning and practices it throughout life

F. Program Outcomes (PO)

On the successful completion of the program, the student will be able to

PO1	Does the teaching efficiently and effectively
PO2	Demonstrates efficacy in teaching and learning
PO3	Design and develops improvised teaching-learning materials
PO4	Address the needs of their learners effectively
PO5	Enhances Communication Skills
PO6	Evaluates the learning abilities of their learners.

G. PO to PEO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6
PEO1	3	3	3	3	3	3
PEO2	3	3	3	2	3	3
PEO3	3	3	3	3	3	3
PEO4	3	3	3	3	3	3
PEO5	3	3	3	3	3	3

SCIENCE

C. Program Educational Objectives (PEO)

After five years of successful completion of the program, the student will be able to

PEO1	Possess sound knowledge in the fundamentals of science
PEO2	Develops analytical skills
PEO3	Thinks abstractly
PEO4	Performs computations
PEO5	Develops HOTS

D. PEO to Mission Statement Mapping

	PEO1	PEO2	PEO3	PEO4	PEO5
M1	3	3	3	3	3
M2	3	3	3	3	3
M3	3	3	3	3	3

E. Program Outcomes (PO)

On the successful completion of the program, the student will be able to

PO1	Develops scientific attitude
PO2	Enhances reasoning ability
PO3	Carries over numeric calculations
PO4	Possesses critical thinking to solve the problem
PO5	Apply appropriate techniques for the qualitative and quantitative analysis
PO6	Express creativity.

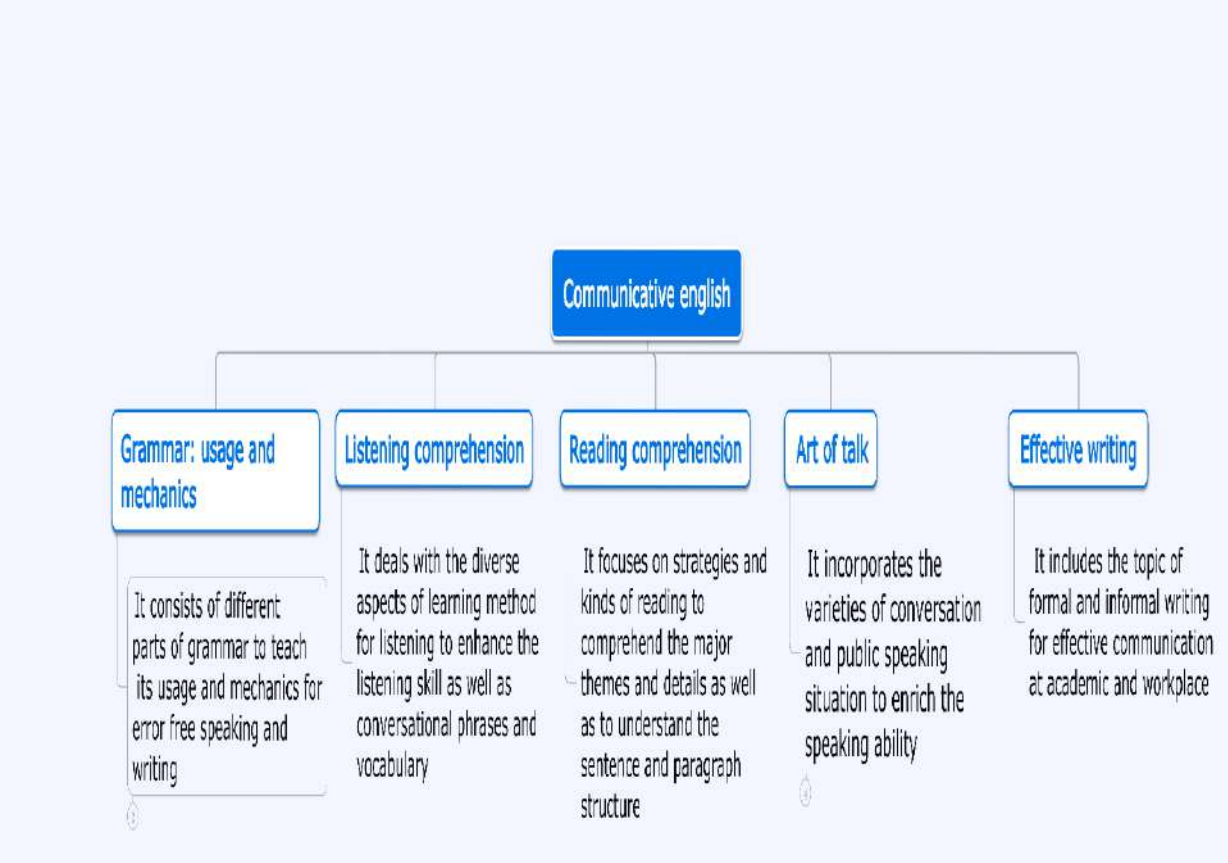
F. PO to PEO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6
PEO1	3	3	3	3	3	3
PEO2	3	3	3	2	3	3
PEO3	3	3	3	3	3	3
PEO4	3	3	3	3	3	3
PEO5	3	3	3	3	3	3

SEMESTER - I

SEMESTER I					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10111	Communicative English	3	0	0	3
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcomes

On the successful completion of the course, the student will be able to

	Course Outcomes	Level
CO1	Become proficient in grammar usage for communication.	Understand
CO2	Acquire the significance of listening in communication and vocabulary development.	Apply
CO3	Think critically and analytically to comprehend The idea and solve problems.	Analyse
CO4	Assess the nuances of public speaking and everyday conversation.	Evaluate
CO5	Understand the use of effective writing for professional and academic communication.	Skill

b. Syllabus

Units	Contents	Hours
I	**English Grammar: Usage and Mechanics** Parts of Speech – Articles – Tenses – Active and Passive voice – Subject-Verb Agreement – Direct and Indirect Speech – Transition words – Collocation – types of sentences	10
II	**Listening Comprehension** Listening Skill and its importance –Active listening - Listening for specific information - main idea - details – conversational phrases and vocabulary -predicting and recognizing emotions –Listening and comprehending news reports – structured talks – TED talks – Conversation videos – practice notetaking – Barriers to listening and strategies to overcome.	10
III	**Reading Comprehension** Kinds &Ways of reading – benefits and purpose of read-aloud strategy -traits of a good reader - reading short articles and news reports - understanding sentence structure – main themes and ideas– reading for analytical, critical and creative thinking – understand the connection between paragraphs - cause and effect – vocabulary development.	10
IV	**Art of Talk** Formal Vs. informal conversation – self-intro –anchoring - types of presentation - oral presentation: extempore and extemporaneous speech - present tables,charts and graphs – group discussion – conversation practice: role play – strategies for fluency – barriers and techniques to overcome them.	9
V	**Effective Writing** Formal Vs. informal writing – note making and summarizing - topic sentence and paragraph making – cohesion and coherence in writing - precise writing — paraphrasing – effective use of transition words and punctuations – descriptive writing–writing resume - transcoding – letter writing – email writing – writing etiquette.	9

	Practicum ✓ Tasks and exercises will be given depending on the course instructors. **References:** A.J. Thomson, A.V. Martinet, A Practical English Grammar, OxfordUniversity Press Murphy, Raymond (2004). Essential English Grammar. 3rd ed., Cambridge UP, Word Power Made Easy- Norman Lewis- Penguin Publishers Hewings, M. (2013). Advanced grammar in use: A reference and practice book for Advanced learners of English. Cambridge UniversityPress. Kumar, S., & Lata, P. (2015). Communication Skills. Oxford UniversityPress. Kallos, Judith. Email Etiquette Made Easy. Online. Killian, Crawford.Writing for the Web. 5th ed., Self Counsel Press, 2015. Howard, Peter, Perfect Your Punctuation, Orient Longman, Delhi. Howard, Peter, Perfect Your Grammar, Orient Longman, Delhi. Howard, Peter, Mistakes to Avoid in English, Orient Longman, Delhi.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	1	1	3	3
CO2	3	3	3	2	3	3
CO3	2	2	2	3	3	3
CO4	3	3	3	0	3	2
CO5	3	3	3	3	2	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	20	20	20	20	20	20

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignment	**2**	**2**	**-**	**-**	**2**
Seminar	**-**	**-**	**2**	**2**	**-**
Test	**5**	**5**	**5**	**5**	**5**
Attendance	**1**	**1**	**1**	**1**	**1**
Total	**8**	**8**	**8**	**8**	**8**

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part A (Objective -10x1=10 marks)	2	2	2	2	2
Part B (Short Answer –4x5=20marks)	10	10	-	-	-
Part – C (Essay-3 x 10 = 30 marks)			10	10	10
Total	12	12	12	12	12

g. Model Question Paper

SI.No	Model Questions	Specification	Level
	Part – A: Objective Type **Answer all the following questions** **10 x 1=10**		
1	Fill in the blanks with suitable articles a) My son is ..... M.A from Agra University. b) She is……. honorary secretary of the club.	Recall	Remember
2	Complete the following by filling the blanks with suitable tenses. Two carpenters …… (1) (work) on Mr. Sharma'sroof. When they …… (2) (stop) work at 6 p.m., they ……. (3) (leave) their ladder …… (4) (lean) against the house.	Recall	Remember
3	Fill in the blanks with suitable Prepositions a).The old man is used .....eating such food. (to, of) b).We went… the place (round, around)	Recall	Remember
4	Rewrite the sentence by using the modal verbs given in brackets a) I'm sure that Mrs. Smith didn't leave home. (cannot) b) I'm thinking about taking a Spanish lesson. (may)	Rewrite	Remember
5	Identify the noun/adjective/verb/adverb in the following sentences a).Everyone left the building in a hurry. b).I sat on the left side of the room.	Identify	Remember
6	Complete the blanks with suitable phrasal verbs a).The teacher…….an explanation of his conduct. A. called off B. called out C. called in D. called for b).She…….the orphan as her child. A. brought out B. brought up C. brought in D. brought about	Recognize	Remember
7	Make Wh' Question for the given expression a).He can speak Chinese. b).The play was interesting	Rescript	Understand
8	Convert the sentences into Active/Passive Voice	Rescript	Underst

	a)They will hire some people to do the job. b) Her silence worries me.		and
9	Find out the rhyming words in the following a) If you can wait and not be tired by waiting,Or being lied about, don‘t deal in lies, Or being hated, don‘t give way to hating, And yet don‘t look too good, nor talk too wise b)If you can bear to hear the truth you‘ve spoken Twisted by knaves to make a trap for fools, Or watch the things you gave your life to, broken, And stoop and build ‘em up with worn-out tools	Rescript	Understand
10	Make a sentence of your own to the given Homophones/homonym	Recognize	Remember
PART – B Short Answer **Answer all the following questions 4 x 5 = 20**			
1	**a. Correct errors, rewrite the passage:** Human civilization evolved from cases of famine, death, infections, and illness over the years, with the advancement in technology, science and health. India has the second largest population in world, after China. It is estimated that by 2025, India crosses China and become the country with the largest population. In 1950-51, India’s population is 361 million. Our population is growing at the rate of 2.2% per annum since independence. **(Or)** **b. Situational dialogue:** You want to visit New Delhi. Construct a situational dialogue on a telephonic inquiry about the availability of a berth on the train.	Construct	Skill
2	**a. Rearrange the following jumbled sentences** i. to stand/when he arrives/visitors/expects/His Excellency ii. brought/the team/Amanda/all her expertise iii. named/Samantha/their first daughter/the couple iv. to stay/a legal assistant/l wouldn‘t like/for long v. the grenade/removed/the paratrooper/the pin/from/careful (or) **b. Cloze writing:** Fill the gaps in the essay with suitable words among the list given in brackets below each paragraph. The question (1) ——how people learn a second language (2) ——received a great deal of scientific attention Especially (3) ——-the 1970s. Research has offered	Interpret	Understand

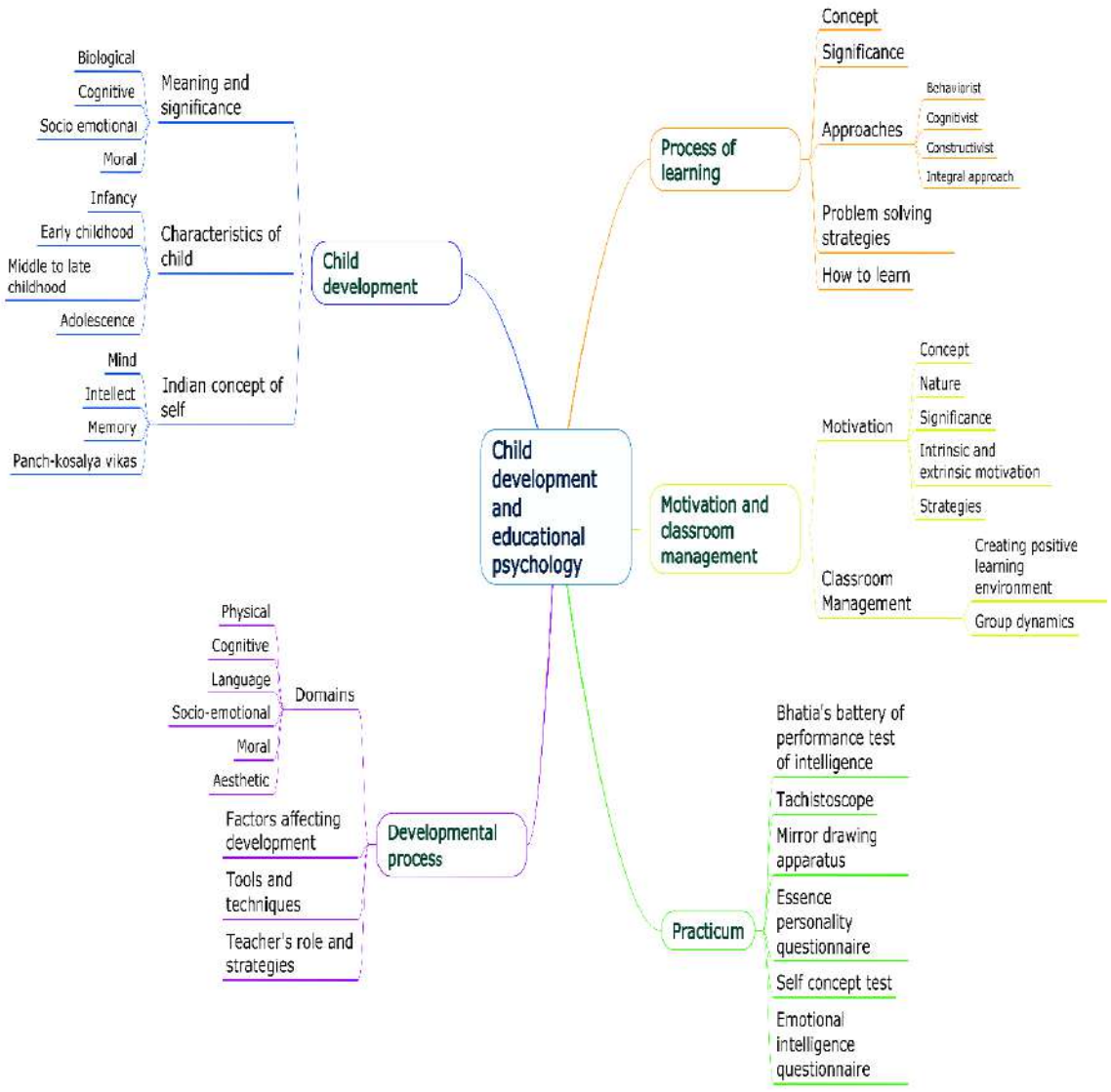
	evidence (4)——has been used to support a number of conflicting claims(5)——-second language (SL) Learning. (6)————-, one fundamental observation is less open to dispute (7) ——— others. If success in adult second language learning is measured (8) —-how close the learnercomes to the level of a native speaker, it is possible, (9) ——quite common, for adults to achieve a high degree of success in learning SL grammar and vocabulary. The same degree of success, though, is apparently unattainable in SL phonology; adult SL speakers who sound (10) ——-native speakers are extremely rare. (than, however, by, that, of, has, since, about, and, like, on, over)		
3	a) Discuss the barriers of listening Or b).Explain the significance of listening in communication	Interpret	Under stand
4	a) Compare active and passive listening (or) b) Discuss reflect listening.	Interpret	Under stand
	PART – C Essay Answer **Answer all the Questions 3 x 10 = 30**		
1	Read the passage carefully and answer the following questions that follow. **(a. Reading Comprehension or b. Précis Writing)** Philosophy of Education is a label applied to the study of the purpose, process, nature, and ideals ofeducation. It can be considered a branch of both philosophy and education. Education can be defined as the teaching and learning of specific skills, and the imparting of knowledge, judgment, and wisdom, and is something broader than the societal institution of education we often speak of. Many educationalists consider it a weak and woolly field, too far removed from the practical applications of the real world to be useful. But philosophers dating back to Plato and the Ancient Greeks have given the area much thought and emphasis, and there is little doubt that their work has helped shape the practice of education over the millennia. Plato is the earliest important educational thinker, and education is an essential element in "The Republic" (his most important work on philosophy and political theory, written around 360 B.C.). In it, he advocates some rather extreme methods: removing children from their mothers' care and raising them as wards of the state, and differentiating children suitable to the various castes, the highest receiving the most education, so that they could act as guardians of the city and care for the less able. He believed that education	Deduce	Analyze

	should be holistic, including facts, skills, physical discipline, music, and art. Plato believed that talent and intelligence are not distributed genetically and thus are being found in children born to all classes, although his proposed system of selective public education for an educated minority of the population does not follow a democratic model. Aristotle considered human nature, habit, and reason to be equally important forces to be cultivated in education, the ultimate aim of which should be to produce good and virtuous citizens. He proposed that teachers lead their students systematically, and that repetition beused as a key tool to develop good habits, unlike Socrates' emphasis on questioning his listeners to bring out their ideas. He emphasized the balancingof the theoretical and practical aspects of subjects taught, among which he explicitly mentions reading, writing, mathematics, music, physical education, literature, history, and a wide range of sciences, as well as play, which he also consideredimportant. During the Medieval period, the idea of Perennials was first formulated by St. Thomas Aquinas in his work "De Magistracy". Perennials holds that one should teach those things deemed tobe of everlasting importance to all people everywhere, namely principles and reasoning, not just facts (which are apt to change over time), and that one should teach first about people, not machines or techniques. It was originally religiousin nature, and it was only much later that a theory of secular perennials developed. During the Renaissance, the French skeptic Michel de Montaigne (1533 - 1592) was one of the first to Critically look at education. Unusually for his Montaigne was willing to question the conventional wisdom of the period, calling into question the whole edifice of the educational system, and the implicit assumption that universityeducated philosophers were necessarily wiser than uneducated farm workers, for example. Q1) What is the difference between the approachesof Socrates and Aristotle? Q2) Why do educationists consider philosophy aweak and woolly‘field? Q3) What do you understand by the term Perennials‘, in the context of the given comprehension passage? Q4) Were Plato‘s beliefs about education democratic? Q5) Why did Aquinas propose a model of education which did not lay much emphasis onfacts?		

2	Letter Writing: a) Write an application letter to ABC publications for the vacancy of upper primary mathematics teacher. (OR) b) Write a letter to your friend, inviting him/her to your graduation ceremony.	Write	Skill
3	General Essay: a) It is time that we all see gender as a spectrum instead of two sets of opposing ideals. Write an essay on the context of the above statement (not exceeding 500 words) (OR) b) Write an essay in less than 500 words on the topic celebrate biodiversity.	Comment	Analyse

SEMESTER - I					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10112	Child Development and Educational Psychology	2	0	2	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcomes (COs)

On successful completion of the course, the student teachers will be able to

	Course Outcomes	Level
CO1	Describe the meaning, concept, characteristics and factors affecting growth and development	Understand
CO2	Use the knowledge of the Indian concept of self	Apply
CO3	Identify the various approaches to the process of learning	Remember
CO4	Apply various problem-solving and learning strategies in real classroom settings	Apply
CO5	Explain group dynamics and apply strategies to facilitate group learning	Understand
CO6	Describe the factors influencing learning	Understand

b. Syllabus

Units	Content	Hours
I	**Child development** Meaning and significance of understanding the process of Child Development: Biological, cognitive, socio-emotional, and moral - Developmental characteristics of a child during: Infancy stage, Early Childhood stage, Middle to Late Childhood stage, and Adolescence stage -The Indian concept of self: Mind (मनस्), Intellect (बुद्धि), Memory (चित्त). Panch-koshIya Vikas (पञ्चकोशीयविकास).-Educational Implications.	8
II	**Developmental Process** Development across domains: Physical Development, Cognitive Development, Language Development, Socio-Emotional Development, Aesthetic Development and Moral Development - Factors affecting development- Individual differences: Children with special needs including developmental disorders, Tools and Techniques for Identifying Learners with different abilities - Teachers' roles and strategies to address the needs of learners with different learning abilities.	8
III	**Process of Learning** Conceptual Clarity and significance-Approaches: Behaviorist, Cognitivist, Constructivist, Developmental, Information processing Model of learning and Shri Aurobindo's Integral approach - Problem-Solving and Learning Strategies: Inquiry and problem-based learning, Steps, and Strategies in problem-solving, Factors hindering problem-solving - How to Learn: Significance and Strategies	9
IV	**Motivation and Classroom Management** Motivation: Conceptual clarity, nature, and significance, Intrinsic and Extrinsic Motivation, and Strategies for Motivation - Classroom management: Creating a positive learning environment planning space for learning and managing behavioral problems - Group dynamics: Classroom as a social group, Characteristics of group, Understanding group interaction-sociometry, Strategies to facilitate group learning.	9

V

Practicum

S. No.	Apparatus and Tools	Concept
1	Bhatia's Battery of Performance Test	Intelligence
2	Tachistoscope	Attention
3	Mirror Drawing Apparatus	Transfer of Learning
4	Eysenck Personality Questionnaire	Personality
5	Self-Concept Test	Self-Concept
6	Emotional Intelligence Questionnaire	Emotional Intelligence

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Tasks and Assignments:

- ✓ Spending a day with a child and preparing a report based on our observations of children for:
  - A day from different economic status (low and affluent)
  - Focus on various factors: Physical, emotional, social, language, cultural, and religious influencing the child on a daily basis.
- ✓ Observing children to understand the styles of children's learning process.
- ✓ Identifying the Learning Difficulties of Students in Different Learning Areas and the Possible Reason for them- Case Study Report.
- ✓ Preparing Personalized Intervention Plans for Students with Learning Difficulties.
- ✓ Planning to use advanced technology to encourage talented/gifted children.
- ✓ Encouraging gifted/talented students beyond the general school curriculum.
- ✓ Familiarization and Reporting of Individual Psychological Tests.

References:

Benjamin S., Bloom et al. (1964). *Taxonomy of educational objectives*. Longman Group.

Bhatt, H. *The diary of a school teacher*: An Azim Premji University publication. www.arvindguptatoys.com/arvindgupta/diary - school teacher- eng.pdf

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Burden, Paul R; Byrd, David. M. (1999). *Methods for Effective Teaching* (Sec Edition), Allyn and Bacon.

Cole, M, and Cole, S (1989). *The Development of Children*, Scientific American Books, New York

	Hurlock, E.B. (2013). *Child Growth and Development*, Tata Mc Graw - Hill Education Kakkar, S (1978). *The Inner World: A Psychoanalytic Study of Childhood and Society in India*. Oxford University Press, New Delhi Mangal, S.K. and Mangal, S. (2019). *Childhood and Growing Up*, PHI Learning Private Limited, New Delhi. Mishra, A (2007), *Everyday Life in a Slum in Delhi*. In D.K. Behera (Ed.) Childhood in South Asia. New Delhi: Pearson Education India	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	1	1	2	1	1
CO2	2	3	1	1	1	1
CO3	3	3	3	2	2	3
CO4	3	3	3	3	3	2
CO5	3	3	3	3	1	2
CO6	3	3	2	2	2	2

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	CO6	Total
Internal	7	7	7	7	7	5	40
External	11	7	11	7	12	12	60
Total	**18**	**14**	**18**	**14**	**19**	**17**	**100**

e. Mapping Course Outcomes with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5	CO6
Assignments	2	-	-	2	2	-
Seminar	-	2	2	-	-	-
Test	4	4	4	4	4	4
Attendance	1	1	1	1	1	1
Total	**7**	**7**	**7**	**7**	**7**	**5**

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5	CO6
Part – A (Objective - 10 x 1 = 10 marks)	1	2	1	2	2	2
Part – B (Short Answer - 4 x 5 = 20 marks)	-	5	-	5	-	5+5
Part – C (Essay- 3 x 10 = 30 marks)	10	-	10	-	10	-
Total	**11**	**7**	**11**	**7**	**12**	**12**

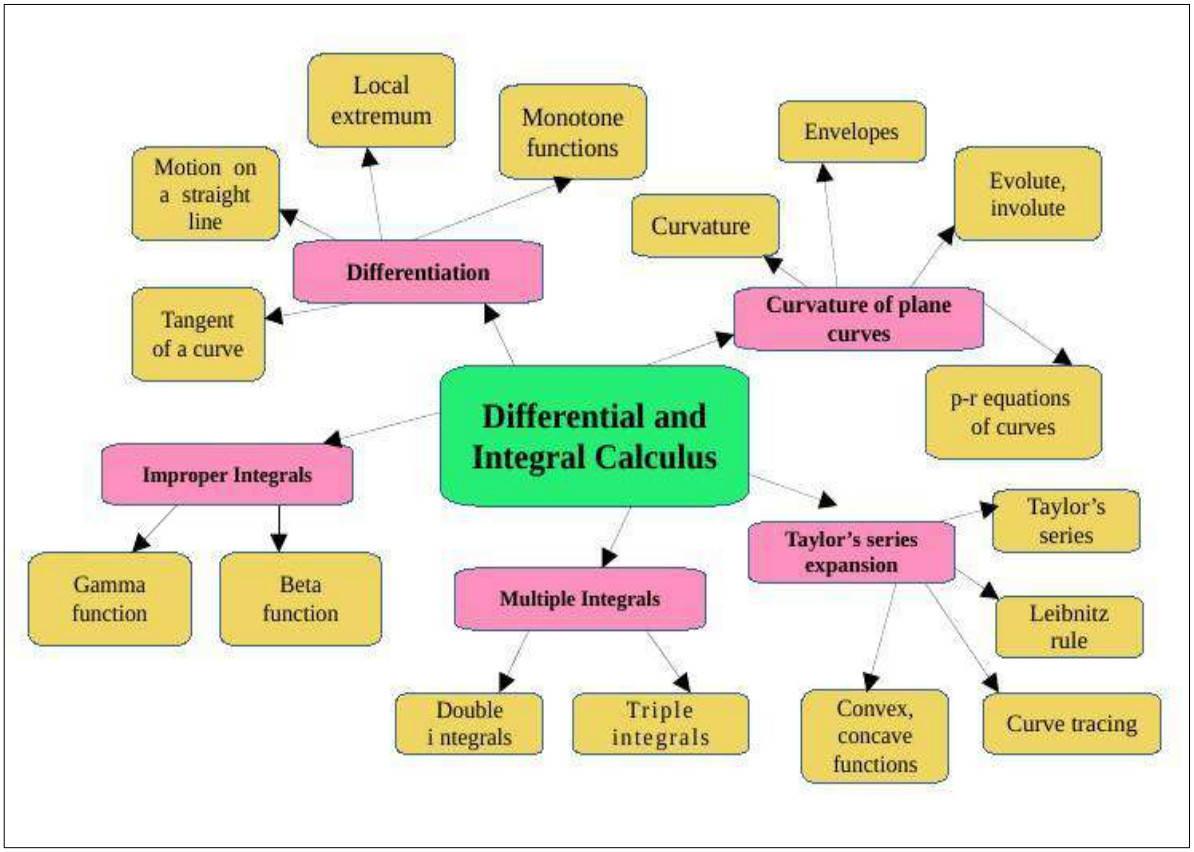
g. Model Question Paper

Sl. No.	Model Questions	Specifications	Level
	Part – A: Objective Type **Multiple Choice Questions 10 x 1 = 10**		
1	As the son, so the father – this statement favours for A. Nature B. Nurture C. Father D. Son	Recognize	Remember
2	Producing innovative ideas is A. Self Concept B. Creativity C. Intelligence D. Personality	Recall	Remember
3	Animism develops in which stage of Piaget A. I B. II C. III D. IV	Recognize	Remember
4	Universal Principle arises in A. Pre Conventional B. Conventional C. Post Conventional D. Modern Conventional	Recognize	Remember
5	A child has an inferiority complex if it is/in A. Rich B. Matured Environment C. Motivated D. Jail	Recognize	Remember
6	Unable to choose between playing cricket or tennis is A. Delusion B. Illusion C. Conflict D. Confusion	Recognize	Remember
7	A crime committed by a child is known as A. Childish B. Illusion C. Distortion D. Juvenile Delinquency	Recall	Remember
8	The word, "Adolescence" means A. Senescence B. Growing C. Problematic D. Imaging	Recall	Remember
9	Bhatia's Battery is used to measure A. Self Concept B. Creativity C. Intelligence D. Personality	Identify	Remember
10	The word, "Personality" means A. Mask B. Creative C. Actor D. Celebrity	Identify	Remember
	PART – B Short Answer **The answer should not exceed 200 words 4 x 5 = 20**		
21	a) Discuss the role of nurture in human development (or) b) Discuss the role of nature in human development	Explain	Understand
22	a) Differentiate: Growth, Maturity and Development (or) b) Define the following concepts; Creativity and Personality	Differentiate Define	Understand
23	a) Give two real-life examples for Pre- Conventional Morality (or) b) Give two real-life examples for Post Conventional Morality	Cite Examples	Understand
24	a) Illustrate Piaget's Concrete Operational Stage (or) b) Illustrate Piaget's Formal Operational Stage	Illustrate	Apply

PART – C Essay Answer 3 x 10 = 30			
25	a) Describe the child as a heterogeneous entity (or) b) Examine the childhood in Jail and Urban Slum	Describe	Analyse
26	a) Explain the growing up of adolescents in diverse cultures (or) b) Discuss the impact of media on Adolescents	Explain Discuss	Understand
27	a) Discuss how the personality will be assessed using the Eysenck questionnaire (or) b) Explain the experiment of the mirror drawing apparatus to describe the transfer of learning.	Assess	Skill

SEMESTER - I					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10113	Differential and Integral Calculus	4	0	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcomes (COs)

On the successful completion of the course, the student will be able to

	Course Outcomes	Level
CO 1	Understand the concepts of derivatives and integration	Understand
CO 2	Solve problems on differentiation and integration in two and three dimensional spaces	Apply
CO 3	Examine the local extremum, concavity, convexity of functions and the order of integration	Analyse
CO 4	Determine tangent of a curve, area, arc length, volume and, evaluate double and triple integrals	Evaluate
CO 5	Compile the application of derivatives, Beta and Gamma functions	Create

b. Syllabus

Units	Content	Hrs.
I	**Differentiation** (Review of differential calculus), related rate problems, implicit differentiation, tangent of a curve (given in parametric form and in implicit form), motion on a straight line, local extremum, increasing, decreasing functions.	14
II	**Curvature of plane curves** Envelopes, curvature, circle, radius and centre of curvature, formula for the radius of curvature when the curve is given in Cartesian and polar coordinates, cartesian co-ordinates of the centre of curvature, evolute and involute, p-r equations of curves.	12
III	**Taylor's series expansion** Higher order derivatives, Taylor's series expansion of sin x, cos x, e^x, $\log(1 + x)$, $(1 + x)^m$ (with m is a negative integer or a rational number), Leibnitz rule and its applications to problems of type e^{ax+b} sin x, e^{ax+b} cos x, $(ax + b)^n$ sin x, and $(ax + b)^n$ cos x, convex and concave functions, curve tracing.	12
IV	**Multiple Integrals** (Review of integral calculus: Antiderivatives and Indefinite Integral, Properties of indefinite integral, Definite integral, Properties of definite integral, Fundamental Theorem of Calculus, Method of Substitution, Method of Integration by Parts, Application of integrals to find area, reduction formulae) Double integrals, Fubini's theorem for calculating double integrals(without proof), Double integrals in polar form, Triple integrals in Rectangular Coordinates, Cylindrical Coordinates, and Spherical Coordinates.	14

V	**Improper Integrals** Improper integrals, Gamma function and Beta function, Relation between beta and gamma functions.	12
	Tasks and Assignments: Each student is required to submit the following: ✓ Solution to homework problems. ✓ Group discussion on the geometrical definition of curvature. ✓ Assignment on different coordinate systems of plane and space. **References:** H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons Inc., 2002. G. B. Thomas and R. L. Finney, Calculus and Analytic Geometry, Ninth International Edition, Addison Wesley, 2002. B. S. Grewal, Higher Engineering Mathematics, Forty fourth Edition, Khanna Publishers, 2017. E. Kreyszig, Advanced Engineering Mathematics, Eighth Edition, John Wiley & Sons, Singapore, 2006. G. F. Simmons, Calculus with analytic geometry, Second Edition, The McGraw-Hill Companies Inc., 1996. Marat V Markin, Integration for Calculus, Analysis, and Differential Equations, World Scientific Publishing Co. Pte. Ltd., 2019.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	2	2	2	3	2	2
CO5	3	3	3	3	3	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer – 4 x 5 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	**12**	**12**	**12**	**12**	**12**

g. Model Question Paper

Sl. No.	Model Questions	Specification	Level
	Part – A: Objective Type **Multiple Choice Marks: 10 x 1 = 10**		
1	The derivative of e^{-x^2} A. $-2xe^{-x^2}$ B. $\frac{e^{-x^2}}{-2x}$ C. e^{-x^2} D. $e^{-x^2}(x^2)$	Recognize	Remember
2	Suppose the free-fall equation is $S(t) = 4.9t^2$. Then the acceleration at any t time is A. 9.8 m/sec^2 B. 9.8 m/sec C. 4.9 m/sec D. 4.9 m/sec^2	Infer	Understand
3	The curvature of a straight line is A. 1 B. zero C. not defined D. slope of that line	Infer	Understand
4	The radius of curvature of the curve $\gamma(t) = (5\cos t, 5\sin t)$ at $(5,0)$ is A. 1/5 B. 25 C. 5 D. 1/25	Indicate	Understand
5	The function $f(x) = e^x$ A. concave B. decreasing C. convex D. None	Find	Understand

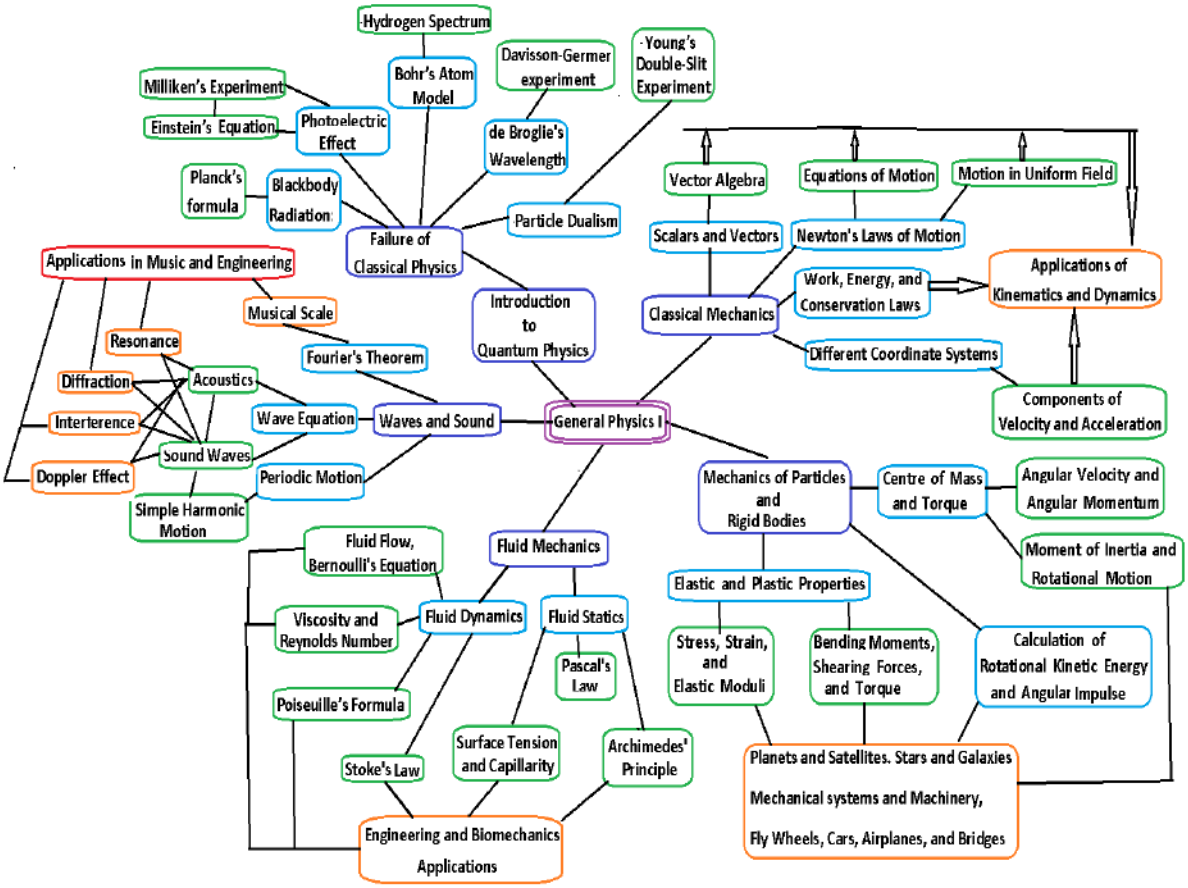
6	The third derivative of $f(x) = x^3 + e^x$ is A. e^x B. $3x^2 + e^x$ C. $6x$ D. $6 + e^x$	Recognize	Remember

7	The value of $\int e^{-x^2} dx$ is A. $\frac{e^{-x^2}}{-2x}$ B. $\frac{e^{-x^2}}{-x^2}$ C. $e^{-x^2}(-2x)$ D. None	Infer	Understand
8	The region of integration for $\int_0^1 \int_0^x f(x,y)dydx$ is A. $\{(x,y) \in \mathbb{R}^2 : 0 \leqslant x \leqslant 1, 0 \leqslant y \leqslant x\}$ B. $\{(x,y) \in \mathbb{R}^2 : 0 \leqslant x \leqslant 1, 0 \leqslant y \leqslant 1\}$ C. $\{(x,y) \in \mathbb{R}^2 : 0 \leqslant y \leqslant 1, 0 \leqslant x \leqslant y\}$ D. both A and B	Infer	Understand
9	The value of gamma function at 1/2 A. $\sqrt{\pi}$ B. $\pi/2$ $2\sqrt{\pi}$ C. D. π	Indicate	Understand
10	The value of beta function at (1,2) is A. 1/2 B. 3 C. 1/6 D. 3/5	Find	Understand
	PART – B Short Answer **Answer all the following questions Marks 4 x 5 = 20**		
11	(a) Prove that $f(x) = x^3$ is an increasing function of $\mathbb{R}$. or (b) Prove that $f(x) = x^3$ has no local extermum on $\mathbb{R}$.	Prove	Understand
12	(a) Prove that the curvature of a circle of radius 'r' is 1/r. or (b) Find both the unit tangent and normal vectors for the curve $r(t) = (\cos t, \sin 2t)$ at t.	Solve	Understand

13	a)Find the derivative of $x^2 + y^2 + y + \sin(xy) = 0$ with respect to , where or b) Find the equation of the tangent line to the curve $r(t) = (2\cos t, 3\sin t)$ at (2,0).	Find	Apply
14	(a) Prove that the p-r equation of $p^2 = r^3/2a$ $r(\theta) = a(1 - \cos\theta)$ is . or (b) Find the co-ordinates of the center of $xy = 2$ curvature of the curve at the point (2,1).	Prove	Apply
PART – C Essay Answer **Answer all the following questions Marks: 3 x 10 = 30**			
15	(a) Find the Taylor's series expansion of $\sin x$ at $x = 0$. or (b) Check the convex property of $\log(1 + x^2)$.	Interpret	Analyse
16	(a) Evaluate $e^{x^2+y^2}\, dydx$ over the semicircular region bounded by the x-axis and the curve $y = \sqrt{1 - x^2}, -1 \leqslant x \leqslant 1$. or (b) Find the volume of the region D enclosed by the surfaces $z = x^2 + 3y^2$ and $z = 8 - x^2 - y^2$. .	Find	Understand
17	(a) State and prove the relation between the gamma and beta functions. or (b) Prove that the value of gamma at ½ is $\sqrt{\pi}$.	Prove	Apply

SEMESTER - I					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10114	General Physics I	4	0	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcome (COs)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Understand classical mechanics, including motion, forces, and energy, and apply these concepts to real-world situations.	Understand
CO 2	Comprehend rotational dynamics, elasticity, and material properties, and apply them to solve problems.	Apply
CO 3	Grasp fluid mechanics principles and their engineering and biomechanics applications.	Analyze
CO 4	Understand wave phenomena, acoustics, and their practical applications in music and engineering.	Understand
CO 5	Explore quantum mechanics, its historical context and wave-particle duality.	Analyze

b. Syllabus

Units	Content	Hrs.
I	Classical Mechanics: Physical Quantities: Scalars and Vectors - Vector Algebra: Scalar and Vector Products - Newton's Laws of Motion - Equations of Motion - Work, Energy, and Conservation Laws - Motion in Uniform Field - Components of Velocity and Acceleration in Different Coordinate Systems - Applications of Kinematics and Dynamics in Real-World Scenarios (any few examples)	13
II	Mechanics of Particles and Rigid Bodies: Centre of Mass and Torque - Angular Velocity and Angular Momentum - Moment of Inertia and Rotational Motion - Elastic and Plastic Properties - Stress, Strain, and Elastic Moduli - Bending Moments, Shearing Forces, and Torque - Calculation of Rotational Kinetic Energy and Angular Impulse	12
III	Fluid Mechanics: Fluid Statics and Dynamics - Pascal's Law and Archimedes' Principle - Surface Tension and Capillarity - Fluid Flow, Bernoulli's Equation - Viscosity and Reynolds Number - Poiseuille’s Formula and Stoke's Law - Applications of Fluid Mechanics in Engineering and Biomechanics	13
IV	Waves and Sound: Periodic Motion and Simple Harmonic Motion - Wave Equation and Wave Types - Sound Waves and Acoustics - Interference and Diffraction - Fourier's Theorem and Musical Scale - Doppler Effect and Resonance Phenomena - Applications of Waves and - Sound in Music and Engineering	13

V	Introduction to Quantum Physics: Failure of Classical Physics - Historical Perspective and Origin of Quantum Theory - Blackbody Radiation: Planck's Quantum Hypothesis and the Ultraviolet Catastrophe – Derivation of Planck's formula for Blackbody Radiation – Photoelectric Effect - Einstein's Photoelectric Equation and its verification by Milliken's Experiment – Bohr's Atom Model and quantization of Atomic Energy Levels -Hydrogen Spectrum - de Broglie's Wavelength and Wave-Particle Dualism – Davisson-Germer experiment – Young's Double-Slit Experiment	13
	Tasks and Assignments: ✓ Individual or Group Seminar presentation on selected topics ✓ Report on interdisciplinary application of selected problems/concepts ✓ The ability to communicate their ideas effectively, both orally and in writing. ✓ Understands function effectively in multidisciplinary teams and topics **References:** Addison- Wesley Mechanics Berkeley Physics course Charles Kittel, et. Al. 2007, Tata McGraw- Hill. Physics – Resnick, Halliday & Walker 9/e, 2010, Wiley Engineering Mechanics, Basudeb Bhattacharya, 2nd edition, 2015, Oxford University Press University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole. Introduction to Mechanics - Kleppner and Kolenkow Mathur D.S.: Elements of Properties of Matter University Physics. FW Sears, MW Zemansky and HD Young13/e, 1986 Principles of Quantum Mechanics-David J. Griffiths University Physics – Sears Semansky and Ground	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3

d.Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	20	20	20	20	20	100

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 5 x 4 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	12	12	12	12	12

g. Model Question Paper

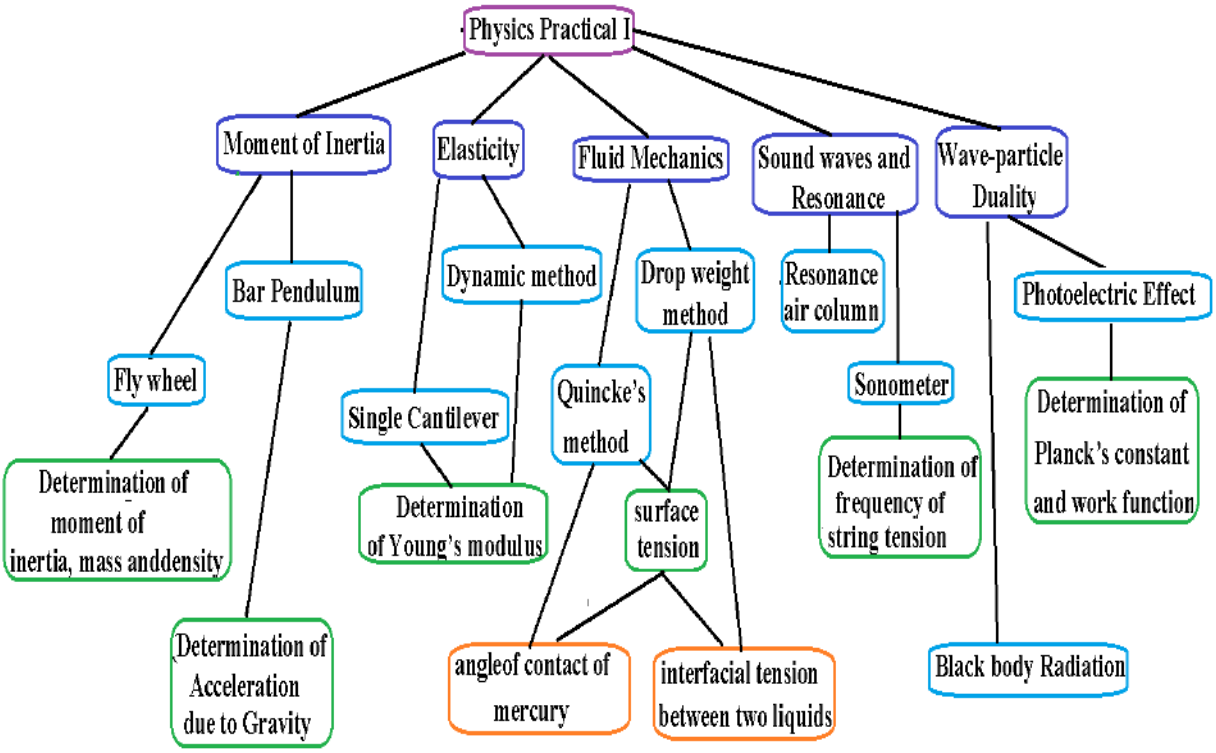
Sl. No.	Model Questions	Specification	Level
	Part – A Objective Type Multiple choice 10 x 1 = 10		
1	What is the fundamental concept underlying Newton's Laws of Motion? a) Scalar quantities b) Vector quantities c) Inertia d) Work	Recognize	Remember
2	Which of the following quantities is a vector? a) Speed b) Mass c) Displacement d) Temperature	Recall	Remember
3	What is the formula for calculating torque? a) Force × Time b) Mass × Acceleration c) Force × Lever Arm d) Work × Distance	Recognize	Remember

4	In rotational motion, what does the moment of inertia depend on? a) Mass and acceleration b) Mass and radius of rotation c) Force and time d) Velocity and time	Recognize	Remember
5	What is the unit of viscosity? a) Newton per meter b) Pascal per second c) Poise d) Joule per second	Recognize	Remember
6	What principle explains why a ship floats on water? a) Pascal's Law b) Archimedes' Principle c) Bernoulli's Equation d) Newton's Third Law	Recognize	Remember
7	What is the phenomenon where two waves combine to form a new wave? a) Diffraction b) Reflection c) Interference d) Refraction	Recall	Remember
8	What property of a medium affects the speed of sound waves? a) Temperature b) Density c) Pressure d) Viscosity	Recall	Remember
9	Which experiment provided evidence for the wave-particle duality of electrons? a) Davisson-Germer experiment b) Millikan's oil drop experiment c) Young's double-slit experiment d) Photoelectric effect	Identify	Remember
10	Who developed the Bohr model of the atom, which quantized atomic energy levels? a) Albert Einstein b) Niels Bohr c) Werner Heisenberg d) Max Planck	Identify	Remember
PART – B Short Answer The answer should not exceed 200 words 5 x 4 = 20			
11	a) Explain the concept of scalar and vector quantities. Provide examples of each. (OR) b) State Newton's First Law of Motion and give an example illustrating it.	Explain	Understand
12	a) Describe the equations of motion for uniformly accelerated motion. Provide an example problem. (OR) b) Explain the principle of conservation of energy. How does it apply to a falling object?	Explain	Understand
13	a) Define the moment of inertia. How does it differ for different objects? (OR) b) What are stress and strain in materials? How do they relate to elastic and plastic properties?	Explain	Understand
14	a) Calculate the angular velocity of a rotating object given its moment of inertia and angular momentum. (OR)	Explain	Understand

	b) Explain the concept of bending moments, shearing forces, and torque in mechanics. Provide practical applications		
PART – C Essay Answer The answer should not exceed 400 words 3 x 10 = 30			
15	a) Discuss Pascal's Law and its applications in fluid mechanics. Provide real-world examples. (OR) b) Explain the phenomenon of surface tension and capillarity. How do they affect the behavior of liquids?	Describe	Analyze
16	) Describe the properties of sound waves and their behavior. Explain the applications of sound waves in various fields. (OR) b) Explore the concept of interference and diffraction in wave physics. Provide examples and their significance.	Explain Discuss	Understand
17	a) Discuss the historical background and key experiments that led to the development of quantum theory. Highlight the major failures of classical physics. (OR) b) Explain the principles of the Bohr model of the atom. How did it address the quantization of atomic energy levels?	Explain Discuss	Understand

SEMESTER –I					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10115	General Physics Practical I	0	0	2	2
Internal	60	External	40	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Demonstrate an understanding of moment of inertia through the analysis of a flywheel. Examine the principles of angular momentum conservation using a bar pendulum	Apply
CO 2	Make measurements of Young's modulus using the single cantilever method. Express an understanding of Young's modulus determination through dynamic methods and graphical analysis.	Analyze
CO 3	Demonstrate the measurement of liquid surface tension using the drop weight method. Examine the determination of interfacial tension between two liquids. Make calculations of surface tension and angle of contact of mercury using Quincke's method	Create
CO 4	Express an understanding of resonance in an air column. Explore sound waves and resonance principles through the use of a sonometer	Skill
CO5	Demonstrate the determination of Planck's constant and work function of metals using the photoelectric effect. Explore Black Body Radiation and understand Planck's Law	Analyze

b. Syllabus

Units	Content	Hrs.
I	Moment of inertia - Fly wheel and Bar Pendulum	13
II	Elasticity - Young's modulus by the single cantilever method - Determination of the Young's modulus by Dynamic method (using graph).	13
III	Fluid Mechanics - Drop weight method - Determination of surface tension of liquid and the interfacial tension between two liquids.- Quincke's method - Determination of surface tension and angle of contact of mercury	13
IV	Sound waves and Resonance - Resonance air column - Sonometer	13
V	Wave-particle Duality - Photoelectric Effect -Determination of Planck's constant and work function of metals using photoelectric effect - Black body Radiation	12

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	0	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	Total
Internal	15	15	15	15	60
External	10	10	10	10	40
Total	**25**	**25**	**25**	**25**	**100**

e. Mapping Course Outcome with Internal Assessment (60 Marks)

	CO1	CO2	CO3	CO4
Punctuality	-	-	-	2
Knowledge about the experiment	3	3	3	3
Handling of apparatus, recording ofobservation and calculations	5	5	5	4
Maintenance of record book	6	6	6	5
Attendance	1	1	1	1
Total	**15**	**15**	**15**	**15**

f. Mapping Course Outcome with External Assessment (40 Marks)

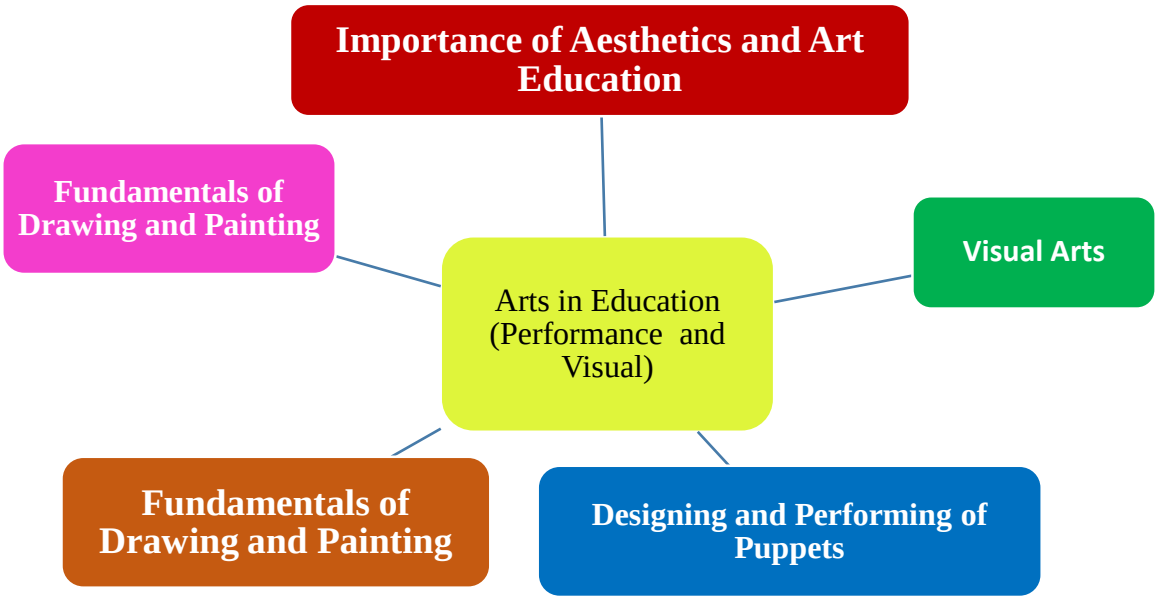
Category	CO1	CO2	CO3	CO4
Part – A	10	10	10	10
Total	**10**	**10**	**10**	**10**

g. Model Question Paper

Sl. No.	Model Questions	Specification	Level
40 x 1 = 40			
1	Determine the Planck's constant and work function of the given metal using photoelectric effect	Assess	Analyze, Skill

SEMESTER - I					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDUVA01	Arts in Education (Performance and Visual)	0	0	2	2
Internal	100	External	0	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Explain the importance of Aesthetics arts in the teaching-learning process	Understand
CO 2	Practice different forms of arts such as visual arts and performing arts(Drama, Music,& dance)	Apply
CO 3	Criticize/ Analyze the processes of puppets and crafts through experience	Analyze
CO 4	Recommend different learning ways to drama in the teaching process	Evaluate
CO 5	Construct/design any type of drawing and painting /Drama script/craft on their own.	Create

b. Syllabus

Units	Content	Hrs.
I	**Importance of Aesthetics and Art education** Aesthetics and Art – its meaning, dimensions and constituents. - Importance of Arts in Education.-Types of Arts – visual and performing; Renowned Indian Arts and Artists – Classical, folk and contemporary. -Indian festivals and their artistic significance. The value of art in Education - use as an instrument in education; moral dimensions of works of art and the controversial distinction between the value of Popular art and High art.	13
II	**Visual Arts** Different materials of visual arts– Rangoli, pastels, posters, clay, paintings. Using different methods of visual arts- Paintings, block printing, collage, clay modelling, paper cutting and folding; Listening/viewing performing art forms of music, dance and theatre.	13
III	**Designing and Performing of Puppets** Puppets - history of Puppets; meaning, definition; Characteristics of Puppets and types. Different Types of Puppetry in India. Designing, creativity performance of Puppets. Puppets and communication skills- Create a good engaging story and perform with own puppets; Performing with small group and to prepare their own skits with the puppets. Techniques of using Puppets in classroom situation.	13
IV	**Performing arts in Drama** Drama as a medium of education- Identification of local performing art forms and their integration in teaching – learning. - Listening/viewing performing art skit, mime, one act play or theatre. Evaluation strategies; assessing the different forms of Art.	13

V	**Fundamentals of Drawing and Painting** Concept and Types of drawing- Colours and Sketching- understanding of various means and perspectives, Different forms of painting. Use of Drawing and Painting in Education -Chart making, Poster making, match-stick drawing and other forms, Model making – Clay modelling, Origami, Decorative – Rangoli, and any other local art.	12
	Tasks and Assignments: Each student is required to submit **any Four** assignments from the following: ✓ Textbook analysis to find scope to integrate art forms either in the text or activities or exercises ✓ Preparation of instructional material for education in the arts for secondary school. ✓ Documentation of the processes of any one art or craft with the pedagogical basis such as Weaving or printing of textiles, making of musical instruments and Folk performances in the community, etc. - how the artists design their products, manage their resources, including raw materials, it is marketing, problems they face, including historical, social, economic, scientific and environmental concerns. ✓ Art and Craft Exhibition ✓ Representative of Art in the Art Club ✓ Case studies of the children's work of art and their understanding of the concept of Art. ✓ Select a concept from the school curriculum which includes a social message and identify an appropriate art form to spread the message in public and prepare a report. ✓ Identify a local art form and integrate it in teaching an appropriate lesson from school curriculum – Prepare a lesson plan ✓ Select an appropriate lesson from the school curriculum and rewrite it in the form of a drama. ✓ Organize a show on dance/ music / dramas and Prepare report **References**: Dewey, J. (1934). Art as experience. New York: Minton. Reed, H. (1968). Education through art. New York: Faber and Faber. Eisner, E. W. (1972). Educating artistic vision. New York: Macmillan. John, B., Yogin, C., & Chawla, R. (2007). Playing for real: Using drama in the classroom. New York: Macmillan. Jefferson, B. (1969). Teaching art to children – Continental view point. Boston: Allyn Bacon. Tagore, R. (1962). Lectures and addresses. New Delhi: Macmillan. Coomaraswamy, A. K. (1974). Christian and oriental philosophy of art. New Delhi: Munshiram Manoharlal. Rupali Tripathi, (2004), Teaching of music, New Delhi: Mohit Publication. Dash B.N, (2002), Teacher and Education in the Emerging India Society (Vol. I & II) New Kalaimani Saraswathi, (1994), Bharata Natyakalai, Madras: Thirumagal Nilayam.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	2	3	3	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	19	19	19	19	19	95
External	-	-	-	-	-	-
Attendence	1	1	1	1	1	5
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (100 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments/Tasks	18	18	-	-	-
Seminar	-	-	18	-	-
Attendance	2	2	2	2	2
Practical work	-	-	-	18	18
Total	20	20	20	20	20

f. Rubric for Assignments

Sl. No.	Criteria	100%	75%	50%	25%	0%	Relation to COs
1	**Content 50%**	Ideas are detailed, well developed, supported with specific evidence & facts, and examples	Ideas are detailed, Developed, and supported with evidence and facts mostly specific.	Ideas are presented but not particularly developed or supported;	Content is not sound	Not attended	CO1, CO2, CO4
2	**Organization 50%**	Includes title, introduction, statement of the main idea with illustration and conclusion.	Includes title, introduction, statement of the main idea, and conclusion.	organizational tools are weak or missing	No organization	Not attended	CO1, CO2, CO4

g. Rubric for Seminar

Sl. No.	Criteria	100%	75%	50%	25%	0%	Related to COs
1	**Knowledge and Understanding 50%**	Exceptional knowledge of facts, terms, and concepts	Detailed knowledge of facts, terms, and concepts	Considerable knowledge of facts, terms, and concepts	Minimal knowledge of facts, terms, and concepts	Not Attending	CO3
2	**Presentation 50%**	Well Communicated with logical sequences, examples, and references	Communicated with sequences	Just Communicated	No coherent communication	Not Attending	CO3

h. Rubrics for practical work

Sl. No.	Criteria	100%	75%	50%	25%	0%	Related to COs
1.	**Skills**	Controls complex skills/performance Considering plans, and performing activities Comes up with next steps	Controls detailed skills/performance Can replicate activities or practice Properly	Controls basic skills/performance Can do activities with the help of teachers.	Controls basis skills/ performance Cannot do activities with the help of teachers.	Not Attended	CO5
2.	**Organization**	Supplies exceptional improvement in the organization Plans his/her activities and work**s** efficiently	Supplies detailed improvement in the organization Can replicate Plan his/her activities and works	Works accurate and sticks to protocols and rules	Works carelessly, unorganized, and does not stick to the protocols and rules	Not Attended	CO5

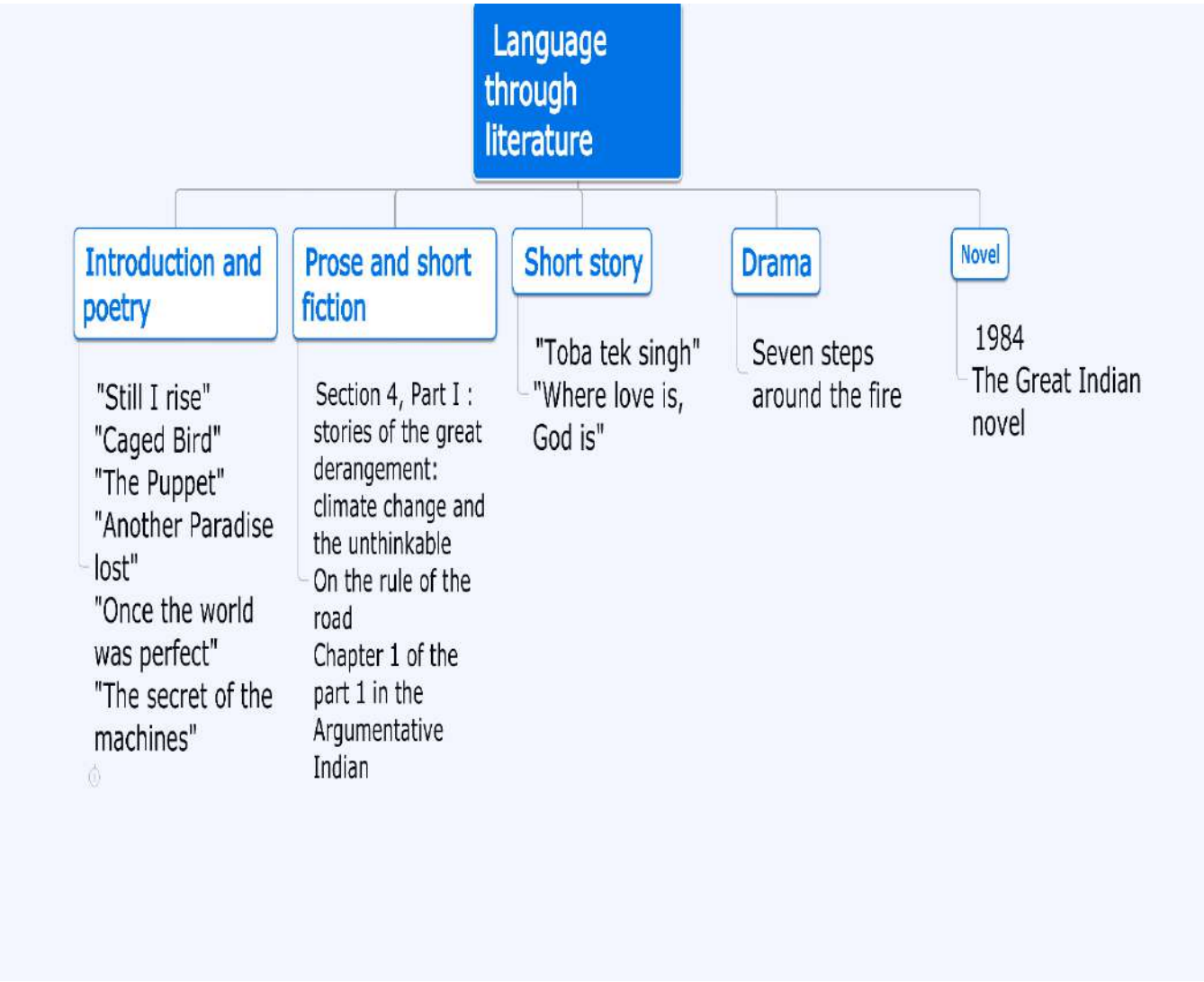
i. Activities / Internal Assessment

S. No	Activity/ assignment /CO	CO1	CO2	CO3	CO4	CO5	Total
1.	Write up on significance and applications of arts in the teaching-learning process or Test	20					**20**
2.	**Group activity:** write up a story and make a skit using their handmade chart puppet or shadow puppet or clay puppet or cotton puppet or design of Puppets with models			20			**20**
3.	**Group activity**: Give a presentation on processes of any art such as **Music/Dance/Drama** in the community with pedagogical bases such as how the artists Design their products, manage their resources.		20				**20**
4.	**Conduct an Art and craft exhibition** (Students should display their handmade art, drawing, painting and craft items such as flowerpot, glass candle, embroidery design, colour paper)				20		**20**
5.	**Drawing/ chart/Painting** on the given topic in Maths/Physical science or related to school Curriculum as TLM					20	**20**
	Total	20	20	20	20	20	100

SEMESTER - II

Semester II					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10211	Language through Literature	3	0	0	3
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcomes (COs)

On the successful completion of the course, the student will be able to

	Course Outcomes	Level
CO1	Understand the role of literary works in learningEnglish as a Second language	Understand
CO2	Recognize the allegorical meaning of the literaryworks	Apply
CO3	Interpret the literary works of different genres toenhance their divergent thinking and expand cultural knowledge	Analyse
CO4	Integrate different literary texts critically	Create
CO5	Develop their writing skill for specific information	Skill

b. Syllabus

Units	Content	Hours
I	**Introduction to language and literature** **Poetry:** Maya Angelo – "Still I Rise" and "Caged Bird"; Gabriel GarciaMarquez – "The Puppet" Meena Kandasamy – "Another Paradise Lost", Joy Harjo – "Once the Worldwas Perfect" and Rudyard Kipling – "The Secret of the Machines"	**10**
II	**Prose and short- fiction** Amitav Ghosh: "Section 4, Part I: Stories of The Great Derangement: Climate Change and the Unthinkable, A.G. Gardiner – On the Rule of the Road, Amartya Sen – Chapter 1 of Part 1 in The Argumentative Indian and George Orwell –Animal Farm	**10**
III	**Short Story** Saadat Hasan Manto – "Toba Tek Singh" Leo Tolstoy – "Where Love Is, God Is"	**9**
IV	**Drama** Mahesh Dattani **–** *Seven Steps Around the Fire*	**9**
V	**Novel** George Orwell – *1984* Sashi Tharoor – *The Great Indian Novel*	**9**
	Practicum ✓ Tasks and exercises will be given depending on the course instructors **References:** Simpson, Paul., Language through Literature: An Introduction,Routledge, 1997. Teaching English Through Literature - https://www.researchgate.net/publication/281379160_Teaching_English through literature Krishnaswami,N, Methods of Teaching English, Macmillan,2008. Harmer, Jeremy, Practice of English Language Teaching, Pearson	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	0	0	3	3
CO2	3	3	3	1	3	3
CO3	3	3	3	0	3	2
CO4	1	0	1	2	3	2
CO5	3	3	3	0	0	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	20	20	20	20	20	100

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part A (Objective – 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer -4 x 5 = 20marks)	10	10	-	-	-
Part – C (Essay-3 x 10 = 30 marks)	-	-	10	10	10
Total	12	12	12	12	12

g. Model Question Paper

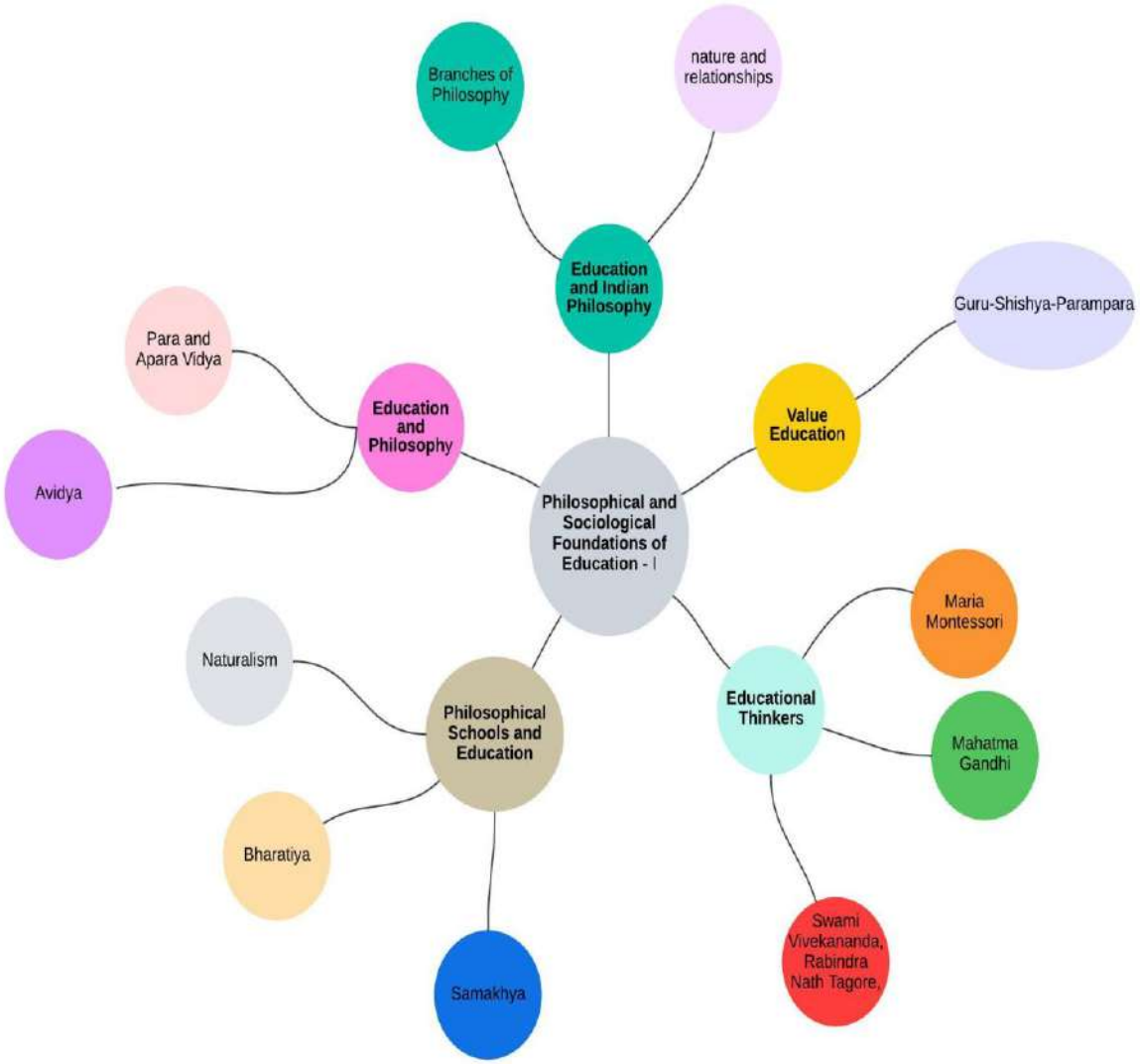
S.No.	Questions	Specification	Level
	Part – A **Short Answer 10 x 1= 10**		
1.	Which of the following is not used as a symbol ofwealth in Still I rise a. Oil Wells b. Pearls c. Diamonds d. Gold Mines	Recall	Remember

2.	What does the Cage Bird's singing reveal about him? a. He is terribly unhappy b. He prefers to sing rather than to fly c. He is afraid to be free d. He wants to be heard	Recall	Remember
3.	Which animal hides during the battle of the Cowshed? a. Boxer b. clover c. Jessie d. Mollie	Recall	Remember
4.	To whom does Napolean sell the farm? a. Mr. Pilkington b. Mr. Fredreck c. Mr.Jones d. Snowball	Recall	Remember
5.	In which Pakistani city was the lunatic asylum situated? a. Lahore b. Karachi c. Multan d. Islamabad	Recall	Remember
6.	What was the real name of Toba Singh? a Baghat Singh b Virendar Singh c Bijay Singh d. Ranjit Singh	Recall	Remember
7.	What is the theme of Seven Steps around the Fire? a. Love b. Identity Crisis c. Partition d. festival	Recall	Remember
8.	What is the role of Uma in Seven Steps around the Fire? a. Professor b. CEO c. Doctor d. Engineer	Recall	Remember
9.	How old is Julia? a. 26 b. 30 c. 32 d. 35	Recall	Remember
10.	Winston commits thought crime by writing which of thefollowing in his diary? a. I hate big brother b. Down with the party c. Down withbig brother d. Death to big brother	Recall	Remember

PART – B Paragraph 4x 5=20			
11.	a. Discuss the main message of Caged Bird or) a) Explain what Amitav Ghosh refers to as "The Great Derangement"	Explain	Understand
12.	a. State your opinion about the ending of the story Animal farm Or) b. Assess how does Harjo write to re-establish lost connections in her poem Once the World was Perfect	State	Analyse
13.	a) Infer how Ghosh uses the work The Great Derangement as a backdrop to encouraging a change in behavior by humans concerning the whole ideology of climate change. Or) b) What do the four puppets signify in the story?	Explain	Understand
14.	a) What does Kandasamy mean by "occupational hazard"? Or) b) Make a detailed observation on the importance of arguments In the shaping of Indian culture? Assess your case with an example from Amartya Sen's "Argumentative India"	Observe	Evaluate
PART – C Essay 3 x 10 = 30			
15.	a) Examine the social relevance of the story 1984 or b) Elaborate the theme of Seven Times Around the Fire	Examine	Understand
16.	A) Discuss the political satire of Toba Tek Singh Or b) Examine the moral lesson in Where Love is God Is	Assess	Skill
17.	a) Elaborate the satirical view of The Great Indian Novel or b) Discuss the role of Big Brother in Oceania and in Winston's life. What role does Big Brother play in each?	Elaborate	Analyse

SEMESTER - II					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10212	Philosophical and Sociological Foundations of Education -I	3	1	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Know the relationship between education and Indian philosophy	Remember
CO 2	Apply knowledge of philosophy in education	Understand
CO 3	Analyze the different philosophical schools	Apply
CO 4	Evaluate the important points of different Educational Thinkers	Analyze
CO 5	Use the gained knowledge of Value Education in teaching and day to day life	Skill

b. Syllabus

Units	Content	Hrs.
I	**Education and Indian Philosophy** Conceptual clarity, nature and relationships, Aims of studying philosophical perspective of education, Branches of Philosophy and their educational implications: Metaphysics (तत्त्वमीमांसा), Epistemology (ज्ञानमीमांसा), Axiology (मल्यमीमांसा), Understanding Indian Perspective of Education, Meaning, nature and aims of education with special reference to Vedic, Buddhist, Jain, Sikh and Islamic traditions	12
II	**Education and Philosophy** Understanding the terms Darshana, Para and Apara Vidya, Avidya, Shiksha, Samvaad, Panchkosha, Gurukulam, Acharya, Guru, Shishya, Upadhyaya, Jigyasa, Swadhyaya, Understanding Western Perspective of Education, Meaning, Nature, and aims of education with reference to Cognitive, Behaviorist and Developmental Theories of Education.	13
III	**Philosophical Schools and Education** Conceptual Clarity of the following schools of thought with their implications for educational practices: Bharatiya: Samakhya, Yoga, Nyaya, Vaisheshika, Mimansa, Vedanta, Western: Idealism, Naturalism, Pragmatism, Progressivism.	13
IV	**Educational Thinkers** Deliberations on aims, processes, and educational institutions developed on thoughts of the following thinkers and practitioners: Bharatiya: Swami Vivekananda, Rabindra Nath Tagore, Mahamana Madan Mohan Malaviya, Mahatma Gandhi, Western: J. Rousse, Maria Montessori, Friedrich Froebel, John Dewey.	13
V	**Value Education** Conceptual Clarity, Significance and Types of Values, Indian Traditional Values, Guru-Shishya-Parampara and Educational Values, Convocation message in Taittiriya Upanishad, Values enshrined in Indian Constitution, NEP, 2020 and Values with special reference to 21st Century, Pedagogical Issue	13
	Task and Assignments: ✓ Individual/group assignments/tasks in various forms like writing small paragraphs/brief notes, conceptualizations on specific terms ✓ Discuss in small groups related to different thinker/s and preparation of a report followed by individual/group presentation. ✓ Sharing of student experiences (in groups) related to readings on great thinkers helps them to reshape their concept and enable them to develop a vision, mission and objectives for a school and their plan to accomplish the objectives in the form of a group report.	

	✓ Identification and reporting of Indian perspective related to educational aims, student-teacher characteristics, methods, evaluation procedure, and convocation based on critical study of life and thoughts of thinkers. **References:** Bilton, Tony, et a. (1987). Introductory Sociology. London, UK:Mac Millan. Ghurye (1986). Caste and Race in Modern India. Bombay, India:Popular Prakashan. Giddens, Anthony (1990). Sociology.Cambridge, UK: Polity Press. Gupta, Dipankar (1989). Social stratification.New Delhi, India: Oxford University Press. Horton, P.B. & Hunt, C.B. (1987). Sociolgy. Singapore: McGraw-Hill. Haralamboss, Michael (1989). Sociology, Themes and Perspectives. New Delhi, India: Oxford University Press. Kolenda, Pauline (1997). Caste in Contemporary India, Beyond Organic Solidarity. Jaipur, India: Rawat Publications. Kamat, A.R. (1985). Education and Social Change in India. Bombay, India: Somaiya Publication. Linton, Ralph (2006).The Study of Man. Delhi, India: Surjeet Publications. Majumdar, D.N. (1990). Races & Cultures of India. New Delhi, India: Kalyani Publishers. Mehta, Prayag (1995). Education, Participation and Empowerment. Dew Delhi, India : Concept Publishing Company. Rai, S.V. (1985). Education and Rural Development. New Delhi, India : Sage Publications. Ratna and M. Zacharian (eds.). Education and the Process of Change. New Delhi, India: Sage Publications. Rawat, H.K. (2012). Sociology Basic Concepts. Jaipur, India: Rawat Publication. Rao, C.N.S. (eds.). Sociology Principles of Sociology with an Introduction to Social Thought. New Delhi, India : S.Chand & Company Pvt. Ltd.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	2	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	2	2	1	3	2	2
CO5	1	1	1	1	2	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 4 x 5 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	**12**	**12**	**12**	**12**	**12**

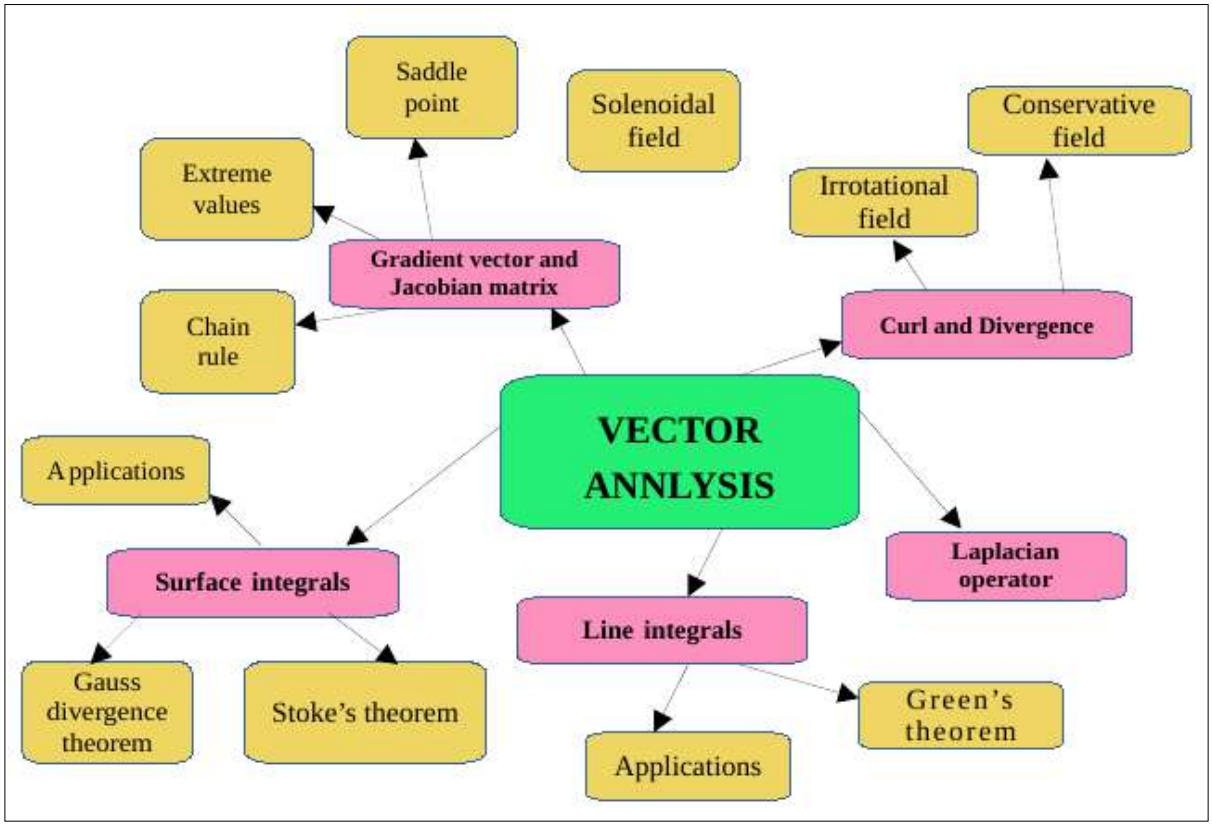
g. Model Question Paper

Sl. No.	Model Questions	Specification	Level
	Part – A: Objective Type Multiple Choice Marks: 10 x 1 = 10		
1	The literal meaning of philosophy is A. Love of Wisdom B. Love of Knowledge C. Love of Truth D. Love of God	Recognize	Remember
2	The word philosophy comes from the word philo-sophia which is A. Latin word B. Greek word C. Celtic word D. Roman word	Recall	Remember
3	The nature of philosophy can be explained as A. Critical B. Synthetic C. Comprehensive D. All of the above	Recognize	Remember
4	Education is the dynamic side of A. Psychology B. Sociology C. Philosophy D. Literature	Recognize	Remember
5	There is an interaction between Philosophy and education, either without the other is A. Incomplete and unserviceable B. Complete and whole C. Functional and efficient D. Purposeful	Recognize	Remember
6	All Great philosophers of the world have also been A. Great leaders B. Great speaker C. Great educators D. Great healer	Recognize	Remember
7	The scope of educational philosophy is directly concerned with the A. Educational Evaluation B. Primary education C. Concept of education D. Problems of education	Recall	Remember

8	The scope of the philosophy of education is formed by A. The belief of the society B. The educational values C. The political principles D. Opinioned of the people	Recall	Remember
9	Aims of education are relative to A. Aim of religion B. Aim of teacher C. Aim of life D. Aim of government	Identify	Remember
10	The ultimate human values are the nature of A. Spiritual B. Intellectual C. Physical D. None of the above	Identify	Remember
PART – B Short Answer The answer should not exceed 200 words Marks: 4 x 5 = 20			
11	a) Discuss the relationship between Education and Philosophy. (or) b) Explain the Sankhya School of thought in the light of present circumstances.	Explain	Understand
12	a) Give two real-life examples for Metaphysics (or) b) Give two real-life examples of Epistemology	Cite Examples	Understand
13	a) Differentiate: Para and Apara Vidhya (or) b) Define the following concepts; Shiksha, Samvaad	Differentiate Define	Understand
14	a)Explain in detail Panchkosha (or) b)Explain in detail the Gurukulam system	Explain	Understand
PART – C Essay Answer The answer should not exceed 400 words. Marks: 3 x 10 = 30			
15	a) Describe the Samakhya philosophy (or) b) Examine the Yoga	Describe	Analyse
16	a) Explain the philosophical thoughts of Swami Vivekananda (or) b) Explain the philosophical thoughts of Rabindra Nath Tagore	Explain Discuss	Understand
17	a) Assess the values enshrined in the Indian Constitution. (or) b) Assess the values enshrined in NEP 2020	Assess	Skill

SEMESTER - II					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10213	Vector Analysis	4	0	0	4
Internal	40	External	60	Total	100

Course Content overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO1	Understand the concepts of vectors, derivatives and integration.	Understand
CO2	Solve problems on vector differentiation and integration in two and three dimensional spaces.	Apply
CO3	Examine the extreme values of functions of two variables, solenoidality, irrationality, conservativeness of a given vector field and verify Gauss, Green's and Stokes theorems.	Analyze
CO4	Determine Hessian matrix, area, arc length, surface area and volumeof surface of revolution, and evaluate double and triple integrals.	Evaluate
CO5	Compile the application of line, surface and volume integrals.	Create

b. Syllabus

Units	Content	Hrs.
I	**Gradient vector and Jacobian matrix** Differentiability, total differential, chain rule. directional derivative, gradient of a scalar field, geometrical meaning, tangent plane, Hessian matrix, extreme values and saddle point for function of two variables.	14
II	**Curl and Divergence** Operations with vectors, scalar-valued functions over the plane and the space, vector function of a scalar variable, divergence and curl of a vector field, solenoidal field, irrotational field and conservative field, scalar and vector potentials.	12
III	**Laplacian operator** Laplacian of a scalar field, standard identities involving curl, divergence,gradient and Laplacian operators.	12
IV	**Line integrals** Line integrals, Applications, Green's theorem	12
V	**Surface integrals** Surface integrals, Applications, Stoke's theorem, Gauss divergence theorem.	14
	Tasks and Assignments: Each student is required to submit the following: ✓ Solution to homework problems. ✓ Group discussion on finding parametrization for curves and surfaces. ✓ Assignments on finding the limits integrals in line integrals and surface integrals. **References:** A. E. Taylor and W. R. Mann, Advanced Calculus, John Wiley & sons, New York, 1972. H. M. Schey, Div, Grad, Curl, and All That: Informal text on VectorCalculus, W. W. Norton & Co., New York, 1973. M. Spiegel and S. Lipschutz, Vector Analysis, McGraw Hill	

	Publications, 2017. G. B. Thomas and R.L. Finney, Calculus and Analytic Geometry,Ninth Edition, Pearson, Noida, 2019. E. Kreyszig, Advanced Engineering Mathematics, Eighth Edition, John Wiley & Sons, Singapore, 2006.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	2	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	2	2	1	3	2	2
CO5	1	1	1	1	2	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 4 x 5 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	**12**	**12**	**12**	**12**	**12**

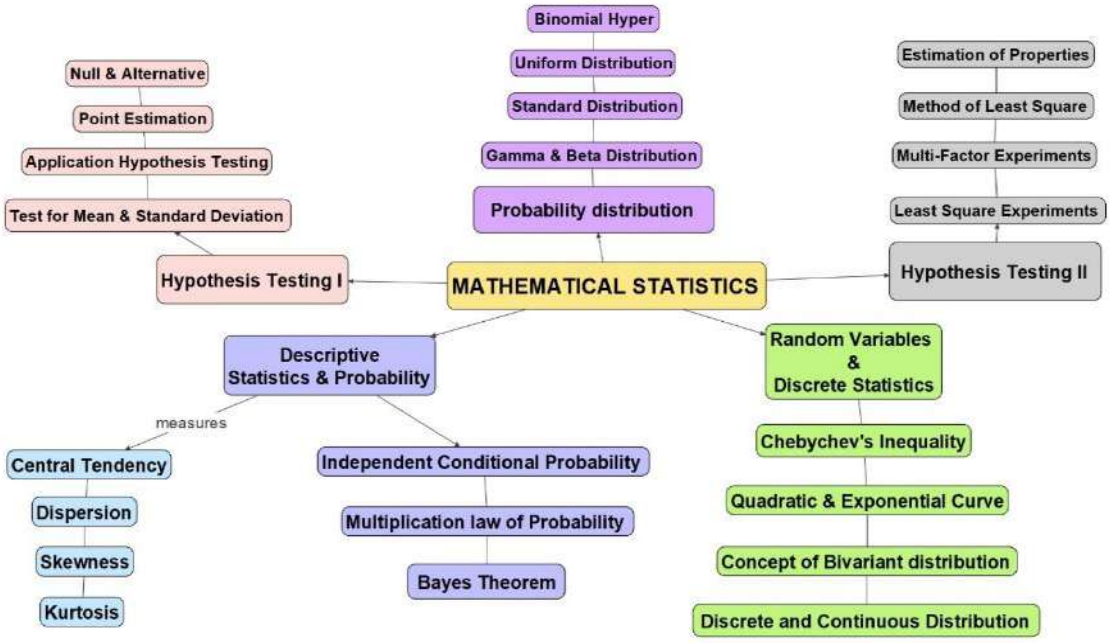
g. Model Question Paper

Sl. No.	Model Questions	Specification	Level
	Part – A: Objective Type **Multiple Choice Marks: 10 x 1 = 10**		
1	Let f(x,y,z) be scalar valued function. Then ∇f is A. $\left(\frac{\partial f}{\partial x}, \frac{\partial f}{\partial y}, \frac{\partial f}{\partial z}\right)$ B. $\frac{\partial f}{\partial x} + \frac{\partial f}{\partial y} + \frac{\partial f}{\partial z}$ C. 0 D. None	Recognize	Remember
2	If (a,b) is a local extremum for f(x,y), then A. $\frac{\partial f}{\partial x}(a,b) \neq \frac{\partial f}{\partial y}(a,b)$ B. $\frac{\partial f}{\partial x}(a,b) \neq 0$ C. $\frac{\partial f}{\partial x}(a,b) = 0 = \frac{\partial f}{\partial y}(a,b)$ D. $\frac{\partial f}{\partial y}(a,b) \neq 0$	Infer	Understand
3	The Laplacan operator for f(x,y,z) is A. $\frac{\partial f}{\partial x} + \frac{\partial f}{\partial y} + \frac{\partial f}{\partial z}$ B. $\frac{\partial^2 f}{\partial^2 x} + \frac{\partial^2 f}{\partial^2 y} + \frac{\partial^2 f}{\partial^2 z}$ C. $\left(\frac{\partial f}{\partial x}, \frac{\partial f}{\partial y}, \frac{\partial f}{\partial z}\right)$ D. $\nabla \times (\nabla f)$	Infer	Understand
4	Vector field F(x,y,z) is irrotational if A. $\nabla \times F = 0$ B. $\nabla . F = 0$ C. $\nabla . (\nabla \times F) = 0$ D. None	Indicate	Understand
5	A vector field F is a potential field if A. $\nabla \times F = 0$ B. $\nabla . F = 0$ C. $F = \nabla f$ D. $\nabla . (\nabla \times F) = 0$	Find	Understand
6	The line integral of a potential field over a closed curve is A. 0 B. -1 C. need not be zero D. 1	Recognize	Remember
7	Let F be vector field. Which of the following theorem says that the surface integral of $\nabla \times F$ is equal to the line integral F over the boundary curve? A. Divergence Theorem B. Green's Theorem C. Stoke's Theorem D. None	Infer	Understand
8	If f(x,y,z)=x^2+y, then ∇f is A. (2x, y) B. (x^2,0) C. (0, y) D. (2x,1)	Infer	Understand
9	The line integral of a potential field over a closed curve is A. 0 B. -1 C. need not be zero D. 1	Indicate	Understand
10	Vector field F(x,y,z) is irrotational if A. $\nabla \times F = 0$ B. $\nabla . F = 0$ C. $\nabla . (\nabla \times F) = 0$ D. None	Find	Understand
	PART – B Short Answer **Marks: 4 x 5 = 20**		
11	(a) Find the derivative of $w(x,y,z) = xy + z$, $x = \cos t, y = \sin t, z = t$. What is the derivative at t=0? or (b) Find $\frac{\partial w}{\partial r}$ and $\frac{\partial w}{\partial s}$ in terms of r and s if $w(x,y,z) = x + 2y + z^2$, x=r/s, y=r^2+log(s), z=2r.	Find	Understand

12	(a) Find the local extreme values of f(x,y)=xy. or (b) Find the equation of tangent plane at (1,1,1) on the surface $x^2+y^2+z^2=3$.	Solve	Understand
13	(a) Find the divergence of F(x,y,z)=(2xy, -xy,-z). or (b) Let F(x,y,z) be vector field and g(x,y,z) be a scalar function. Then prove that $\nabla \times gF = g(\nabla \times F) + (\nabla g \times F)$.	Prove	Apply
14	(a) Find the divergence of F(x,y,z)=(x^2-y,4z, x^2). or (b) Find the divergence of F(x,y,z)=(2xy, -xy,-z).	Prove	Apply
	PART – C Essay Answer **Marks: 3 x 10 = 30**		
15	(a) (i) Show that the function $f(x,y,z) = x^2 + y^2 - 2z^2$satisfies the laplace equation. (ii) Prove curl grad f=0. or (b) (i) Prove that $\nabla \times F = 0$, where F(x,y,z)=(x,y,z). (ii) Prove that $F(x,y,z) = e^{3x+4y}\cos 5z$ satisfies the laplace equation.	Prove	Analyze
16	(a) Verify Green's theorem for the field F(x,y)=(x-y,x) and region bounded by the unit circle C: $\gamma = (\cos t, \sin t), 0 \leqslant t \leqslant 2\pi$. or (b) Integrate f(x,y,z)=x-$3y^2$+z over the line segment C joining the origion and the point (1,1,1).	Find	Understand
17	(a) Verify Stokes's theorem for the hemisphere S: $x^2 + y^2 + z^2 = 9, z \geq 0$, its bounding circle $x^2 + y^2 = 9, z = 0$and the field $F(x,y,z) = (y,-x,0)$. or (b) Verify divergence theorem for the field $F(x,y,z) = (x,y,z)$over the sphere $x^2 + y^2 + z^2 = a^2$.	Verify	Apply

SEMESTER II					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDUI0214	Mathematical Statistics	4	0	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Understand the uncertainness in various real-life situations using the knowledge of probability.	Remember
CO 2	Model and predict various events as discrete random variables.	Apply
CO 3	Analyze the various experiments	Analyze
CO 4	Estimate the basic statistics in a practical situation and to give a conclusive inference from the available resources.	Evaluate
CO 5	Test different hypotheses and to establish the validity of the proposed hypothesis with statistical evidence.	Create

b. Syllabus

Units	Content	Hrs.
I	**Descriptive statistics and Probability:** scientific investigation, population and sample, data collection, types of variables and scales of measurement, methods of displaying data, graphical and tabular methods, grouped data, frequency distributions, histograms and frequency polygons, measures of central tendency: mean, median and mode, quantiles: quartiles, percentiles, measures of dispersion, range, variance and standard deviation, measures of skewness and kurtosis, exploratory data analysis, stem and leaf diagram and box plot. bivariate data, scatter plot, covariance, and correlation coefficient, applications.	13
II	**Probability distribution**: Point estimation and confidence intervals point estimation of the population mean and standard deviation of a normal distribution, estimation of proportion, confidence intervals, large sample methods, applications.	13
III	**Hypothesis Testing-** Simple and composite, null and alternative, test of hypothesis, Type I and Type II errors, level and power of a test, p-value, tests for mean and standard deviation, test for proportion, one tail or two tail applications.	13
IV	**Sampling distributions**: Comparison of two populations, paired-observation comparisons, the difference between (a) population means and (b) population proportions using independent random samples, equality of population variances, large sample tests, applications.	13
V	**Statistical Inference:** Designed experiments completely randomized, randomized complete blocks and Latin square experiments, analysis of variance, Introduction to multifactor experiments, applications.	12

	Tasks and Assignments: The following are the thrust areas selected for assignment/oral presentation ✓ Write a note on the correlation coefficient, and regression lines in detail with the support of neat diagrams/charts (not more than 500 words) ✓ Explain in detail any three probability distributions with examples ✓ Explain any two significant methods for hypothesis testing (not exceeding 10 minutes for presentation for questions & and answers) **References:** R. E. Walpole, R. H. Myers, S. L. Myers and K. E. Ye(2010), Probability and Statistics for Engineers and Scientists, Pearson, 9th Edition. S. M. Ross(2008), Introduction to Probability and Statistics for Engineers and Scientists, Academic Press, Fifth Edition, 2014. A. D. Aczel and J. Sounderpandian, Complete Business Statistics, Seventh Edition, McGraw-Hill, Irwin. S. C. Gupta and V. K. Kapoor(2000), Fundamentals of Mathematical Statistics (A Modern Approach), Tenth Edition, Sultan Chand and Sons. M. L. Samuels and J. A. Witmer(2003), Statistics for the life sciences, Third Edition, Prentice Hall. H. E. Van Emden, Statistics for terrified Biologists, Blackwell Publishing, 2008. R. Barlow(1999), Statistics - A guide to the use of statistical methods in the Physical Sciences, Wiley. P. Fornacini(2008), The uncertainty in physical measurements - An Introduction to Data Analysis in the Physics Laboratory, Springer. J. N. Miller and J. C. Miller(2005), Statistics and Chemometrics for Analytical Chemistry, Fifth Edition, Pearson Education.	

c. Mapping of Program Specific Outcomes Course Outcomes

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	2	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	2	2	3	3	2	2
CO5	3	1	3	3	2	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	20	20	20	20	20	100

e. Mapping course outcome with Internal assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assignment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 5 x 4 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	**12**	**12**	**12**	**12**	**12**

g. Model Question paper

Sl. No.	Model Questions	Specification	Level
	Part – A: Objective Type **Multiple choice 10 x 1 = 10**		
1	The Arithmetic Mean of the Binomial distribution is A. nq B. pq C. np D.n^2	Recall	Remember
2	In a normal distribution if x increases then f(x) become A. increases B. decreases C. 0 D. 1	Recognize	Remember
3	Balls numbered 1-12 are thrown. What is the probability of selecting a number multiple of 3 or 4? A. 1/2 B. 1/3 C. 1/4 D. 2/3	Find	Understand
4	P(AUB) = A. P(A)+P(B)+P(AnB) B. P(A)+P(B)-P(AnB) C. P(A)-P(B)-P(AnB) D. P(A)-P(B)+P(AnB)	Recall	Remember

5	The mean and the standard deviation of the weights of ponies in a large animal shelter are 20Kg and 3Kg respectively. A pony is selected at random from the shelter. Using Chebyshev's Inequality, the value of the lower bound of the probability that the weight of the selected pony is between 14 Kg and 26 Kg is A. 3/4 B. 1/4 C. 0 D. 1	Interpret	Apply
6	Assume that we want to estimate the mean IQ score for the population of Statistics students. How many Statistics Students must be randomly selected for IQ Test? (We want 95% confidence that the sample mean is within 3 IQ points) A. 99 B. 98 C. 94 D. 97	Calculate	Apply
7	Suppose a screening test for a disease has a 1% false positive rate and a 1% false negative rate and also that the rate of disease in the population is 0.002. Find the Probability of a randomly selected person tests Positive A. 0.166 B. 0.99 C. 0.002 D. 0.998	Calculate	Apply
8	What is the equation for a least square method of $A^TAx =$ A. A^Tx B. A^T C. A^Tb D. A^TA	Recall	Remember
9	What is the addition law of Probability? A.P(A+B)=P(A)+P(B)-P(A.B) B. P(A+B)=P(A)-P(B)-P(A.B) C. P(A+B)=P(A)+P(B)+P(A.B) D. P(A+B)=P(A)-P(B)+P(A.B)	Recall	Remember
10	What is the relation between mean and variance of Poisson Distribution? A. Mean ≠ Variance, B. Mean > Variance C. Mean< Variance, D. Mean = Variance	Analyze	Analyze
PART – B Short Answer The answer should not exceed 200 words 4 x 5 = 20			
11	(a)Define Frequency Region cumulative frequency Curve Or (b)Define Range, Variance, and Standard Deviation.	Define	Remember
12	(a)Show that the arithmetic mean of the regression coefficient is greater than the correlation coefficient Or (b)Show that the correlation coefficient lies between 1 and -1	Show	Apply
13	(a)Define the term skewness and Kurtosis Or	Solve	Create

	(b)Two Dice are thrown. Find the probability that the sum of points on them is 5 or 9.		
14	(a)If $f(x)=\begin{cases} Kxe^{-x}, & x>0 \\ 0, & \text{elsewhere} \end{cases}$ is the p.d.f of the random variable X. Find K. Or (b)If the joint p.d.f of (x,y) is $f(x,y)=\begin{cases} ¼, & 0\le x,y<2 \\ 0, & \text{otherwise} \end{cases}$ Find $P(X+Y\le 1)$	Identify	Apply
	PART – C Essay Answer **The answer should not exceed 400 words 3 x 10 = 30**		
15	(a)Let $X_1,X_2,X_3,\ldots$be independent random variable such that for j=1,2,…., $p(X_j=\pm j^a) = 6^{-1}j^{-2(a-1)}$ and $p(X_j=0)=1-3^{-1}j^{-2}(a-1)$,where a>1 is a constant. Show that Lindeberg's condition is satisfied if a<1.5 (or) (b) Let $X1,X2,\ldots$ be a sequence of identically distributed random variables with $E\|X1\|<\infty$ and let $Yn= n^{-1}\max 1\le i\le n \|Xi\|$. Show that $\lim n\ E(Yn) = 0$ and $\lim n\ Yn= 0$ a.s.	Prove	Evaluate
16	(a)Find the mean deviation from the mean and the standard deviation of arithmetic progression a, a+d,a+2d,..a+2nd (or) (b)Write a note on the partial correlation in case of the variables.	Identify	Apply
17	(a)Let X be a continuous random variable with f(x)=ax,0≤x≤1 =a,1≤x≤2 =-ax+3a,2≤x≤3 =0, elsewhere Find the value of a. (or) (b) Let x be a random variable with the following probability distribution Find E(x) and $E(X^5)$	Identify	Apply

x	-3	6		9
P(X=x)	1/6	½		1/3

SEMESTER - II					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10215	General Physics II	4	0	0	4
Internal	40	External	60	Total	100

Course Content Overview

a. Course Outcome (COs)

On successful completion of the course, the student teachers will be able to

	Course Outcome	Level
CO 1	Understand electricity, magnetism, and their applications in electrical engineering.	Understand
CO 2	Comprehend optics principles and their applications in modern technology.	Apply
CO 3	Gain knowledge of thermodynamics and its applications in energy systems.	Analyze
CO 4	Understand wave phenomena, acoustics, and their practical applications in music and engineering.	Understand
CO 5	Understand the fundamentals of quantum mechanics and its applications, including quantum tunnelling.	Understand

b. Syllabus

Units	Content	Hrs.
I	**Electromagnetism** Electrical Charge and Coulomb's Law - Electric Field, Potential, and Current - Ohm's Law and Circuits - Magnetic Fields and Forces - Ampere's Law and Inductance - Electromagnetic Waves and Maxwell's Equations - Applications of Electromagnetism in Electrical Engineering.	13
II	**Electromagnetic Waves and Optics** Electromagnetic Waves and Speed of Light - Reflection and Refraction - Interference and Diffraction in Optics - Polarization and Double Refraction - Huygens' Principle and Fermat's Principle - Fresnel and Fraunhofer Diffraction - Applications of Optics in Imaging and Modern Technology.	13
III	**Thermodynamics and Heat Transfer:** Thermometry and Temperature Scales - Laws of Thermodynamics (First and Second) - Heat Conduction and Convection - Radiation and Blackbody Radiation - Entropy and the Carnot Cycle - Heat Engines and Refrigeration - Applications of Thermodynamics in Energy Systems.	12
IV	**Modern Physics - Nuclear Physics** Structure of Nucleus - Radioactivity and Decay Processes - Nuclear Reactions and Fission-Fusion - Elementary Particles and Fundamental Interactions - Condensed Matter Physics: Crystallography and Solids - Band Theory of Solids and Semiconductor Physics - Applications of Modern Physics in Medical Imaging and Materials Science.	13
V	**Wave-Particle Duality and Quantum Mechanics** Fundamental Postulates of Quantum Mechanics - Wave-Particle Duality - Heisenberg's Uncertainty Principle and Its Implications - Schrödinger Equation: Time-Dependent and Time-Independent Formulations - Particle in a Box and Potential Wells - Quantum Mechanical Operators: Operators, Eigenstates, and Observables - Quantum Mechanics of Simple Harmonic Oscillator - Quantum Mechanics Applications: Quantum Tunnelling	13
	Tasks and Assignments: ✓ Individual or Group Seminar presentation on selected topics ✓ Report on interdisciplinary application of selected	

	problems/concepts ✓ The ability to communicate their ideas effectively, both orally and in writing. ✓ Understands function effectively in multidisciplinary teams and topics **References:** A Beiser: concepts of modern physics. ,6th edition,Tata Mcgraw Hill, New Delhi. Thermodynamics – F. Fermi. Heat and thermodynamics - Zemansky and Ditman (Mc Graw Hill). F. W. Sears, and G. L. Salinger,]it Thermodynamics, Kinetic theory, and Statistical Thermodynamics, Narosa (1986) J S Dugdale, Entropy and its physical meaning, Taylor and Fancis (1996) Physics: Resnick, Halliday and Walker F.R. Richtmeyer. E.H. Kennard and T. Lauritsen: Introduction to modern Physics Littleield and T.V. Thorley: Atomic and nuclear physics Nuclear Physics by I.Kaplan(Addision-Wiley Pub. Co. Inc.) Nuclear Physics by Bucham (Indian Ed.) Nuclear Physics by S.S.M.Wong Concepts of Nuclear Physics by B.L.(Cohen (TMI Ed.) A. J. Dekker, Solid state physics, MacMillan (1981) Principles of Quantum Mechanics-David J. Griffiths University Physics – Sears Semansky and Ground Aruldhas G, "Quantum Mechanics", Printice-Hall of India Pvt. Ltd. 2002	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	20	20	20	20	20	100

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 5 x 4 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	12	12	12	12	12

g. Model Question Paper

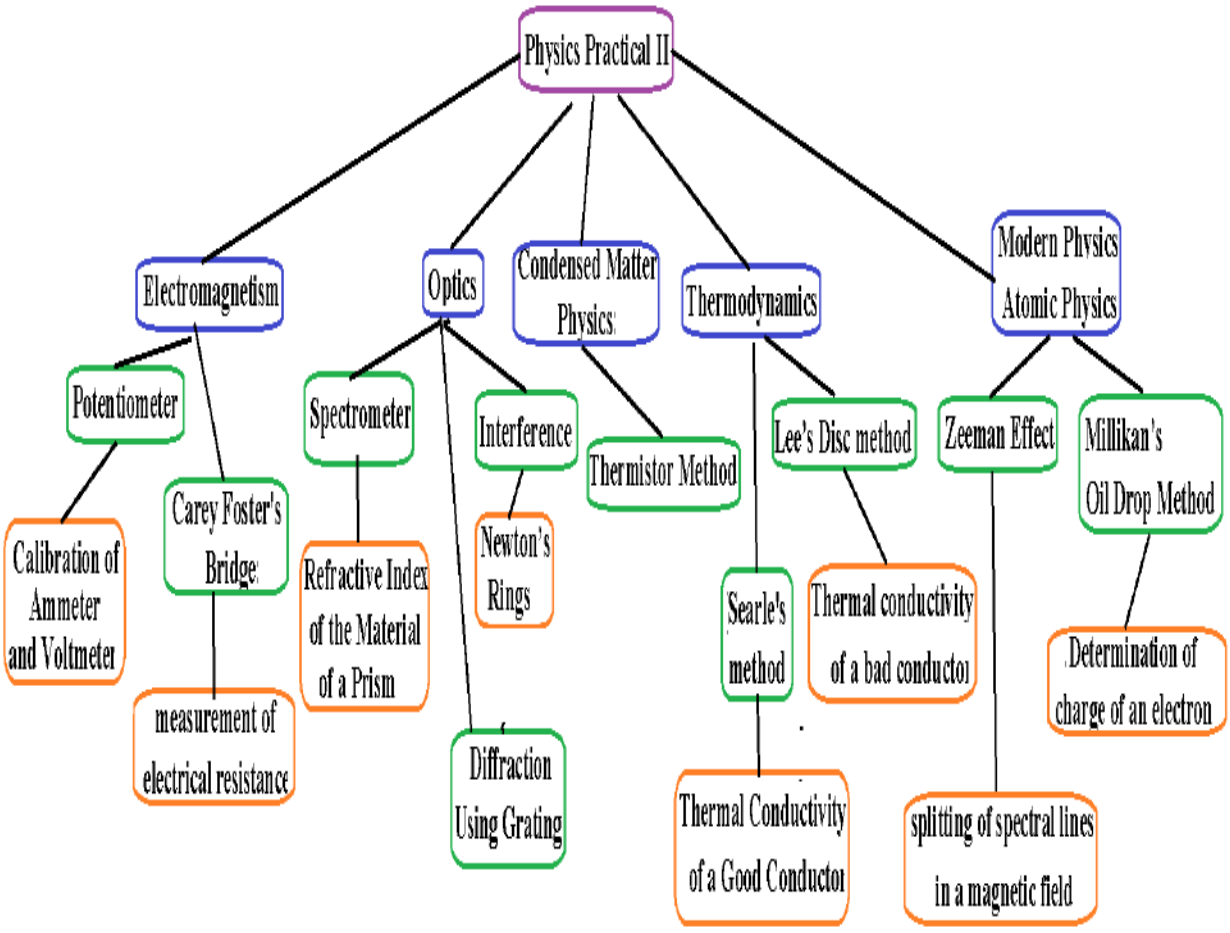
Sl. No.	Model Questions	Specifications	Level
	Part – A **Objective Type Multiple choice 10 x 1 = 10**		
1	What fundamental law describes the force between charged particles? a) Newton's First Law b) Faraday's Law c) Ampere's Law d) Coulomb's Law	Recognize	Remember
2	In electrical circuits, what does Ohm's Law describe? a) The relationship between voltage and current b) The relationship between resistance and voltage c) The relationship between charge and electric field d) The relationship between magnetic field and current	Recall	Remember
3	What optical phenomenon explains the splitting of light into its constituent colors? a) Reflection b) Refraction c) Interference d) Diffraction	Recognize	Remember
4	What is the speed of electromagnetic waves in a vacuum? a) 3 × 10^5 m/s b) 3 × 10^7 m/s c) 3 × 10^8 m/s d) 3 × 10^10 m/s	Recognize	Remember
5	According to the Second Law of Thermodynamics, what is the direction of heat transfer in a closed system? a) From hot to cold b) From cold to hot c) Heat transfer doesn't occur in a closed system d) It depends on the specific materials involved	Recognize	Remember
6	What type of radiation is emitted by a blackbody at all temperatures? a) X-rays b) Ultraviolet c) Infrared d) Microwave	Recognize	Remember
7	What is the process by which heavy atomic nuclei split into smaller ones, releasing a large amount of energy? a) Nuclear fusion b) Nuclear fission c) Radioactivity d) Nuclear decay	Recall	Remember

8	In condensed matter physics, what does the band theory of solids explain? a) The behavior of gases at high temperatures b) The structure of atomic nuclei c) The electrical conductivity of materials d) The behavior of electromagnetic waves	Recall	Remember
9	Which principle states that it's impossible to simultaneously measure the position and momentum of a particle with perfect accuracy? a) Planck's principle b) Heisenberg's Uncertainty Principle c) Fermat's Principle d) Newton's Second Law	Identify	Remember
10	What does the Schrödinger equation describe in quantum mechanics? a) The behavior of electromagnetic waves b) The behavior of particles in a box c) The behavior of electrons in atoms and molecules d) The behavior of planets in orbit	Identify	Remember
	PART – B **Short Answer** **5 x 4 = 20**		
11	a) Explain Coulomb's Law and its significance in electromagnetism. (OR) b) Describe the concept of electric potential. How is it related to electric field and work done?	Explain	Understand
12	a) Calculate the current in a circuit with a resistance of 10 ohms and a voltage of 20 volts. (OR) b) Explain Ampere's Law and its applications in electromagnetism.	Explain	Understand
13	a) Define reflection and refraction of light. Provide real-world examples of each. (OR) b) Explain the phenomenon of interference in optics. How does it relate to Young's double-slit experiment?	Explain	Understand
14	a) Define polarization in optics. How is it achieved, and what are its applications? (OR) b) Describe Fresnel and Fraunhofer diffraction patterns. How are they different, and what are their practical uses?	Explain	Understand

PART – C Essay Answer 3 x 10 = 30			
15	a) Discuss the First and Second Laws of Thermodynamics. Provide examples illustrating these laws. (OR) b) Explain the mechanisms of heat transfer through conduction, convection, and radiation. How do they apply to everyday situations?	Describe	Understand
16	a) Describe the structure of the atomic nucleus and the forces that hold it together. Explain the process of nuclear decay. (OR) b) Discuss the significance of condensed matter physics in modern technology. Explain the band theory of solids and its applications.	Explain Discuss	Understand
17	a) Explore the concept of wave-particle duality in quantum mechanics. How does it challenge classical physics? (OR) b) Describe the Schrödinger equation in quantum mechanics. How does it describe the behavior of particles in potential wells?	Explain Discuss	Understand

SEMESTER – II					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10216	General Physics Practical-II	0	0	2	2
Internal	60	External	40	Total	100

Course Content Overview



a. Course Outcome (CO)

	Course Outcome	Level
CO 1	Demonstrate the calibration of an ammeter and voltmeter using a potentiometer. Explore electrical resistance measurement through Carey Foster's Bridge	Apply
CO 2	Examine diffraction using a grating and understand the phenomenon. Study interference through Newton's Rings and comprehend its principles.	Analyze
CO 3	Demonstrate the Seebeck Effect and thermocouple to understand electrical potentials and thermoelectricity. Explore thermal conductivity in a good conductor using Searle's Method. Investigate thermal conductivity in a bad conductor using Lee's Disc method	Create
CO 4	Make measurements of the resistance of a thermistor as a function of temperature using the Thermistor Method.	Skill
CO5	Demonstrate the Zeeman Effect to understand the splitting of spectral lines in a magnetic field. Use Millikan's Oil Drop Method to determine the charge of an electron	Analyze Skill

b. Syllabus

Units	Content	Hrs.
I	Electromagnetism: Potentiometer: - Calibration of Ammeter and Voltmeter - Carey Foster's Bridge: measurement of electrical resistance	13
II	Optics: Diffraction Using Grating - Newton's Rings: The study of Interference - Spectrometer: Refractive Index of the Material of a Prism	13
III	Thermodynamics: Seebeck Effect and Thermocouple: study of electrical potentials and thermoelectricity - Thermal Conductivity of a Good Conductor - Searle's Method - Thermal conductivity of a bad conductor- Lee's Disc method	13
IV	Condensed Matter Physics: Thermistor Method - measuring the resistance of a thermistor as a function of temperature	13
V	Modern Physics: Atomic Physics - Zeeman Effect: splitting of spectral lines in a magnetic field - Millikan's Oil Drop Method: Determination of the charge of an electron	12

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	0	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	Total
Internal	15	15	15	15	60
External	10	10	10	10	40
Total	**25**	**25**	**25**	**25**	**100**

e. Mapping Course Outcome with Internal Assessment (60 Marks)

	CO1	CO2	CO3	CO4
Punctuality	-	-	-	2
Knowledge about the experiment	3	3	3	3
Handling of apparatus, recording of observation and calculations	5	5	5	4
Maintenance of record book	6	6	6	5
Attendance	1	1	1	1
Total	**15**	**15**	**15**	**15**

f. Mapping Course Outcome with External Assessment (40 Marks)

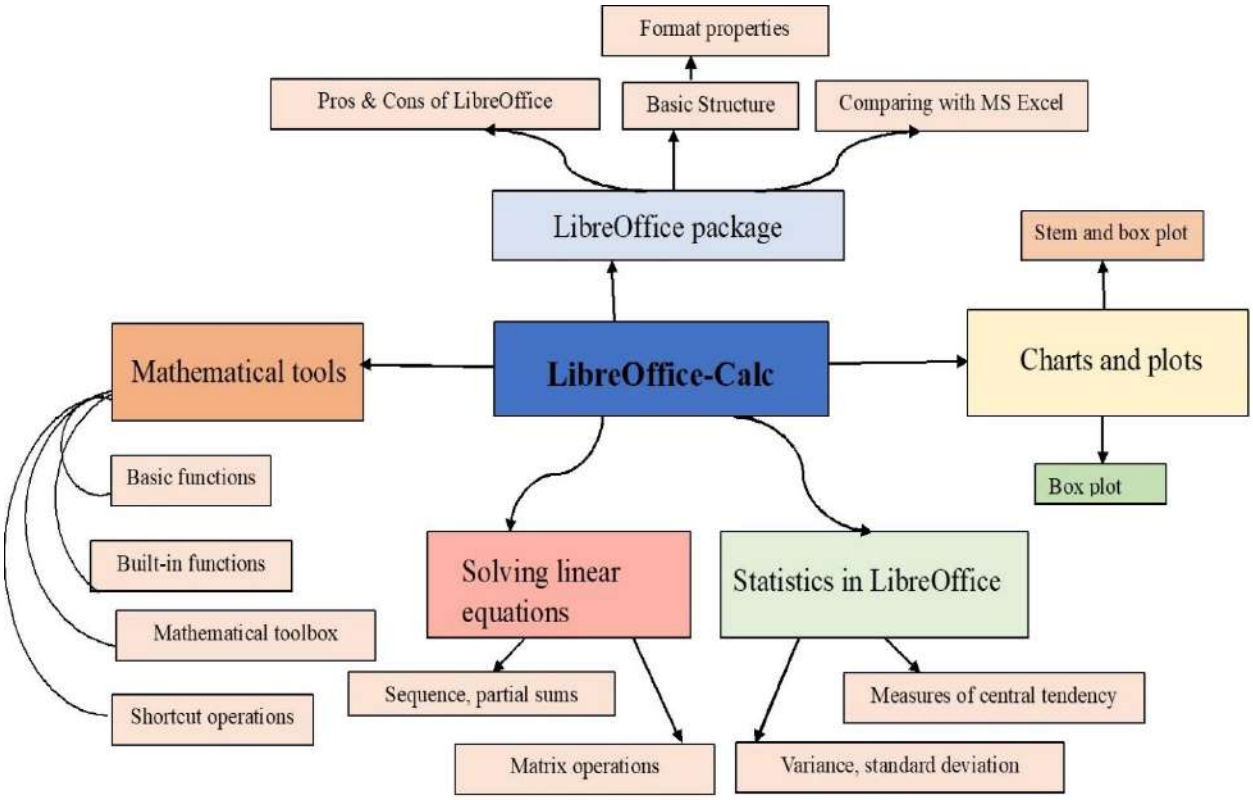
Category	CO1	CO2	CO3	CO4
Part – A	10	10	10	10
Total	10	10	10	10

g. Model Question Paper

Sl. No.	Model Questions	Specification	Level
	40 x 1 = 40		
1	Measure the electrical resistance of a given material using Carey Foster's Bridge:	Assess	Analyze, Skill

SEMESTER II					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDUI0217	Basic Computing Lab	0	0	2	2
Internal	60	External	40	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Familiarize the use of Libre Office, Calc, and necessary basic commands.	Understand
CO 2	Apply the software in the basic mathematical study for solving equations using matrix.	Apply
CO 3	Draw frequency diagram, histogram, and frequency polygons.	Analyze
CO 4	Find various measures involved in statistics by means of Libre Office Calc.	Evaluate

b.Syllabus

Units	Content	Hrs.
I	**Introduction to Microsoft Libre Office package**: Features of libre office, Pros and Cons, MS libre calc, Basic structure, comparison with MS Excel, shortcut operations, creating, saving, and printing a file in libre calc inserting pictures and graphics, exporting files, format properties, creating hyperlinks.	13
II	**Mathematical Functions**: Toolbox, basic functions, built-in functions, basic math and trigonometry functions, statistical functions, text functions, data visualization through diagrams, creating tables, data sorting and filtering, pivot tables, charts, simple bar, multiple bars, pie charts, histogram.	13
III	**Solving simple problems:** Creating sequences, partial sums, matrix, creating a matrix, basic operations in a matrix, determinant, inverse matrix, solution to a system of equations using matrix.	13
IV	**Statistics in LibreOffice:** Measures of central tendency, mean, median and mode, quartiles, percentiles, measures of dispersion, range, variance, and standard deviation.	13
V	**Charts and plots:** Measures of skewness and kurtosis, exploratory data analysis, stem and leaf diagram, and box plot.	12
	Laboratory Assignments (not limited to): ✓ To find the roots of the Algebraic and Transcendental equations using the Bisection method, Regula-Falsi method, Newton-Raphson method, Secant method, and Iterative method ✓ To solve the system of linear equations using the Gauss elimination method, Gauss Jacobi method, Gauss-Seidel method and Gauss Jordan method ✓ To determine the Eigen values and Eigen vectors of a Square matrix. ✓ To implement Numerical Integration using the Trapezoidal rule, Simpson's rules. ✓ To demonstrate basic statistical operations through the software. ✓ Create stem, leaf and box plots	

c. Mapping of Program Specific Outcomes with Course Outcomes

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	3	2	3	2
CO3	3	3	3	3	2	3
CO4	3	3	3	3	3	2
CO5	2	2	3	2	3	1

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	Total
Internal	15	15	15	15	60
External	10	10	10	10	40
Total	25	25	25	25	100

e. Mapping course outcome with Internal assessment (60 Marks)

	CO1	CO2	CO3	CO4
Punctuality	1	1	1	1
Understanding the software	4	4	4	4
Being active in practical sessions	5	5	5	5
Test	4	4	4	4
Attendance	1	1	1	1
Total	15	15	15	15

f. Mapping Course Outcome with External Assignment (40 Marks)

Category	CO1	CO2	CO3	CO4
Part A	10	10	10	10
Total	10	10	10	10

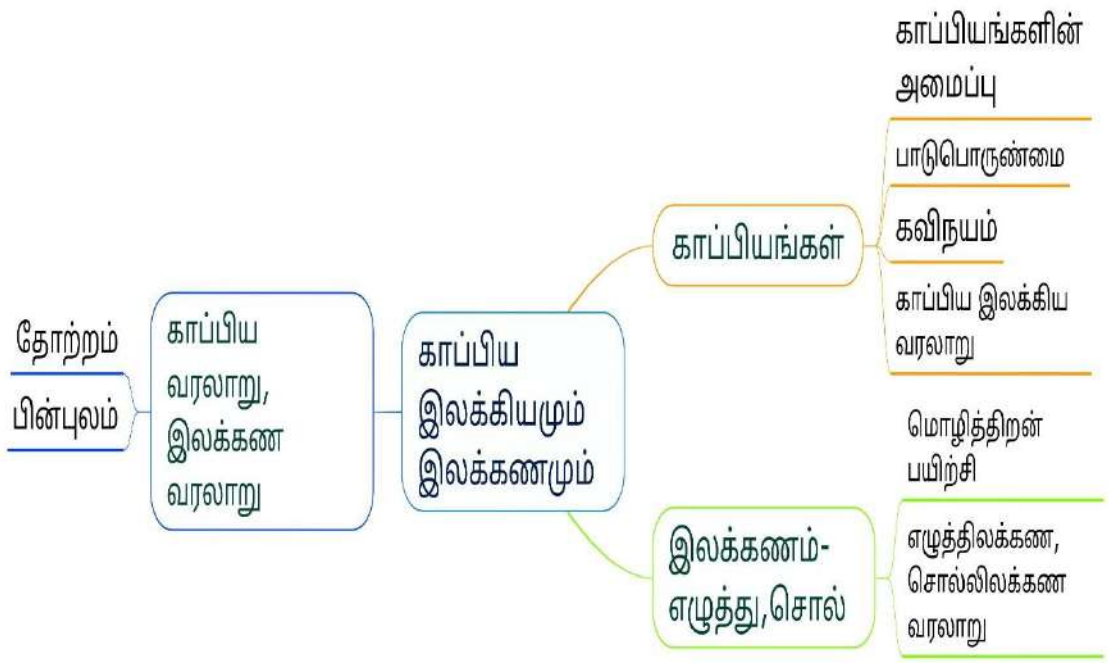
g. Model Question paper

S. No	Model Question paper 2 X 20 = 40	Specification	Level
1.	Write a code to find the root of Cos x -3x =0 using the Bisection method and present it in LibreOffice Calc	Assess	Analyze
2.	Construct a box plot to find the maximum, minimum, median, first quartile, and third quartile for the given data set: 23, 42, 12, 10, 15, 14	Assess	Analyze

SEMESTER - III

SEMESTER - III					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10311T	Epic Literature and Grammar	3	0	0	3
Internal	40	External	60	Total	100

பாடத்திட்ட மேம்பார்வை



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	காப்பிய இலக்கியத்தின் தோற்றம், பின்புலம் முதலியவற்றை தெரிந்துகொள்தல்.	தெரிந்து கொள்ளுதல்
CO 2	காப்பியங்களின் அமைப்பு, பாடுபொருண்மை, கவிநயம் போன்றவற்றைக் கண்டுணர்தல்	அறிந்து கொள்ளுதல்
CO 3	காப்பிய இலக்கிய வரலாறு குறித்து மொழிதல்	புரிந்து கொள்ளுதல்
CO 4	மொழித்திறன்(எழுத்து, சொல்) பயிற்சி பெறுதல்	தெரிந்து கொள்ளுதல்
CO 5	எழுத்திலக்கண, சொல்லிலக்கண வரலாற்றைச் சுருக்கமாக புரிந்துகொள்தல்.	அறிந்து கொள்ளுதல்

b. Syllabus

Units	Content	Hrs.
I	**காப்பியங்கள்** அ) சிலப்பதிகாரம் – மதுரைக்காண்டம் - **`அடைக்கலக்காதை'.** **ஆ)** மணிமேகலை – **`மணிமேகலா தெய்வம் வந்து தோன்றிய காதை'.**	10
II	**பக்திக் காப்பியங்கள்** **அ)** பெரியபுராணம் – **`நமிநந்தியடிகள் நாயனார் புராணம்'.** **ஆ)** கம்பராமாயணம் **– கிட்கிந்தா காண்டம் – `நட்புகோட் படலம்'.** **(தேர்ந்தெடுத்த பத்துப் பாடல்கள் மட்டும்)** **இ)** சீறாப்புராணம் – நுபுவத்துக்காண்டம் - **`மானுக்குப் பிணை நின்ற படலம்'.** **(தேர்ந்தெடுத்த பத்துப் பாடல்கள் மட்டும்)** **ஈ) தேம்பாவணி –** இரண்டாம் காண்டம் - **`சித்திர கூடப் படலம்'.** **(தேர்ந்தெடுத்த பத்துப் பாடல்கள் மட்டும்)**	10
III	**இலக்கணம் - எழுத்து, சொல்**	9

	இலக்கணம் (எழுத்து): எழுத்தின் வகைகள், ஒலிப்பு முறைகள், புணர்ச்சி முறைகள், ர-ற; ல-ள-ழ; ந-ன-ண ஆகிய ஒலிகளை வேறுபடுத்தி அறியும் முறை , உயிர்மெய்க் குறில், உயிர்மெய் நெடில் வேறுபாடு அறியும் முறை, ஒலிப்பு முறை)	
IV	**இலக்கணம்(மொழிப்பயிற்சி)** **இலக்கணம் (சொல்): தொடரியல் அமைப்பு, சொல்லின் வகைகள் (பெயர்ச்சொல் -** அறுவகைப்பெயர், ஆகுபெயர்; **வினைச்சொல் -** தெரிநிலை வினை; **இடைச்சொல் -** `-உம்' இடைச்சொல்; **உரிச்சொல் –** மிகுதிப்பொருள் தரும் சொற்கள்**), வேற்றுமைகள்(வகை, உருபுகள்), வடசொற்களைத் தமிழ்ச்சொற்களாக மாற்றும் முறைமை, வாக்கிய வகைகள்(**தன்வினை-பிறவினை; செய்வினை-செயப்பாட்டு வினை**)**	9
V	**காப்பிய வரலாறு, இலக்கண வரலாறு** அ) காப்பியத்தின் தோற்றமும் வளர்ச்சியும் ஆ) தமிழ் எழுத்திலக்கணம், சொல்லிலக்கணம் வரலாறு	9
	பாடநூல்கள் / பார்வைநூல்கள்: **இலக்கணம்:** ➢ பரந்தாமனார், அ.கி., நல்ல தமிழ் எழுத வேண்டுமா?, பாரிநிலையம், சென்னை. 1988. ➢ பரமசிவம், கு., இக்காலத் தமிழ் மரபு, அடையாளம் பதிப்பகம், சென்னை.2011. ➢ வேல்முருகன், ப., எழுத்திலக்கண மாற்றம், தி பார்க்கர் பதிப்பகம், சென்னை. 2006. **இலக்கிய வரலாறு:** ➢ சிவத்தம்பி, கா., தமிழில் இலக்கிய வரலாறு, நியூ செஞ்சுரி புக் ஹவஸ், சென்னை. 2000. ➢ சிற்பி பாலசுப்பிரமணியம்., தமிழ் இலக்கிய வரலாறு, நறுமலர் பதிப்பகம், சென்னை. 1992. **இலக்கண வரலாறு:**	

	➢ இளவரசு, சோம., இலக்கண வரலாறு, மெய்யப்பன் பதிப்பகம், சிதம்பரம். 2003. ➢ புலவர்.இளங்குமரன்.இரா.,இலக்கண வரலாறு., மணிவாசகர் பதிப்பகம்., சிதம்பரம். 1999.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5
CO1	3	3	2	2	2
CO2	3	3	2	2	2
CO3	3	3	2	2	2
CO4	3	3	2	2	2
CO5	3	3	2	2	2

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 5 x 3= 15 marks)	3	3	3	3	3
Part – C (Essay- 5 x 7 = 35 marks)	7	7	7	7	7
Total	**12**	**12**	**12**	**12**	**12**

g. Model Question Paper

Sl. No.	Model Questions	Specification	Level
Part – A: Objective Type 10 x 1 = 10			
1	இராமனுக்கும் சுக்ரீவனுக்கும் நட்புப் பாலமாக இருந்தவன் யார்?	Recognize	Remember
2	கண்ணகியை கவுந்தியடிகள் யாரிடம் அடைக்கலமாகக் கொடுக்கிறார்?	Recall	Remember
3	மணிமேகலையின் தோழி யார்?	Recognize	Remember
4	நமிநந்தியடிகள் பிறந்த ஊர் எது?	Recognize	Remember
5	நீரினால் விளக்கெரிக்கப்பட்ட கோயில் எது?	Recognize	Remember
6	சீறாப்புராணம் எழுதியவர் யார்?	Recognize	Remember
7	மானுக்குப் பிணை நின்ற படலத்தில் மான் யாரிடம் உதவி கேட்டது?	Recall	Remember
8	சித்திரகூடப்படலத்தில் சித்திரமாக வரையப்பட்டவன் யார்?	Recall	Remember
9	உயிர் நெடில் எழுத்துக்கள் யாவை?	Identify	Remember
10	அளபெடை என்றால் என்ன?	Identify	Remember
PART – B Short Answer The answer should not exceed 200 words 5 x 3 = 15			
11	சிலப்பதிகார அடைக்கலக் காதையில் வரும் நிகழ்வுகளைத் தொகுத்து எழுதுக.	Summarize	Analyse
12	மணிமேகலா தெய்வம் வந்து தோன்றிய காதை கோவலனை எவ்வாறு பெறுமை படுத்துகிறது?	Explain/ Discuss	Understand
13	தேம்பாவணியில் வரும் சித்திர கூடப் படலத்தில் வரும் கதையைத் தொகுத்து எழுதுக.	Assess	Skill
14	இலக்கியவகைச் சொற்கள் குறித்து எழுதுக.	Explain/ Discuss	Understand
15	தமிழ் சொல்லிலக்கணம் குறித்து விவரி.	Explain/ Discuss	Understand
PART – C Essay Answer The answer should not exceed 400 words 5 x7 = 35			

16	அ) பெரியபுராணத்தில் நமிநந்தியடிகள் சிவத்தொண்டு குறித்து எழுதுக. (அல்லது) ஆ) இராமனின் சிறப்புகளாக நட்புகோட் படலத்தில் அனுமன் கூறுவதை விளக்குக.	Explain	Understand
17	அ) தமிழ் எழுத்திலக்கண வரலாறு குறித்து விவரி. (அல்லது) ஆ) மானுக்குப் பிணை நின்ற படலத்தில் மானின் மாட்சிமை குறித்து எழுதுக.	Differentiate/ Define	Understand
18	அ) காப்பியத்தின் தோற்றமும் வளர்ச்சியும் குறித்து விவரிக்கவும். (அல்லது) ஆ) ஆணரனின் வாழ்க்கை வரலாற்றை விவரி.	Describe	Understand
19	அ) உயிரளபெடை, ஒற்றளபெடை குறித்து எழுதுக. (அல்லது) ஆ) குற்றியலுகரத்தை அதன் வகைகள் விளக்குக.	Illustrate	Apply
20	அ) வேற்றுமை உருபுகள் எத்தனை? உதாரணம் தந்து விளக்குக. (அல்லது) ஆ) ஓரெழுத்து ஒருமொழிச் சொற்களைப் பட்டியலிடுக.	Illustrate	Apply

SEMESTER - III					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10311H1	हिन्दीभाषाअधिगम Hindi Language Learning	3	0	0	3
अंदरका	40	बाहरी	60	कुल	100

इकाई -1

- वर्णमाला (स्वर, व्यंजन) और बारहखड़ी
- फल, फूल, सब्जियों का नाम, पशु-पक्षियों का नाम
- दिनों और रंगों का नाम, शारीरिक अंगों का नाम, महीनों का नाम
- एक से पचास तक गिनती

इकाई -2

- संज्ञा
- सर्वनाम
- विशेषण
- क्रिया
- चाहिए, पसंद का प्रयोग

इकाई -3

- भूतकाल (उदाहरण सहित)
- वर्तमान काल (उदाहरण सहित)
- भविष्यत् काल (उदाहरण सहित)
- 'ने' प्रत्यय का नियम

इकाई -4

- लिंग, वचन, कारक,
- समानार्थक शब्द, विलोम शब्द
- संवाद - दुकान में, अस्पताल में, मार्केट में राम, सफर में
- अनुवाद अभ्यास (हिंदी से अंग्रेज़ी और अंग्रेज़ी से हिंदी)

इकाई -5

- कन्याकुमारी, (पाठ)
- चाह, एक बूँद (कविता)
- भगवान सब का एक है (कहानी)

सहायक ग्रंथ :

1. हिन्दी वातायण, डॉ.के. एम. चंद्रमोहन, विश्वविद्यालय प्रकाशन, वाराणसी,(2008).
2. होटल प्रबंधन, डॉ.के. पी. राजरत्नम., मैथ क्रियेटर्स, कोयम्बुत्तूर, (2021).
3. प्राथमिक पाठ्य पुस्तक, दक्षिण भारत हिन्दी प्रचार सभा,मद्रास,चेन्नई, (2022).
4. मध्यमा पाठ्य पुस्तक, दक्षिण भारत हिन्दी प्रचार सभा,मद्रास,चेन्नई,(2022).
5. देवनागरी लिपि तथा हिन्दी का मानकीकरण,डॉ अनुराधा सेंगर, केन्द्रीय हिन्दी निदेशालय, भारत सरकार, नई दिल्ली, (2019).

SEMESTER – III					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10311H2	**हिन्दी भाषा – संरचना एवं साहित्य** Hindi Language structure and Literature	3	0	0	3
Internal	40	External	60	Total	100

इकाई – 1 **हिन्दी भाषाका विकास : परिचय**

पूर्व –ऐतिहासिक भाषाएं, हिन्दी की बोलियाँ,हिन्दी और हिन्दुस्तानी,खड़ीबोली हिन्दी,राष्ट्रभाषा–राजभाषा–संपर्क भाषा

इकाई – 2 **हिन्दी भाषा की संरचना**

संज्ञा, सर्वनाम, क्रिया, विशेषण, क्रिया–विशेषण, अव्यय, कारक एवं विभक्तियाँ, लिंग, वचन, काल

इकाई – 3 **हिन्दी साहित्य का इतिहास : संक्षिप्त परिचय**

आदिकाल, भक्तिकाल, रीतिकाल, आधुनिक काल - (सामान्य परिचय)

इकाई – 4 **पाठाध्ययन एवं अध्यापन के लिए (मध्यकालीन पद्य)**

1. कबीरदास (साखी – पाँच दोहे)
2. तुलसीदास (पाँच दोहे)
3. सूरदास (बाल वर्णन – दो पद)
4. बिहारीलाल (पाँच दोहे)

इकाई – 5 **पाठाध्ययन एवं अध्यापन के लिए (आधुनिक पद्य)**

1. सूर्यकान्त त्रिपाठी 'निराला' – तोड़ती पत्थर
2. धर्मवीर भारती –टूटा पहिया
3. निर्मला पुतुल– उतनी दूर मत ब्याहना बाबा

सहायक ग्रंथ:

1. कामता प्रसाद गुरु, संक्षिप्त हिन्दी व्याकरण, नागरीप्रचारिणी सभा, वाराणसी (2005).

2. बाबू गुलाबराय, हिन्दी साहित्य का सुबोध इतिहास, लक्ष्मी नारायण अग्रवाल एजुकेशनल पब्लिशर्स, आगरा (2017).

3. विश्व नाथ त्रिपाठी, हिन्दी साहित्य का सरल इतिहास,ओरिएन्ट ब्लैकस्वेन, हैदराबाद (2007).

4. दंगल झाल्टे, प्रयोजनमूलक हिन्दी: सिद्धांत और प्रयोग, वाणी प्रकाशन, नयी दिल्ली (2015).

5. विनोद गोदरे, प्रयोजनमूलक हिन्दी, वाणी प्रकाशन, नयी दिल्ली (2016).

6. प्रेमचन्द्र, विश्व में हिन्दी, तक्षशिला प्रकाशन, नयी दिल्ली (2015).

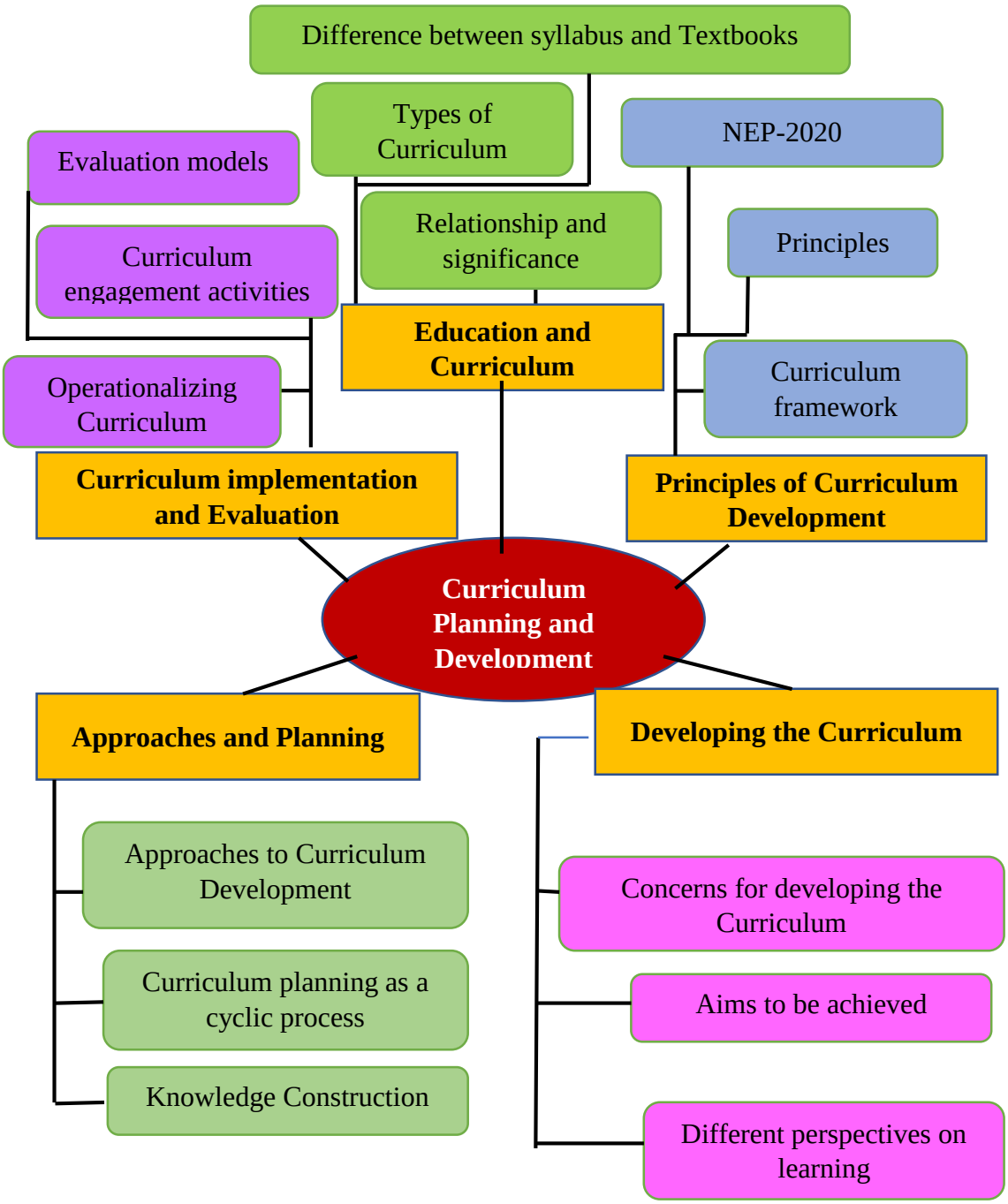
7. विद्यानिवास मिश्र (सं.), आज के लोकप्रिय हिन्दी कवि–अज्ञेय, राजपाल एण्ड सन्ज़, दिल्ली (2002).

8. रामविलास शर्मा (सं.), राग विराग, लोकभारती प्रकाशन, इलाहाबाद (1998).

9. हरेराम समीप (सं.), समकालीन दोहा कोश, शब्दालोक प्रकाशन, दिल्ली (2015)

SEMESTER - III					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10312	Curriculum Planning and Development	2	0	0	2
Internal	40	External	60	Total	100

Course content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Explain the concept of curriculum and differentiate different types of Curriculums	Understand
CO 2	Analyze the Principles of Curriculum Development within the context of NCF 2005, NCFTE 2009 and NEP-2020	Analyze
CO 3	Evaluate the implications of various perspectives in curriculum development.	Evaluate
CO 4	Design a curriculum using one of the approaches to curriculum development	Create
CO 5	Synthesize their knowledge of curriculum development and translate it into effective curriculum implementation strategies.	Apply

b. Syllabus

Units	Content	Hrs.
I	**Education and Curriculum** Meaning, Relationship and significance - Types of Curriculum - Subject-centered, Activity-centered, Child-Centeredness, Environmental centered, Community-centered, Difference between syllabus and Textbooks.	6
II	**Principles of Curriculum Development** Curriculum framework – Concept - NCF 2005, NCFTE 2009, NEP-2020–Objectives, aspects and recommendations - Principle of Integration, Utility, Character Formation, Flexibility, Creativity and Conservation - Practical Work and Mental Discipline.	6
III	**Developing the Curriculum** Concerns for developing the Curriculum - Aims to be achieved, Structure and nature of discipline - Different perspectives on learning and their implications to curriculum development - Socio–cultural aspects and Aspirations of society, Value transitions, Social efficiency and needs, Environmental concerns, Gender concerns, Inclusiveness, technological advancement, Impact of Globalization.	6
IV	**Approaches and Planning** Approaches to Curriculum Development – Processes and Product approaches- Learner – Activity, Broad fields, Social problems centered, Knowledge Construction - Curriculum planning as a cyclic process, Reactive, Inactive, Preactive and Proactive**.**	7
V	**Curriculum implementation and Evaluation** Curriculum implementation - Operationalizing Curriculum into learning situations - Curriculum engagement activities - Role of school at Regional, State and National level for implementation. Role of teachers in operationalizing – Evaluation - Role of teachers	7

	in evaluating the curriculum - Use of evaluation feedback / inputs , Evaluation models-Tyler Model, Hilda Taba Model. Stake's Model, Cronbach's Model, CIPP or Stuffle beam Model.	
	Tasks and Assignments: Arranging discussion on: ✓ Basis of National curriculum frame works (1975, 1988, 2000, and 2005). ✓ Document: Learning without burden" by Prof. Yashpal ✓ Preparing of Report based on observation of: ✓ Facilities and infrastructure to implement the present curriculum. ✓ Interviewing teachers to understand their role in: ✓ Implementing and assessment of the curriculum. Analysis of the following in the context of principles of developing the Curriculum: ✓ Guidelines of NEP, 2020. ✓ Curriculum of 4 Years B.Ed. Integrated Programme ✓ Learning without Burden, MHRD, and India. ✓ Position paper (2006). National Focus Group on 'Curriculum, Syllabus, Textbooks', NCERT. ✓ NCERT (1988) National Curriculum for Elementary and Secondary Education: A framework. ✓ NCERT (2000) National Curriculum Framework for school Education. ✓ NCERT (2005) National Curriculum Framework. NCERT publications. **References:** Arora, G.L. (1984). Reflections on curriculum. New Delhi: NCERT. Dewey, John (1956). The child and the curriculum. Chicago, Illinois: University of Chicago Press. Dewey, John(1997). My pedagogic creed. in D.J. Flinders and S.J. Thorton(eds.), The Curriculum studies reader. New York: Routledge, Egan, K. (2005). An imaginative approach to teaching. San Francisco: Jossey-Bass.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	3	2
CO2	3	3	2	3	2	2
CO3	2	3	3	3	3	2
CO4	3	3	3	3	2	3
CO5	3	3	3	3	3	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

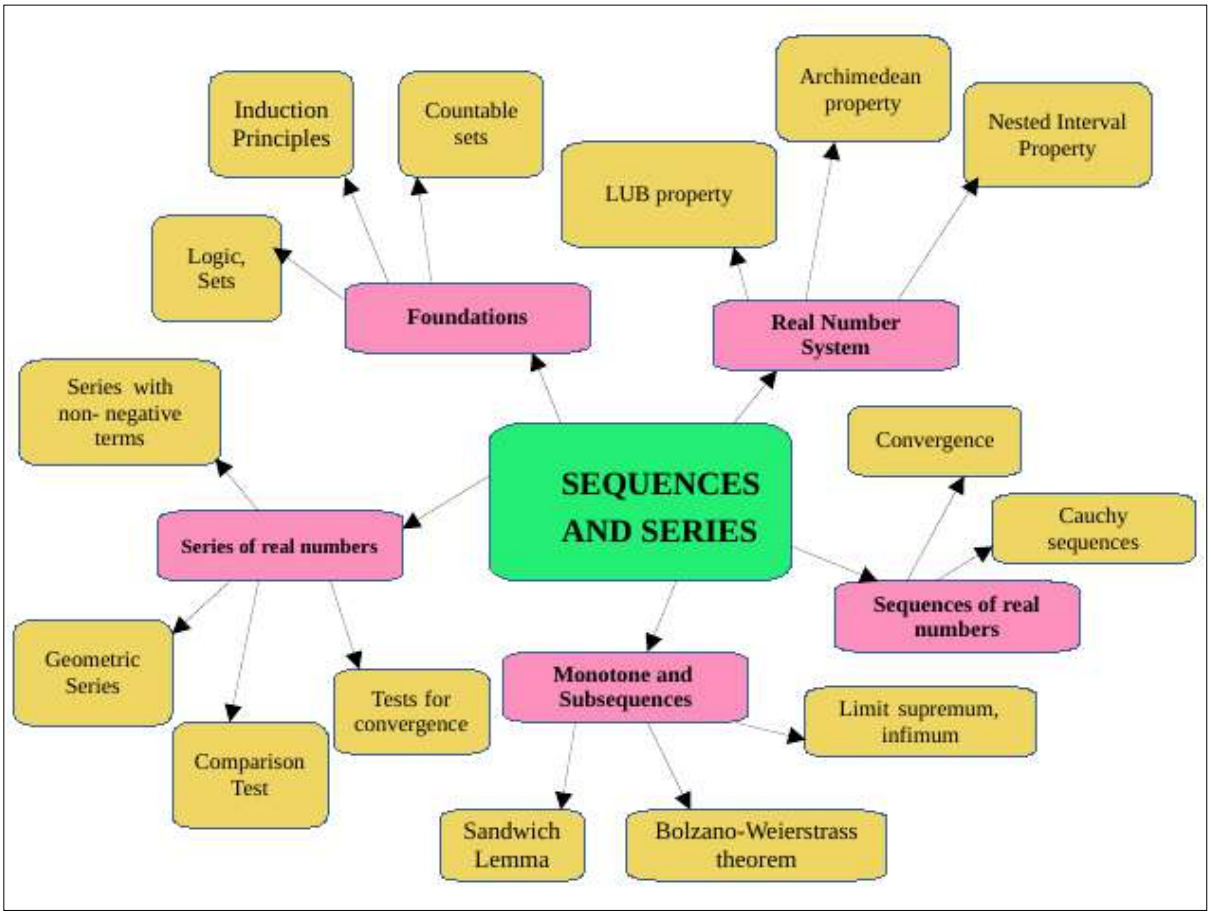
Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 4 x 5 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	**12**	**12**	**12**	**12**	**12**

g. Model Question Paper			
Sl. No.	**Model Questions**	**Specification**	**Level**
	Part – A: Objective Type **Multiple choice 10 x 1 = 10**		
1	Which term is used to express the totality of the learning experiences that the pupil receives through manifold abilities in the school A. Curriculum B. Content C. Lesson plan D. Syllabus	Recognize	Remember
2	The words curriculum is derived from A. German language B. Dutch language C. Latin language D. French language	Recall	Remember
3	National Curriculum Frame Work (NCF), 2005 recommends that teaching should emphasize maximum on A. relating class room learning to life outside the school B. memorizing scientific terms given in text book C. answering all questions in the text book exercises D. improving students' performance in examinations	Recognize	Remember
4	National Education Policy -2020 lays emphasis in A. Learning for exams B. rote learning C. practice and drill D. conceptual understanding	Recognize	Remember
5	Major concern of the school curriculum is A. any one of the specific skill for the children B. holistic development of Children C. minimum learning D. languages only	Identify	Remember
6	Globalization prompted the Education system to--------- its Curriculum. A. modernize B. avoid C. translate D. emphasize	Recognize	Remember
7	---------- approach is one of the most widely used approached of the curriculum development A. activities centred B. social problems centred C. subject centred D. broad fields centred	Recognize	Remember
8	Curriculum planning is a A. simple processes B. cyclic processes C. closed processes D. closed processes	Recall	Remember
9	---------- is a Curriculum engagement activity A. learning students' interest B. avoiding usage of Technology C. reducing competition among students D. banning discussions among students	Identify	Remember
10	Stuffle beam model is also called as ---------- A. CIPP model B. modern model C. old model D. Taba's model	Recall	Remember

	PART – B Short Answer **The answer should not exceed 200 words 4 x 5 = 20**		
11	a) Discuss the needs and significance of the curriculum (or) b) Discuss the relationship and difference between the types of curriculum	Differentiate Define	Understand
12	a) Differentiate curriculum, curriculum framework, syllabus and textbooks. (or) b) Define the curriculum and write short notes on basic principles of curriculum development	Explain	Understand
13	a) Give some objectives, aspects and recommendations of NCF 2005 (or) b) Give some examples of Curriculum planning as a cyclic process.	Differentiate Define	Understand
14	a) Illustrate the role of school at Regional, State and National level for implementations.(or) b) Illustrate the role of teachers in operationalizing and evaluating the curriculum	Explain	Understand
	PART – C Essay Answer **The answer should not exceed 400 words 3 x 10 = 30**		
15	a) Describe the types of Curriculum (or) b) Examine the facilities and infrastructure to implement the present curriculum	Define Describe	Analyse
16	a) Explain the concerns for developing the Curriculum (or) b) Discuss the implementations of curriculum	Define Discuss	Understand
17	a) Describe Curriculum Evaluation with Hilda Taba model (or) b) Explain the approaches to Curriculum development	Describe Assess	Skill

SEMESTER - III					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10313	Sequences and Series	4	0	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Understand the mathematical logic and the mathematical notion of sets and functions.	Understand
CO 2	Apply the fundamental properties of real number system.	Apply
CO 3	Examine the notion of convergence and the convergence of Cauchy sequence from the LUB property.	Analyze
CO 4	Judge the connection between the limit of a sequence and limsup,liminf of that sequence.	Evaluate
CO 5	Construct the decimal representation of real numbers	Create

b. Syllabus

Units	Content	Hrs.
I	**Foundations:** Statements and Logic, Sets, Functions, Relations, Induction Principles, Equivalent and Countable sets.	12
II	**Real Number System** There is no rational number whose square is 2, Properties of Real numbers (Addition, Multiplication, Order Property, LUB property), Archimedean property, Existence of greatest integer, Between any two distinct real numbers, there is a rational number, Existence of square root for positive real numbers, Between any two distinct real numbers, there is an irrational number, Nested Interval Property, The absolute value function and its properties.	14
III	**Sequences of real numbers** Sequences and convergence, Bounded sequences, Algebra of Convergent Sequences, Cauchy sequences, Convergence of Cauchy sequences.	12
IV	**Monotone and Subsequences** Monotone Sequences, Sandwich Lemma, Subsequences, Bolzano-Weierstrass theorem for bounded sequences, limit supremum and limit infimum.	12
V	**Series of real numbers** Series of real numbers, convergence and divergence, series with non-negative terms, alternating series, tests for convergence of series.	14
	Tasks and Assignments: Each student is required to submit the following: ✓ Group discussion on mathematical logic. ✓ Assignments on writing rigorous proof for some basic properties of real numbers. ✓ Seminar on decimal representation of real numbers. ✓ Self study on the equivalence of LUB property and the convergence of bounded monotone sequence.	

	References: A. Kumar, S. Kumaresan, B. K. Sarma, A Foundation Course inMathematics, Narosa Publishing House, 2018. Jay Cummings, Proofs, A Long-Form Mathematics Textbook. Edward D. Gaughan Introduction to Analysis, American Mathematical Society, 2009. A. Kumar and S. Kumaresan, A Basic Course in Real Analysis, CRC Press, 2014. R. G. Bartle and D. R Sherbert, Introduction to Real Analysis, JohnWiley and Sons (Asia) P. Ltd., 2000. K. A. Ross, Elementary Analysis- The Theory of Calculus Series- Undergraduate Texts in Mathematics, Springer Verlag, 2003.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 4 x 5 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	**12**	**12**	**12**	**12**	**12**

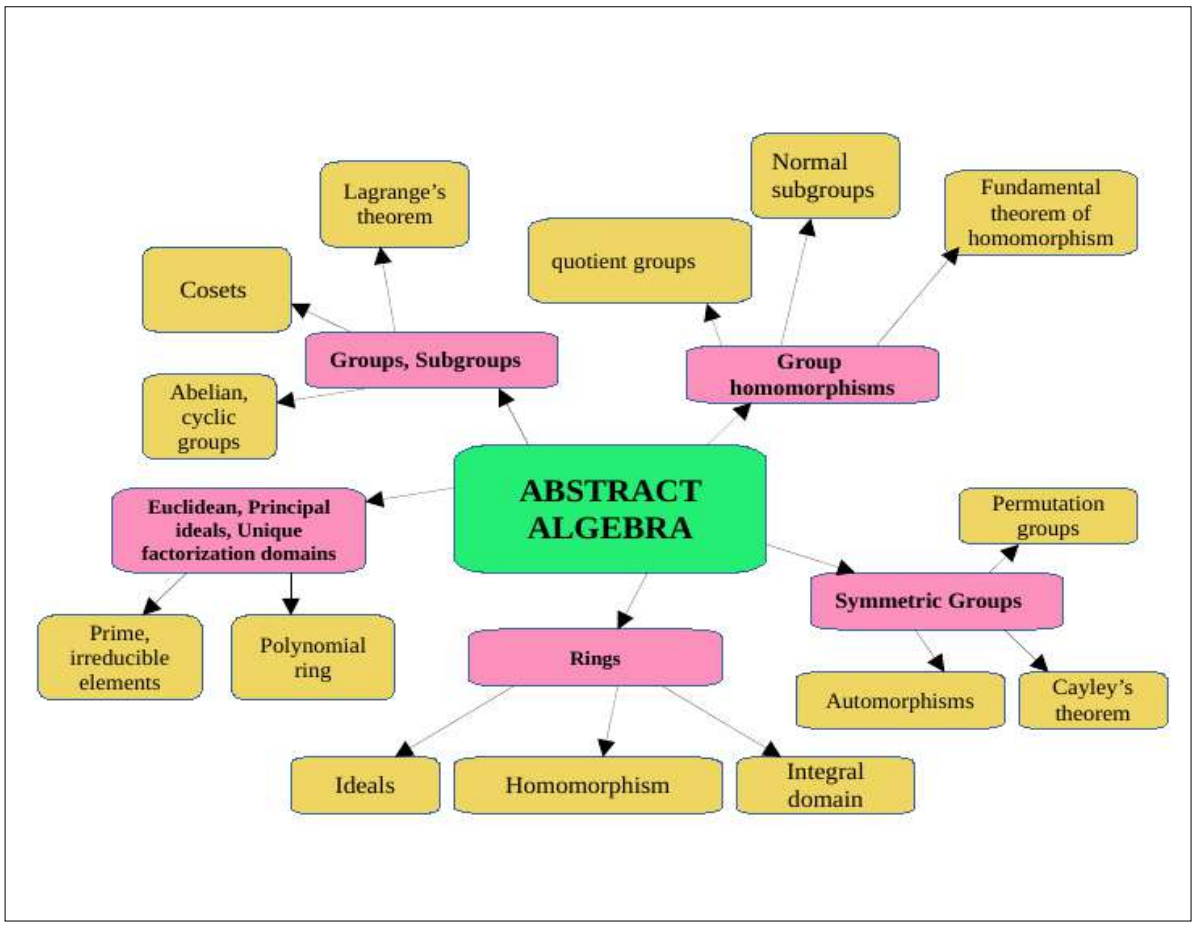
g. Model Question Paper

Sl. No.	Model Questions	Specifications	Level
	Part – A: Objective Type **Multiple Choice Marks: 10 x 1 = 10**		
1	Let A={1,a,{2,3}} A. $2 \in A$ B. $\{2,3\} \subseteq A$ C. $\{2,3\} \in A$ D. $1 \notin A$	Recognize	Remember
2	Let A={1,2} and B={1,2,3}. The set {(1,1),(2,1),(1,3)} is A. a function from A to B B. not a subset of $A \times B$ C. equal to $A \times B$ D. relation but not a function from A to B.	Recognize	Remember
3	Which system do not have LUB property A. $\mathbb{Q}$ B. $\mathbb{N}$ C. $\mathbb{Z}$ D. $\mathbb{R}$	Recognize	Remember
4	Which one not true A. If x<y, then ∀z, x+z=y+z B. (-1) x= - x C. If x<y, then ∀z, xz=yz D. (-a)(-b)=ab	Recall	Remember
5	The sequence $\left(\frac{(-1)}{n}\right)$ is A. Monotone B. converges to 0 C. not convergent D. not bounded	Recall	Remember
6	Consider the sequence: 1, 2, 3, 4, -1, 7, 7, 7, 7, 7, 7, ... Find the smallest $k \in \mathbb{N}, x_n \in (-2,8)$. A. 4 B. 6 C. 5 D. 3	Recognize	Remember
7	If $0 \leqslant a_n \leqslant \frac{1}{n^2}$ then (a_n) is A. not bounded B. need not converge C. converges to 0 D. monotone	Recognize	Remember
8	The sequence $(-1)^n$ is A. increasing B. decreasing C. cauchy sequence D. diverge sequence	Identify	Remember

9	Consider the series. $\sum \frac{1}{n}$ A. partial sum is decreasing B. series is not converges C. series is convergent D. None	Identify	Remember
10	The series is $\sum \frac{(-1)}{n^2}$ A. convergent B. not convergent C. n^{th} term doesnot converges to 0 D. None	Identify	Remember
	PART – B **Short Answer Marks: 4 x 5 = 20**		
11	(a) Prove that $\mathbb{Z} \times \mathbb{Z}$is countable. or (b) Let $f: X \to Y$ and $A, B \subseteq Y$. Prove that $f^{-1(A \cup B)} = f^{-1(A)} \cup f^{-1(B)}$.	Analyze	Analyze.
12	(a) Prove nested interval property. or (b) Prove $\mathbb{N}$ is not bounded above.	Prove Find	Skill
13	(a) Prove the triangle inequality. or (b) If a<b, prove that there is a rational r such that a<r<b.	Find	Understand
14	(a) Prove that there exists $r \in \mathbb{R}$ such that $r^2 = 2$. or (b) Prove that there is no $r \in \mathbb{Q}$ such that $r^2 = 2$.	Find Prove	Understand
	PART – C **Essay Answer Marks: 3 x 10 = 30**		
15	(a) Prove that every Cauchy sequence is a convergent sequence. or (b) Prove that $\mathbb{R}$ is not countable.	Prove	Skill
16	(a) State and prove Bolzano-Weierstrass theorem. or (b) Prove that (a_n) is convergent if and only if $\limsup a_n = \liminf a_n$.	Obtain	Apply
17	(a) State and prove ratio test. or (b) Discuss the convergence of geometric series.	Prove	Skill

SEMESTER - III					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10314	Abstract Algebra	4	0	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Understand the concept of groups and rings.	Understand
CO 2	Use the properties of groups and rings.	Apply
CO 3	Analyze different kind of groups and rings.	Analyze
CO 4	Appraise the algebraic structures, viz., groups and rings.	Evaluate
CO 5	Investigate algebraic structures.	Create

b. Syllabus

Units	Content	Hrs.
I	**Groups, Subgroups - Definition and Examples** Groups, definition and examples, finite, infinite, abelian, cyclic groups, Subgroups, existence of smallest subgroups of a group containing a subsetof the group, order of an element, cosets of subgroups, Lagrange's theorem.	12
II	**Quotient groups and Group homomorphisms** Normal subgroups, properties, the subgroup of the form HK and O(HK), quotient groups, homomorphisms of groups, kernel, image, fundamental theorem of homomorphism.	12
III	**Symmetric Groups** Permutation groups, Cayley's theorem, automorphisms.	12
IV	**Rings, Homomorphisms, and Ideals** Rings, commutative ring, integral domain, division ring, field (definitions), finite integral domain is a field, ring homomorphism, ideals, quotient rings, maximal ideals and prime ideals and their characterizations, quotient field of an integral domain.	14
V	**Euclidean, Principal ideal and Unique factorization domains** Euclidean rings: division algorithm, GCD and unique factorization theoremin a Euclidean ring, principal ideal domain and unique factorization domain, polynomial rings.	14
	Tasks and Assignments: Each student is required to submit the following: ✓ Solution to homework problems. ✓ Group discussion on problem solving. ✓ Classifying groups for small orders.	

	References: I. N. Herstein, Topics in Algebra, 2nd Edition, John-Wiley & Sons, 1975. J. B. Fraleigh, A First course in Abstract Algebra, 7th Edition, Pearson Education, 2003. D. S. Dummit and R. M. Foote, Abstract Algebra, Third Edition, Wiley, 2004. M. Artin, Algebra, Prentice-Hall of India, 1994. C. Lanski, Concepts in Abstract Algebra, American Math. Society, Indian Edition, Universities Press, 2010. J. A. Gallian, Contemporary Abstract Algebra, Nineth Edition, Cengage India Private Limited, 15 August 2019.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	1	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	2	3	3	3
CO4	3	3	1	3	3	3
CO5	3	3	1	3	3	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 4 x 5 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	**12**	**12**	**12**	**12**	**12**

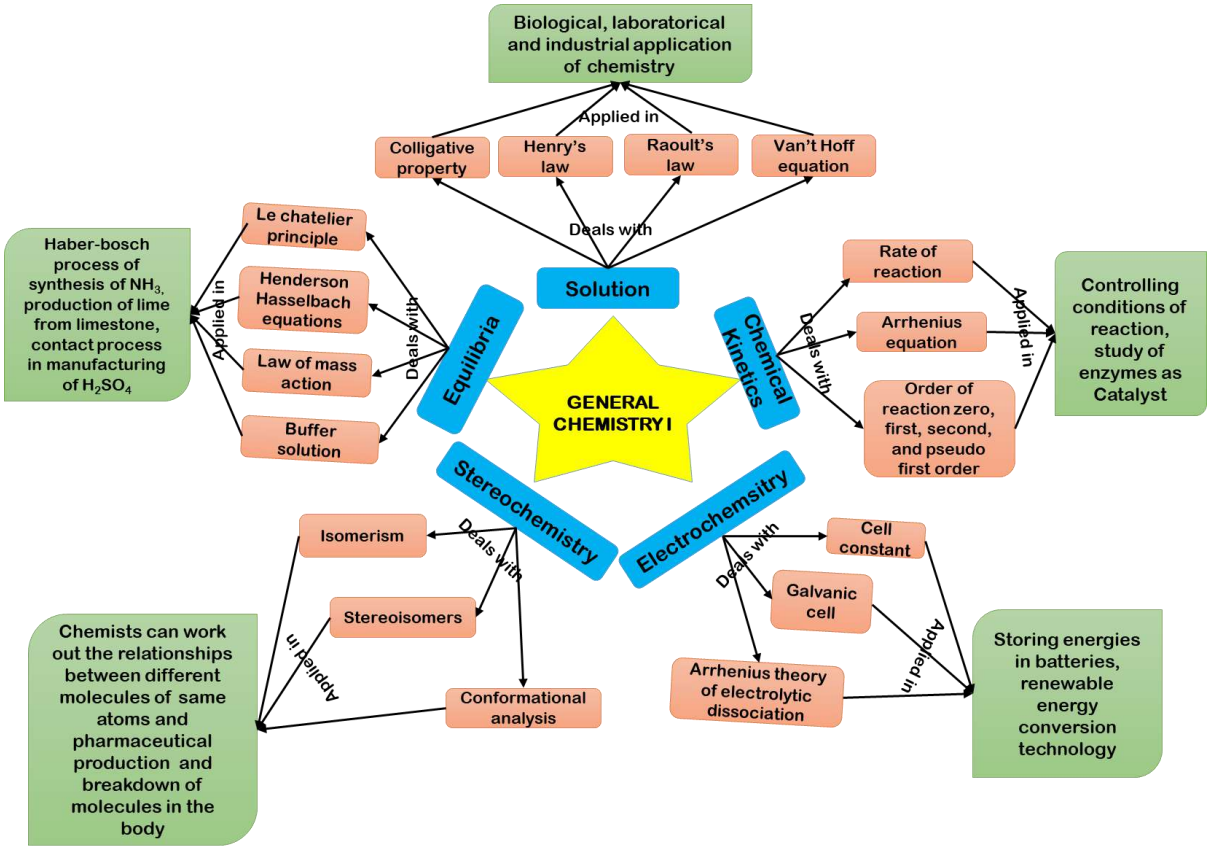
g. Model Question Paper

Sl. No.	Model Questions	Specification	Level
	Part – A: Objective Type **Multiple Choice Marks: 10 x 1 = 10**		
1	In a set $\mathbb{R}$ of real no. * be defined as a*b = a + 2b then * is A. Commutative B. Associative C. Not a binary operation D. Not associative but binary operation.	Recognize	Remember
2	If the order of every non-identity element in a group is 'n' then A. 'n' is necessarily a prime no. B. 'n' can be any odd no. C. 'n' is an even no. D. 'n' can be any positive no.	Infer	Understand
3	Let S_n be the group of all permutations on the set {1, 2,..n} under the composition of mappings. For n>2, if H is the smallest subgroup of S_n containing the transposition (1,2) and the cycle (1,2,..n) then A. H = S_n B. H is abelian C. The index of H in S_n is 2 D. H is cyclic	Infer	Understand
4	Which of the following condition on a group G implies that G is abelian? A. The o(G) is p^3 for some prime p. B. Every proper subgroup of G is Cyclic. C. Every subgroup of G is normal in G. D. The function f: G→G defined by f(x) = x^{-1} for all x∈G, is Homeomorphism.	Indicate	Understand
5	Let G be a cyclic group of order 8, then its group of automorphism has order A. 2 B. 4 C. 6 D. 8	Find	Understand
6	Let G be the group such that a^2 = e for each a∈G where e is the identity element of G. then, A. G is cyclic B. G is finite C. G is abelian D. None of these	Infer	Understand
7	Which of the following cannot be the cardinality of the field? A. 25 B. 81 C. 15 D. 11	Find	Understand
8	The GCD of 2 and x in $\mathbb{Z}[x]$ is A. 2 B. x C. 1 D. x^2	Find	Understand
9	The ideal (x) in $\mathbb{Z}[x]$is A. prime B. maximal C. equal to $\mathbb{Z}[x]$ D. equal to (x^2)	Recognize	Remember
10	Which is one not UFD A. $\mathbb{Z}[x]$ B. $\mathbb{R}[x]$ C. $\mathbb{Z}_2[x]$ D. $\mathbb{Z}[\sqrt{-5}]$	Indicate	Understand

PART – B Short Answer **Marks: 4 x 5 = 20**			
11	a) Verify whether the following sets are closed under the given operation. (i) {0, 4, 8, 12} addition mod 16 (ii) {1, 4, 5, 7} multiplication mod 9 or b) In each case, find the inverse of the element under the given operation (i) 13 in Z_{20} (ii) $\begin{bmatrix} 6 & 3 \\ 8 & 2 \end{bmatrix}$ in GL (2, Z_{13})	Verify Find	Understand
12	(i) Find the number of subgroups of order 4 in D_{10}. (ii) Find the number of elements of order 3 in S_6. or (i) Determine the order of the elements in S_7. (ii) How many elements of order 5 are there in A_6?	Solve	Understand
13	a) State and prove Cayley's Theorem. or b) State and prove Lagrange Theorem.	Prove	Apply
14	a) Prove that $\mathbb{R}/\mathbb{Z}$ is isomorphic to the unit circle which is a subgroup of $\mathbb{C}$under complex multiplication. or b) Let Z be the centre of the group G. Prove that order G/Z cannot be a prime.	Prove	Apply
PART – C Essay Answer **Marks: 3 x 10 = 30**			
15	(a) Let R be a commutative ring with unity and let A be an ideal of R. then prove that R/A is an integral domain iff A is a prime ideal. or (b) Suppose that R is a commutative ring without zero-divisor. Show that all the non-zero elements of R have the same additive order.	Interpret	Analyze
16	(a) (i) Give an example of a finite non-commutative ring. (ii) Give an example of an infinite commutative ring without that that does not have unity. or (b) (i) Give an example of a commutative ring without zero-divisors that is not an integral domain. (ii) List all zero-divisors in Z_{20}. What is the relationship between the zero-divisors of Z_{20} and the units of Z_{20}?	Cite Examples	Understand
17	(a) Prove the fundamental theorem of homomorphism for ring. or (b) Prove polynomial ring over the field is an Euclidean domain.	Prove	Apply

SEMESTER - III					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10315	General Chemistry I	4	0	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO1	Phase Equilibria: Phase Rule for one and two-component systems	Understand
CO2	Colligative properties of solution	Apply
CO3	Order of reactions – zero, first, second and pseudo-first-order reactions	Analyze
CO4	Classification of electrolyte conductance concepts and application of conductance measurements	Skill
CO5	Hypothesise concept of stereoisomerism and its applications	Create

b. Syllabus

Units	Content	Hrs.
I	**Equilibria:** Chemical, Ionic and phase: chemical equilibrium; law of mass action; Kp, Kc and Kx; Le Chatelier's principle, solubility product; concepts of strong/weak acids and bases; pH scale; Henderson Hasselbach equations; Buffer solutions, Acid-base indicators; Phase Equilibria - Phase, Components, Degree of freedom, Phase rule, one component system and two-component system.	12
II	**Solution:** Ideal solutions and Raoults law; Henry's law; colligative properties, completely miscible and partially miscible binary liquids, Van't Hoff equation and Van't Hoff factor.	12
III	**Chemical Kinetics:** Rate of reaction and rate laws; molecularity and order of reactions – zero, first, second and pseudo first order reactions, Collision theory, ARRT, Arrhenius equation.	13
IV	**Electrochemistry:** Arrhenius theory of electrolytic dissociation, classification of electrolytes, conductance concept, Cell constant; Galvanic cells, Applications of conductance measurements.	13
V	**Stereochemistry:** Introduction, Concept of Isomerism, Classification of Stereoisomers, Optical isomerism, Chirality & elements of symmetry, Wedge formula, Fischer projection, Newman projection, relative and absolute configurations, sequence rules, D & L, R & S systems of Nomenclature, enantiomers, meso form, diastereoisomers, inversion, retention, and racemization. Geometrical Isomerism: About C=C, E-Z notation - determination of configuration. Conformational analysis: Ethane, 1,2 – dihalo and dihydroxy ethanes and butane.	14
	Tasks and Assignments: ✓ The ability to transfer their ideas effectively, both orally and in writing. ✓ Individual / Group Seminar presentation on selected topics ✓ Report on interdisciplinary application of selected topics/concepts	

	References: Silbey, R. J.; Albert, R. A.; Bawendi, M. G.; Physical Chemistry, Wiley, 4th edition, 2004. R. Chang, Chemistry, Tata-McGraw Hill, 1st Indian Edition, 2007. Atkins, P. W.; Paula, J.; Physical Chemistry, Oxford Publications, 8th edition, 2009. Nasipuri, D., *Stereochemistry* of Organic Compounds: Principles and Applications,4th edition, New Academic Science Publisher. 2012. Ernest L Eliel, Samuel H. Wilen, Stereochemistry of organic compounds, Wiley India edition, 2008.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	2	2	3	3	3
CO2	3	3	3	2	3	3
CO3	3	3	3	2	2	3
CO4	3	2	3	3	3	2
CO5	3	3	3	2	2	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

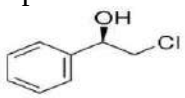
e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A **(Objective - 10 x 1 = 10 marks)**	2	2	2	2	2
Part – B **(Short Answer - 4 x 5 = 20 marks)**	10	10	-	-	-
Part – C **(Essay- 3 x 10 = 30 marks)**	-	-	10	10	10
Total	**12**	**12**	**12**	**12**	**12**

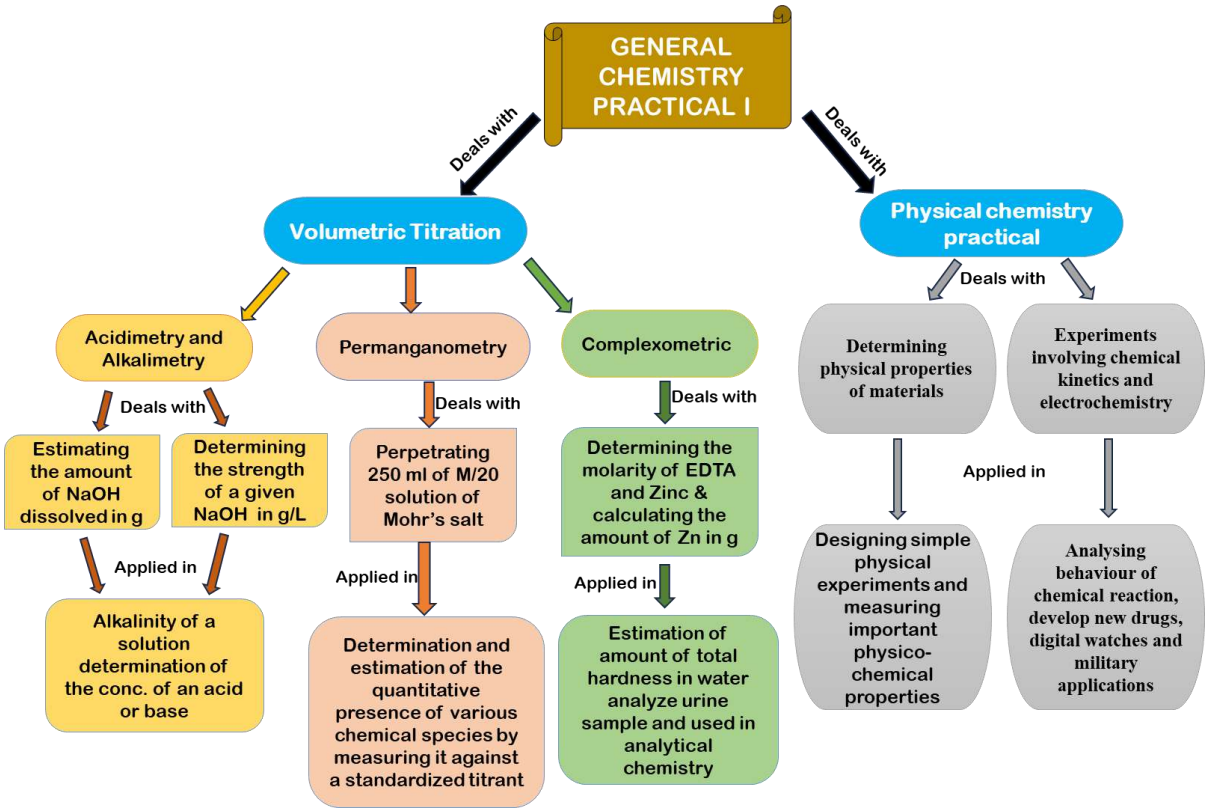
g. Model Question Paper

Sl. No.	Model Questions	Specification	Level
	Part – A: Objective Type **Multiple choice 10 x 1 = 10**		
1	If a system is at equilibrium, the rate of forward to the reverse reaction is – (a) Less (b) Equal (c) High (d) At equilibrium	Recognize	Remember
2	By adding a strong acid to the buffer solution, the pH of the buffer solution (a) Remains constant (b) Increases (c) Decreases (d) Becomes zero	Recognize	Remember
3	Which of the following is not a colligative property – (a) Osmotic pressure (b) Elevation in boiling point (c) Vapour pressure (d) Depression in freezing point	Recall	Remember
4	If α is the degree of dissociation of Na2SO4 the Van't Hoff factor (i) used for calculating the molar mass is (a) 1+ α (b) 1- α (c) 1+2α (d) 1 - 2α	Identify	Remember
5	The rate constant of a reaction depends upon (a) Extent of reaction (b) Time of reaction (c) Temp. of the system (d) Concen. of the system	Recall	Remember
6	A first-order reaction which is 30% complete in 30 minutes has a half-life period of (a) 24.2 min (b) 58.2 min (c) 102.2 min (d) 120.2 min	Identify	Remember
7	A saturated solution of KNO3 is used to make a 'salt bridge' because (a) Velocity of K^+ is greater than that of $NO3^-$ (b) Velocity of $NO3^-$ is greater than that of K^+ (c) Velocities of both K^+ and $NO3^-$ are nearly the same (d) KNO3 is highly soluble in water	Identify	Remember
8	If a strip of Cu metal is placed in a solution of ferrous sulphate (a) Copper will precipitate out (b) Iron will precipitate out (c) Copper will dissolve, (d) No reaction will take place	Identify	Remember
9	For 'n' number of the chiral carbon, the number of possible stereoisomers are A. 2^n B. n^2 C. n^n D. 2^2	Recall	Remember
10	Name the following compound  A. R 1-Chloro 2-Phenyl Ethanol B. R 2-Chloro 1-Phenyl Ethanol C. S 2-Chloro 1-Phenyl Ethanol D. S 1-Chloro 2-Phenyl Ethanol	Identify	Remember

PART – B Short Answer **The answer should not exceed 200 words 4 x 5 = 20**			
11	a) Explain Le Chatelier's principle with an example. (Or) b) What is the Henderson-Hasselbach equations and Phase rule?	Explain	Understand
12	a) Explain the phase rule for one component system. (Or) b) Derive Kp, Kc relationship for HI formation reaction?	Assess	Skill
13	a) What are the Raoults law, Henry's law? (Or) b) What are the Van't Hoff equation, Van't Hoff factor and entropy?	Define	Understand
14	a) what is vapour pressure lowering? (Or) b) What is boiling point elevation?	Explain	Understand
PART – C Essay Answer **The answer should not exceed 400 words 3 x 10 = 30**			
15	a) Derive the equation for the first-order reaction and state the case. (Or) b) Write the Arrhenius equation. Derive an expression for temperature variations.	Explain Discuss	Understand
16	a) Write a short note on the Galvanic cell and its application. (Or) b) Explain the Arrhenius theory of electrolytic dissociation	Explain Discuss	Understand
17	a) Discuss the conformational isomers of 1, 2 dihydroxy ethane (Or) b) Draw the Fischer and Newman Projection formula of Ethane	Assess	Skill

SEMESTER – III					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10316	General Chemistry Practical I	0	0	2	2
Internal	60	External	40	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Describe volumetric analysis	Understand
CO 2	Use the correct titrimetric procedure when carrying out titrations	Apply
CO 3	Perform the complexometric titration	Analyze
CO 4	Estimation of the amount of total hardness in water through complexometric titration	Create
CO 5	Apply knowledge of the rate of reaction in a chemical reaction and electrolyte conductance concepts for making energy storage devices.	Skill

b. Syllabus

Units	Content	Hrs.
I	**Acidimetry and Alkalimetry** 1. Estimation of NaOH using standard Na_2CO_3 solution and link HCl solution 2. Estimation of HCl using standard H_2SO_4 solution and link NaOH Solution	64
II	**Permanganometry** 1. Estimation of FAS (Mohr's salt) using standard FeSO4 solution and link $KMnO_4$ solution	
III	**Complexometric** 1. Estimation of Zinc by using standard Zinc sulphate solution and link EDTA solution	
IV	**Physical chemistry** 1. Determination of physical properties of materials.	
V	1. Experiments involving chemical kinetics and electrochemistry	
	Reference books Jeffery, G. H., Bassett, J., Mendham, J., Denney, and R. C., Vogel's quantitative chemical analysis, 5th edition, Longman Scientific and Technical, 1989. Svehla, G: Vogel's qualitative inorganic analysis, 7th Edition, Prentice Hall, 1996. Mendham, J., Denney, J. C., Barnes, J. D., and Thomas, M. J. K.: Vogel's Prescribed book of qualitative chemical analysis, 6th Edition, Prentice Hall, 2000. Morris Hein, Judith N. Peisen and Robert L. Miner, Foundations of College Chemistry in the Laboratory, John Wiley and Sons, 2011. Halpern, A. M., and McBane, G. C. Experimental Physical Chemistry: A Laboratory Prescribed Book, W. H. Freeman, 3rd edition, 2006. Hein, M.; Peisen, J. N., and Miner, R. L. Foundations of College Chemistry in the Laboratory, John Wiley & Sons Inc., 2011. Dave, R. K. Experiments in Physical Chemistry, Campus Books International, 2011.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	2	3	3	2	2
CO2	3	3	3	2	3	2
CO3	3	2	3	2	3	3
CO4	3	3	3	2	2	3
CO5	3	2	3	2	2	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	12	12	12	12	12	60
External	8	8	8	8	8	40
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (60 Marks)

	CO1	CO2	CO3	CO4	CO5
Punctuality and safety measures taken	2	2	2	2	2
Knowledge about the experiment	3	3	3	3	3
Handling of apparatus and recording of observation	2	2	2	2	2
Maintenance of record book	4	4	4	4	4
Attendance	1	1	1	1	1
Total	12	12	12	12	12

f. Mapping Course Outcome with External Assessment (40 Marks)

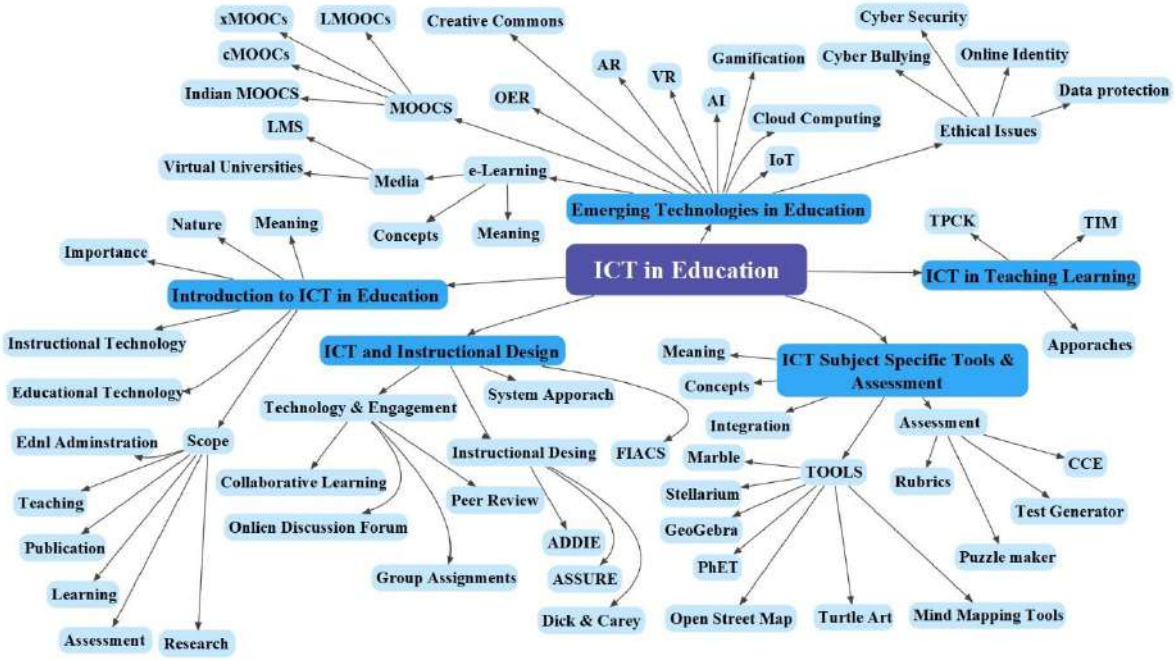
Category	CO1	CO2	CO3	CO4	CO5
Part – A	8	8	8	8	8
Total	**8**	**8**	**8**	**8**	**8**

g. Model Question Paper

Sl. No.	Model Questions	Specification	Level
	Part – A: Descriptive Type 1 x 40 = 40		
1	Estimate the Zinc from the given solution by using EDTA complexometric method	Recognize	Remember

Semester III					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDUVA02	ICT in Education	0	0	2	2
Internal	100	External	0	Total	100

Course Content Overview



a. Course Outcomes (Cos)

S No.	Course Outcome	Level
CO1	Understanding Educational Technology and ICT	Understand
CO2	Understand ICT and Instructional Design	Analyse
CO3	Understand emerging technologies in Education	Understand
CO4	Analyse ICT in Teaching Learning	Analyse
CO5	Work on Subject specific ICT tools and for Assessment	Understand

b. Syllabus

Units	Content	Hours
I	**Introduction to ICT in Education** Meaning, Nature, importance of Information Technology, Communication Technology & Information and Communication Technology (ICT) and Instructional Technology- Educational Technology and ICT in Education (Difference, Scope of ICT- Teaching, learning, Research & Publication Educational Administration and Assessment)-	12
II	**ICT and Instructional Design** Technology & Engagement: Internet, Collaborative learning through Online Discussion Forums, group assignments & Peer reviews- Meaning and Uses of Systems Approach in instructional design,-Models of Development of Instructional Design (ADDIE, ASSURE, Dick and Carey Model Mason's)- Flanders' Interaction Analysis Category System (FIACS)- Challenges relating to Educational Technology.	13
III	**Emerging Technologies in Education** E-learning Concept, methods, and media (LMS, Virtual Universities, Massive Open Online Course (MOOCs), Indian MOOCs, Types of MOOCs: cMOOCs, xMOOCs & LMOOCs)- Open Education Resources (Creative Commons, Concept, and application)- Augmented reality, Virtual reality, Artificial intelligence, Mixed Reality & Gamification in education (Meaning, history, importance, tools and uses)- Cloud Computing & Internet of Things - Meaning, importance and uses- Ethical issues & safety in ICT- (Teaching, Learning and Research, Cyberbullying, Cyber security literacy & data protection, Online identity and privacy).	13
IV	**ICT in Teaching-Learning** Concept, Approaches to integrating ICT in teaching and learning: Technological Pedagogical Content Knowledge (TPCK), Technology Integration Matrix (TIM).- Implication of Learning Theories in ICT in Education: Behaviourism, Cognitivism & Constructivism-	12

V	**ICT-Subject-Specific Tools and Assessment** Developing functional skills to use discipline-specific ICT tools (Geogebra, PhET, Stellarium, Open Street Map, Marble, Turtle Art, Technological tools for Mind mapping etc.)- ICT and Assessment- Electronic assessment portfolio – Concept and types; e-portfolio tools- Online and offline assessment tools – Rubrics, survey tools, puzzle makers, test generators, reflective journal, question bank- ICT applications for Continuous and Comprehensive Evaluation (CCE).	14
References		
	Bharihoke Deepak. (2000). Fundamentals of Information Technology, Pentagon Press: New Delhi Conrad, Keri (2001). Instructional Design for Web based Training. HRD Press Crumlish Christian (1999). The Internet No Experience Required. BPB Publications: New Delhi Evant, M: The International Encyclopedia of Educational Technology. Jain Amit; Sharma Samart; & Banerji Saurab (2002). Microsoft Word for Beginners. NISCOM, CSIR: New Delhi. 7.2 A short history of educational technology – Teaching in a Digital Age – Second Edition (bccampus.ca) Education - Open Educational Resources (OER) - Library Guides at Iowa State University (libguides.com) Learning Theories: Understanding How People Learn – Instruction in Libraries and Information Centers (illinois.edu) Introduction – Everyday Instructional Design (pressbooks.pub) Models of Design – Instructional Designer's Handbook (unizin.org)	

c. Mapping of Programme Outcome with Course Outcomes

	CO1	CO2	CO3	CO4	CO5
PO1	3	3	3	3	3
PO2	3	3	3	3	3
PO3	2	3	2	3	3
PO4	2	3	3	3	3
PO5	3	2	3	3	3
PO6	3	3	2	3	3

d. Evaluation Scheme

Components	CO1	CO2	CO3	CO4	CO5	Total
Internal	15	20	20	15	30	100
Total	15	20	20	15	30	100

e. Mapping Course Outcomes with Internal Assessment

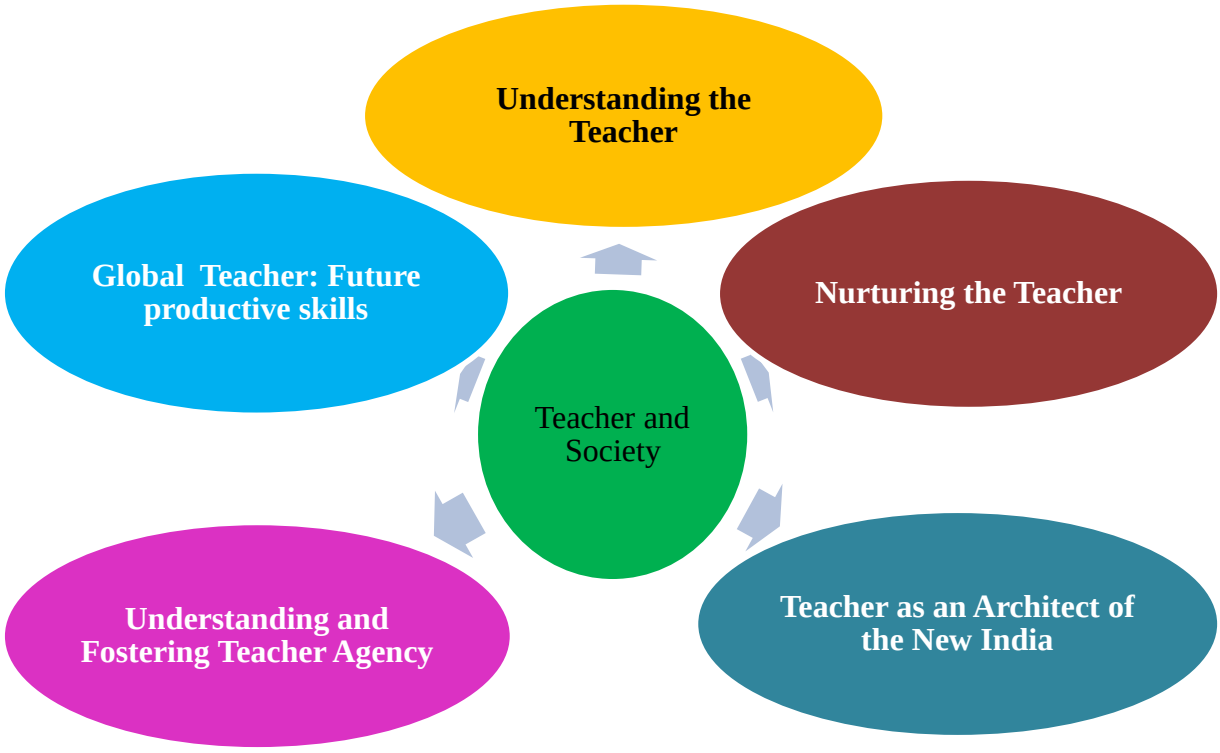
Components	CO1	CO2	CO3	CO4	CO5	Total
Assignments	5		10	5	10	30
Seminar		10			10	20
Test	10	10	10	10	10	50
Total	15	20	20	15	30	100

f. Activities/ Internal Assessment Tasks

Sl. No	Tasks	CO
1	Prepare a report on the trends and developments in Educational Technology	CO1
2	Prepare an instructional design script following any of the instructional design models.	CO2
3	Explore any one online platform for MOOCs and prepare a report highlighting its structure and courses.	CO3
4	Prepare an assessment tool on any one chapter of the textbook.	CO4
5	Identify a virtual field trip in your area of specialisation and organise a virtual field trip	CO5
6	Developing multimedia e-content for a topic using eXe Learning	CO5
7	Developing an educational blog on www.blogger.com, www.wordpress.com, or www.edublog.com	CO5

SEMESTER - III					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDUVA03	Teacher and Society	2	0	0	2
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO1	Understand the relationship between teacher beliefs, values, character, life history, social and cultural context and teaching critically,	Understand
CO2	Differentiate between curriculum role in shaping self, school and society.	Apply
CO3	Differentiate between the narrow curricular aims of education and the broader educational aims and their role in shaping self, school, and society.	Analyze
CO4	Demonstrate an ability to critically practice, ethical positive classrooms so as to improve learning and teaching.	Create
CO5	Conceptualize teacher agency, its individual, contextual, and structural dimensions and how it gets impacted and in turn shapes education.	Skill

b. Syllabus

Units	Content	Hrs.
I	**Understanding the Teacher** Exploring the wider Personal and General Social Context of Teacher: Life History, Teacher Beliefs, Values and Aspirations, Diverse Identities, Social Contexts and Commitment to Learning and Education. Exploring the Professional Teacher: Qualifications, Education in teaching, Attitude, Aptitude, Experience and Exposure- The Charismatic Teacher, the Communicator Teacher, The Missionary Teacher, The Competent Practitioner, The Reflective Practitioner, The Learning Teacher-Reflexive Practice: Nurturing the Professional Capital through collaborative and/or collective engagement with self, others, the social context. -Teachers' Role in Course Planning and Syllabus Design.	6
II	**Nurturing the Teacher** Teaching: One profession, many roles.- Teaching Character: Nurturing Teachers for Human Flourishing - Holistic Teacher Development: Nurturing the Panchakoshas - Teacher Values, Beliefs, and current Philosophy of Teaching: A Reflective Dialogue - Developing an Ethic of Care in Teacher Education: Nurturing Teachers towards pedagogy of care.	6

III	**Understanding and Fostering Teacher Agency** Teacher Agency: concept, need importance of Teacher Agency. - Individual, Cultural and Structural Dimensions of Teacher Agency.- Teacher discourses, Philosophy, Relationships, Networks and Professional Development: Shaping teacher agency and Creative insubordination. - Challenges and Issues in fostering Teacher Agency: Performativity, Non-academic engagements, Systemic apathy, Policy and Practice gaps and others. - Role of Teacher in shaping the educational policy, practice, and reforms- Teachers as agents of social change.	6
IV	**Teacher as an Architect of the New India** Engaging in Critical Education: Dialogues on power relations associated with Gender, Ethnicity, Culture, Disability, Class, Poverty, the reproduction of disadvantage and realizing the true human potential. Being a Critical Teacher: Raising debates around rapid technological advancement and impact on individual, family and social life; the growing isolation and impact on mental and social health and well-being, changing relationships between the 'state' and the 'market' and their impact on formal education;	7
V	**Global Teacher: Future productive skills** Global Teacher : conceptualization of teacher, skills ,Teaching and teacher roles, responsibility of Teacher as , 'globalization minds set' and the reconstructed nationalism shaping the socio-political milieu and impact on social psyche, growing materialistic urge, sensory drives and the gradual deterioration of the individual and societal character.	7
	Tasks and Assignments: ✓ Take up a case study of any one teacher education Institution. ✓ Write a biography of any one of your favorite teachers/ Educationists ✓ Report of Challenges and Issues in fostering Teacher Agencies. ✓ Report on teaching and teacher roles, 'globalization' and the reconstructed nationalism shaping the socio-political milieu. **References:** Anand, C L and et al (1993) Teacher and Education in the Emerging Indian Society, NCERT, NewDelhi. Aggarwal (2002) - Landmarks in the history of Modern Indian Education, Vikas Publishing HousePvt. Ltd., New Delhi. - Chanchal Kumar& et.all(2018)Historical & Sociological Foundation of Education, Ttwenty First Century publications (Bookman); First Edition Gore M.S. (1994). Indian Education – Structure and Process. Macmillan: Delhi. New Delhi: Loughlin, M. (1995) Daring the	

	imagination, unlocking voices of dissent and possibility in teaching. Theory into Practice 24(2)170-116, EJ 512860. RawatPub Martin, R.J. (1994) Multicultural Social reconstructionist education : Design for diversity in teacher education. Teacher Education Quarterly 21(3)77-89, EJ 492(4).	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	2
CO4	3	3	3	3	3	3
CO5	3	3	3	3	2	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	-	-	-2	2
Seminar	-	2	2	-	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 5 x 4 = 20 marks)	-	10	-	10	10
Part – C (Essay- 3 x 10 = 30 marks)	10	-	10	-	-
Total	**12**	**12**	**12**	**12**	**12**

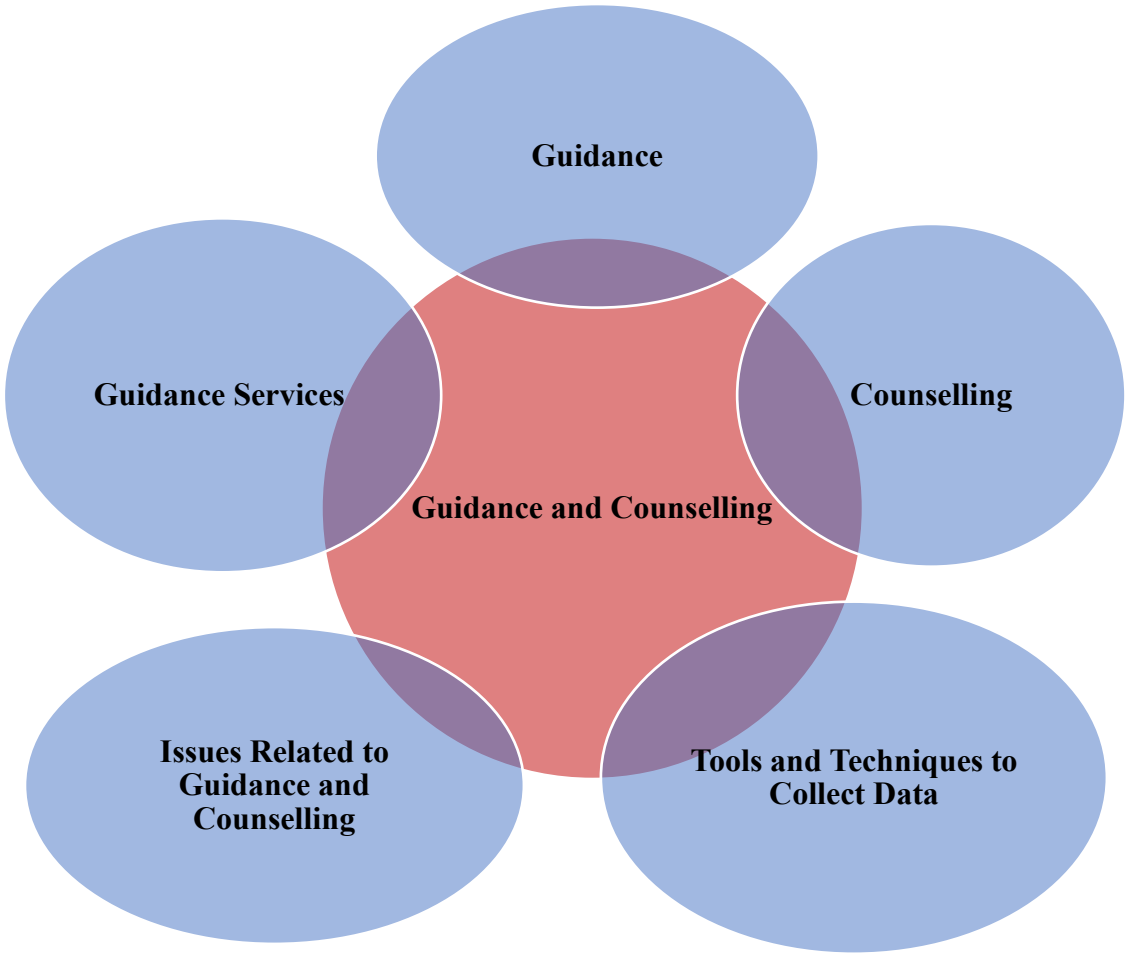
g. Model Question Paper

Sl. No.	Model Questions	Specification	Level
	Part – A: Objective Type **Multiple choice 10 x 1 = 10**		
1	Teacher effectiveness is the major area of A). pedagogy B). sociology C). technology D). philosophy	Recognize	Remember
2	A Teacher, in order to be successful, should A). provide subject knowledge to students B). help students in achieving their goals C). concentrate on syllabus completion D). prepare students to score high marks	Recall	Remember
3	The main function of teacher as a planner includes A). assessment B). evaluation C). setting learning objective D). encouraging independent study habits	Recognize	Remember
4	Teachers can play a quite significant role in bringing desirable social changes by possessing A). tolerance and patience B). studious and scholarly nature C). good physical and mental health D). cordial relationship with parents and guardians of the students	Recognize	Remember
5	The quality of a great teacher, according to students, is A). failure to honor commitments B) deliberate deception C). violation of conscience D). knowledge of learners	Recognize	Remember
6	Man is a Social Animal" said by A). Aristotle B) Comte C). Plato D). Socrates	Recall	Remember
7	Wright Mills was a ……..sociologist. A). British B). American C). Russian D). French	Recognize	Remember
8	Who wrote the famous book 'Folkways'? A). Merton B). MacIver C). Sumner D). Albert	Recognize	Remember
9	theory analyzes the concepts like personal troubles of milieu and public issues of social structure? A). Sociological Imagination B). Chicago School C). Synthetic School D). Formalistic School	Recall	Remember
10	'Mind, Self and Society' this the book written by A). Homans B). Giddens C). George Herbert Mead D). Gramsci	Recall	Remember
	PART – B Short Answer **The answer should not exceed 200 words 5 x 4 = 20**		
11	a) Explain the diversity of schools in India? or b) Explain the structure of schools and governance in India?	Explain	Understand
12	a) Describes the Teacher accountability in schools? or b) Explain the Relationship between school leadership and school diversity issues?	Describe Define	Understand

13	a) Explaining the Developing inspiring school ethos. ? or b) Schools as learning organization discuss?	Illustrate	Apply
14	a) Explain the challenges, school culture? or b) Role of teachers, staff, parents, in engaging school activities?	Differentiate Define	Understand
15	a) What are the functions of Teacher in schools? or b) Explain the challenges, school culture?\	Describe	Analyze
PART – C Essay Answer The answer should not exceed 400 words 3 x 10 = 30			
16	Explain the reforms and practices in inclusive schools. ?	Explain Discuss	Understand
17	Explain the vision and functions of team learning?	Explain Discuss	Understand
18	Schools as “learning organization” discuss?	Assess	Skill
19	Explain the professional ethics of Teachers?	Explain Discuss	Understand
20	Describe the role of SMC, and community school development plan.	Assess	Skill

SEMESTER III					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDUEC01	Guidance and Counselling	3	0	0	3
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Explain the basic meaning, need and significance of Guidance and Counselling in the context of education	Understand
CO 2	Differentiate between Guidance and Counselling with special reference to the purpose and strategies,	Analyze
CO 3	Illustrate the techniques of collecting information for guidance and Counselling	Apply
CO 4	Describe the basic features of Guidance and Counselling with reference to students needs at school level	Create
CO 5	Draw framework for inclusive classroom	Skill

b. Syllabus

Units	Content	Hrs.
I	**Guidance** Meaning, need, nature and scope of Guidance, Brief historical background of Guidance movement in India, Individual and Group Guidance, Basic assumptions and principles of Guidance, Need to understand the needs of the individual and group in the context of Guidance, Essential information for Effective Guidance, Vocational Guidance and Role of teachers.	13
II	**Counselling** Meaning, importance, areas, and types of Counselling, Approaches to Counselling: directive, non-directive and eclectic, behaviourally, and cognitively oriented, Process of Counselling: initiating counselling, preparation, and intake procedures, establishing rapport, termination of and response to initial interview, Establishing Structure: attending behaviour, observation, non-verbal behaviour, listening, verbal patterning and communication responses, silence, use of questions. transference and countertransference. regarding and respect in counselling relationships. involuntary clients, client expectation, Role of family and community.	13
III	**Tools and Techniques to Collect Data** Psychological Testing and Diagnosis: Need and Nature, Test use and interpretation, appraisal techniques, Counselling Interview: Essential aspects, basis procedures, problems, and their handling, Personality Assessment: Historical perspective, Material administration, scoring, interpretation, and evaluation of frequently used personality inventories/ questionnaire and projective tests. Personal Orientation Tests and Rating Scales: Type a behaviour, Locus of Control, Attitude scale, ST AI etc., and other clinical rating scales, Case Study: Need and Importance.	13

IV	**Issues Related to Guidance and Counselling** Factors affecting Guidance and Counselling, Ethical issues in Guidance and Counseling, Limitation of diagnosis with special reference to Counselling, Challenges to organize Guidance and Counselling programmes in schools, Counselling and Guidance of persons with learning disabilities, visual and hearing impairment, Challenges related to counselling services in schools.	12
V	**Guidance Services** Organization of guidance services, types of organization: Centralized form, Decentralized form, mixed form - Functions of school guidance services - Individual information service – Types of data about the individual/student sources of information - Occupational information service –Sources of information, Methods of classifying and disseminating occupational information - Placement service - Educational and vocational placement - Remedial services and follow up service- Evaluation of guidance program - Career talks - Career guidance bureau and career corners	13
	Practicum: ✓ Prepare a case study on students with learning difficulties. ✓ Prepare a report on challenges of organizing guidance and counselling programmes in school ✓ Preparation of a comprehensive guidance program based on survey. **References:** Anastasi A, (1982), Differential Psychology, Macmillan Co, New York. Crow & Crow, (1992), An introduction to Guidance, Eurasia Publishing House, ND. Freeman E.S, (1995), Theory and Practice of Psychological Testing, ND: Henry Holt. Jones. A.J. (1970), Principles of Guidance, Mc Grew Hills Publishers, NewDelhi. Kochar, S.K. (1990), Educational and Vocational Guidance in Secondary Schools, Sterling Publishers, Pvt. Ltd, New Delhi. Super D.R, 1960), The psychology of Careers, Harrer, New York. Rao, S Narayana, (2008), Counselling and Guidance, Tata McGrew Publishing Company Ltd, New Delhi.	

c. Activities/ Internal assessment:

Sl.No	Activity/Assignment	CO
1	Discussion on teacher as guidance practioner.	CO4
2	Analysis of tools and technique for guidance and counselling.	CO3
3	Preparing Report writing on Historical development of guidance and counseling movement in India	CO1
4	Preparation of a vocational/educational counseling program	CO5
5	Prepare a Poster regarding educational & occupational information	CO3

d. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	0	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	2	3	3	3

e. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

f. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

g. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 4 x 5 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	**12**	**12**	**12**	**12**	**12**

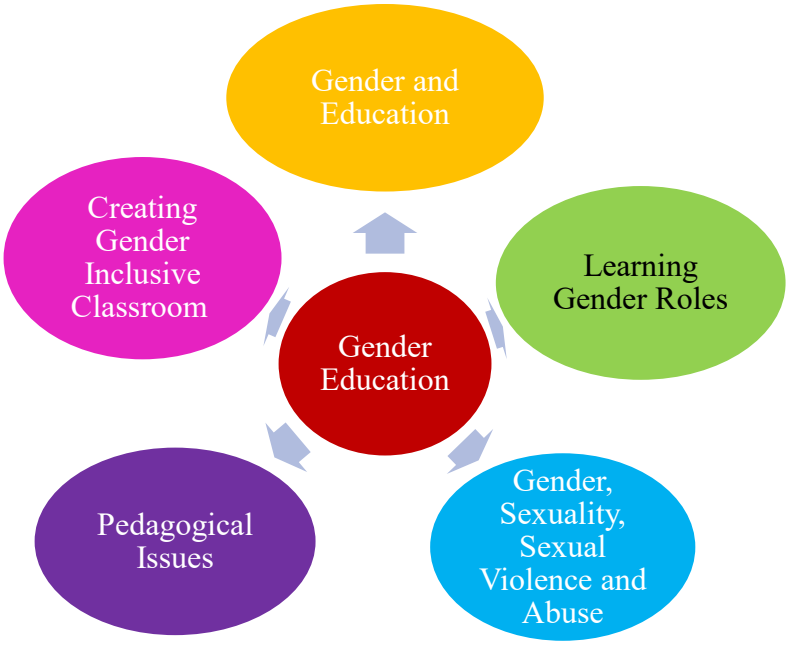
h. Model Question Paper

Sl. No.	Model Questions	Specification	Level
	Part – A: Objective Type **Multiple choice 10 x 1 = 10**		
1	Sex is _____ **A.** Social B. Biological C. Both social and Biological D. Neither social nor biological	Identify	Understand
2	Domestic Violence Act was implemented in India in which year? A. 2000. B. 1990 C. 1995 D. 2005	Identify	Understand
3	_____ is a social construct A. Sex B. Gender C. Transgender D. None of the above	Identify	Apply
4	The meaning of patriarchy is ____ A. Traditional governance system B. Mother and Father's rules over the family C. Father's rules over the family D. None of the above	Discover	Apply
5	'Sex' and 'Gender' can be defined on the asis of the following factors: A. Environmental Factors B. Biological Factors C. Sociological Factors D. Generic factors	Identify	Apply
6	The types of gender discrimination are: (A) Gender Discrimination (B) Caste Discrimination (C) Racial Discrimination (D) All of the above	Discover	Apply
7	Prenatal Diagnostic Testing was banned in the year: (A) 1956 (B) 1958 (C) 1994 (D) 1995	Discover	Apply
8	Section 326-A is a related with: (A) Pre-Diagostic Natal Test (B) Attempted to acid attack , (C) Acid attack (D) Cyber crime	Identify	Remember
9	Section 326-A is a related with:	Identify	Remember

	(A) Pre-Diagostic Natal Test (B) Attempted to acid attack (C) Acid attack (D) Cyber crime		
10	Sexuality is affected by: (A) the interaction of psychological factors (B) the interaction of social factors (C) Both (A) and (B) (D) None of the above	Recognize	Remember
PART – B - 4 x 5 = 20			
11	Distinguish between Sex and Gender.	Distinguish	Apply
12	What is Gender stereotypes? Explain any two	Explain	Understand
13	Explain how we can bring gender equality in the classroom	Explain	Understand
14	Explain patriarchy, Matriarchy, and Feminism	Explain	Understand
PART – C - 3 x 10 = 30			
15	Prepare a note on the ideas to eradicate Gender stereotypes from the society	Explain	Understand
16	Prepare a note on Gender inequalities and social practices in India	Evaluate	Skill
17	A. Distinguish between Gender identity and Gender roles B. Write a short note on any Gender stereotypes they've been experienced	Explain Connect	Analyze

SEMESTER III					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDUEC02	Gender Education	3	0	0	3
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Clarify key concepts like gender, transgender, gender bias, gender stereotype, empowerment, gender parity, equity and equality	Understand
CO 2	Explain the shifting from women studies to gender studies	Apply
CO 3	Address issues related to sexuality, sexual violence, and abuse	Analyze
CO 4	Examine school environment, curriculum, and pedagogy with reference to gender related issues	Create
CO 5	Draw framework for inclusive classroom	Skill

b. Syllabus

Units	Content	Hrs.
I	**Gender and Education** Meaning, relationship, and significance of studying, Conceptual clarity of related terms: Gender, gender perspective, sexuality, patriarchy, masculinity, feminist, gender bias, transgender, gender stereotyping and empowerment, Gender as the basis in school education, Constitutional Provisions with special reference to equity and equality, rights of girls, Education and women's empowerment, Shifting from women's studies to Gender Studies	13
II	**Learning Gender Roles** Social and Cultural Perspectives of Gender Identity: role of family and school, media, and other formal and informal organizations/agencies, Socialization and learning gender roles, Gender stereotyping/Role models, Preventing Measures: role of school and home	13
III	**Gender, Sexuality, Sexual Violence and Abuse** Development of sexuality and its impact on children with reference to gender, body image, role-models, Sexual violence in formal and informal institutions, Child sexual abuse from pre-primary stage to secondary stage: providing accurate information on child sexual abuse, helping, and identifying signs of sexual abuse in children, Providing dos and don'ts about sexual abuse, Legal perspective: Laws for safety and Security of girls and women, Implementation of the POCSO Act	13
IV	**Pedagogical Issues** Analysing classroom practices, Creating gender friendly classrooms and school environment, Analysing Curriculum from gender perspective: learning outcomes, textual material, teaching-learning processes, language used, teaching aids, assessment strategies, ICT pedagogy for gender sensitive school curriculum, Challenges for pedagogical issues.	12
V	**Creating Gender Inclusive Classroom** Gender Analysis and Gender Audit- Developing positive self-concept and self-esteem among girls- Teaching Learning Materials and Classroom Transaction- Teacher as an agent of change- Educational Policies on Empowerment of Women.	13
	Practicum: 1. Preparing a Report on National Educational Policies, (1986/1992 and2020) in the context of gender issues in Education. 2. Preparation of projects on: • Recommendations of commissions and policies on education to empower girls/women.	

- Folklores reflecting socialization process.
- How students perceive sexuality and their own body

3. Field visits to schools to observe the schooling processes from a gender perspective.
4. Preparing Analytical Report on portrayal of men and women in print and electronic media.

References:

Agnes, Flavia (2004) Women and Law in India, Oxford University Press.

Basu, D.D (2013, (21st edition) Introduction to the Constitution of India, LexisNexis.

Desai, Neera, and Thakkar, Usha. (2001). *Women in Indian Society*. National Book Trust, New Delhi.

Dunne, M. et al. (2003). *Gender and Violence in Schools*. UNESCO.

Focus Group on *Gender Issues in Education*, New Delhi.

Forbes, Geraldine (1996). 'Education for Women', Women in Modern India. (pp. 32-63). Cambridge University Press.

http://www.prsindia.org/uploads/media/Justice%20verma%20committee/js%20verma%20committe%20report.pdf access on 3rd March, 2016.

Mazumdar Vina (edit) (2012), Education, Equality and Development, CWDS, Person, Delhi.

Nambissan, Geetha B. 2005. "Integrating Gender Concerns." Changing English: Studies in Culture and Education, vol 12. Issue 2. pp 191 - 199.

National Curriculum Framework (2005) 3.2, Position Paper, National Focus Group on Gender Issues in Education

c. Activities/ Internal assessment:

Sl.No	Activity/Assignment	CO
1	Discussion on Women Role Models in various fields with emphasis on women in unconventional roles.	CO2
2	Analysis of textual materials from the gender perspective for identifying gender bias and gender stereotype in textual materials.	CO3
3	Report writing on Mahila Samakhya Programme.	CO2
4	Watching Video clipping on portrayal of women.	CO5
5	Prepare a Poster promoting Gender Equality and Empowerment .	CO1
6	Prepare a report on Policies and Schemes on Girls Education and Women's Empowerment.	CO5

d. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	0	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	2	3	3	3

e. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

f. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

g. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 4 x 5 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	**12**	**12**	**12**	**12**	**12**

h. Model Question Paper

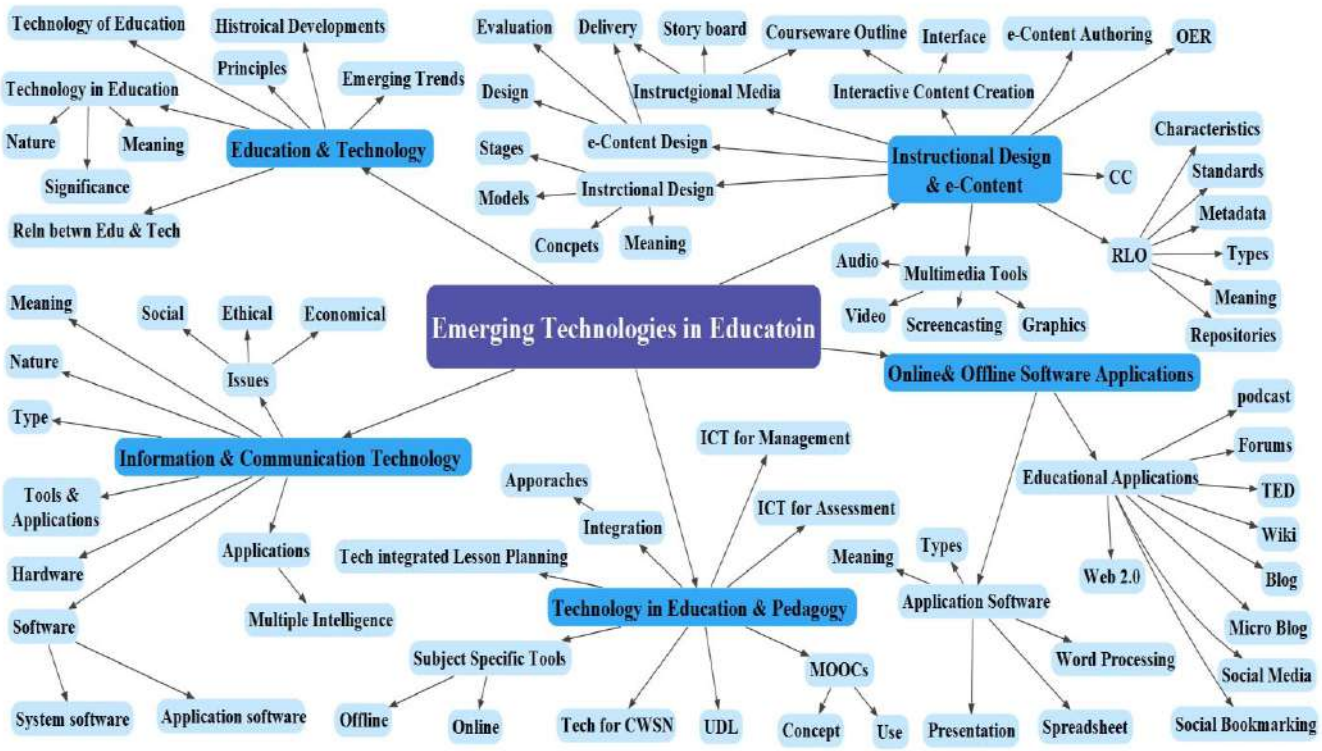
Sl. No.	Model Questions	Specification	Level
	Part – A: Objective Type **Multiple choice 10 x 1 = 10**		
1	Sex is _____ **A.** Social B. Biological C. Both social and Biological D. Neither social nor biological	Identify	Understand
2	Domestic Violence Act was implemented in India in which year? A. 2000. B. 1990 C. 1995 D. 2005	Identify	Understand

3	_____ is a social construct A. Sex B. Gender C. Transgender D. None of the above	Identify	Apply
4	The meaning of patriarchy is ____ Traditional governance system Mother and Father's rules over the family Father's rules over the family None of the above	Discover	Apply
5	'Sex' and 'Gender' can be defined on the asis of the following factors: A. Environmental Factors B. Biological Factors C. Sociological Factors D. Generic factors	Identify	Apply
6	The types of gender discrimination are: (A) Gender Discrimination (B) Caste Discrimination (C) Racial Discrimination (D) All of the above	Discover	Apply
7	Prenatal Diagnostic Testing was banned in the year: (A) 1956 (B) 1958 (C) 1994 (D) 1995	Discover	Apply
8	Section 326-A is a related with: (A) Pre-Diagostic Natal Test (B) Attempted to acid attack (C) Acid attack (D) Cyber crime	Identify	Remember
9	Section 326-A is a related with: (A) Pre-Diagostic Natal Test (B) Attempted to acid attack (C) Acid attack (D) Cyber crime	Identify	Remember
10	Sexuality is affected by: (A) the interaction of psychological factors (B) the interaction of social factors (C) Both (A) and (B) (D) None of the above	Recognize	Remember
	PART – B - 4 x 5 = 20		
11	Distinguish between Sex and Gender.	Distinguish	Apply
12	What is Gender stereotypes? Explain any two	Explain	Understand
13	Explain how we can bring gender equality in the classroom	Explain	Understand
14	Explain patriarchy, Matriarchy, and Feminism	Explain	Understand
PART – C - 3 x 10 = 30			

15	Prepare a note on the ideas to eradicate Gender stereotypes from the society	Explain	Understand
16	Prepare a note on Gender inequalities and social practices in India	Evaluate	Skill
17	A. Distinguish between Gender identity and Gender roles B. Write a short note on any Gender stereotypes they've been experienced	Explain Connect	Analyze

Semester III					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDUEC03	Emerging Technologies in Education	3	0	0	3
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcomes (Cos)

S No	Course Outcome	Level
CO1	Understand the meaning, nature, significance and development of Educational Technology.	Understand
CO2	Understand the meaning, nature, scope and types of ICT	Understand
CO3	Analyse technology in education and pedagogy	Analyse
CO4	Understand online and offline software applications	Understand
CO5	Understand instructional design and e-content development	Understand

b. Syllabus

Units	Content	Hours
Unit 1	**Education and Technology** Relationship between Education and Technology- Conceptual Clarity of Technology of Education and Technology in Education- Meaning, Nature, and Significance of Technology in Education- Historical Development of Technology in Education- Principles of Using Technology in Education- Emerging Trends in Technology in Education.	9
Unit 2	**Information and Communication Technology** Meaning, nature, and types- Fundamentals of Information and Communication Technology- ICT Tools and application- Hardware and Software: meaning, difference and types- System software and Application software- ICT application and multiple intelligence- Social, Economic, and Ethical issues associated with the use of ICT.	9
Unit 3	**Technology in Education and Pedagogy** Approaches of integration of Technology in teaching and learning- Subject-specific ICT tools for creating and facilitating learning- Subject-specific online resources and their uses in lesson Planning- Technology-integrated learning experiences and creating learning Environment- Use of Technology for children with special needs: Tools and processes; Universal Design for Learning - Massive Open Online Courses (MOOC)- Concept and use- ICT for Assessment and Management.	10
Unit 4	**Online and Offline Software Applications** Application software- meaning and types- Word processing, spreadsheet, presentation: Features and educational applications - Drawing tools – diagrams, concept maps, timelines, flow charts. Educational applications of these tools- Web 2.0 technology and tools: meaning characteristics and types- Social networking and social bookmarking: Educational Applications- Blog and microblog – reflective journaling and other educational applications- Wiki, YouTube, TED, Skype – collaborative	10

	authoring and projects- Instant messaging and its educational applications- Online forums/discussion groups and chats: educational applications- Social media sharing – video, presentations, audio (podcasts), graphics, and text- Web 2.0 tools for creating, sharing, collaborating, and networking.	
Unit 5	**Instructional Design and E-content** Instructional Design: concept, principles, models, and stages- E-learning courseware (e-content) design- Identifying and organizing course content: need analysis (learner, content, and task), learning objectives and course sequence- Designing instructional media, evaluation, and delivery strategies- Creating interactive content: storyboard, courseware outline, interactivity, and interface- Courseware delivery and evaluation- Multimedia tools: Audio editing, video editing, screencasting, graphic editing, and basics of animation, and creating interactive media- Reusable learning objects (RLO) – meaning, types and characteristics, RLO repositories, metadata and standards- E-content authoring tools- open source and proprietary alternatives- Open Educational Resources – Meaning and importance, various OER initiatives, creative commons licensing.	10
References		
	Michelle Pacansky-Brock. (2017). Best Practices for Teaching with Emerging Technologies. Routledge. Kumar Pavan R. et al. (2021). Emerging Technologies in Education. Redshine Publications. Khatri.K.L (2020). Educational Technology: Pedagogy and ICT Integration Across the Curriculum. Shipra Publications. Taj Haseen. (2014). Modern Educational Technology - (English) Paperback. H.P. Bhargava Book House. Huang Ronghuai. (2019). Educational Technology A Primer for the 21st Century. Springer Link. Handbook of Emerging Technologies for Learning 9.5 Emerging technologies: conclusion and summary – Teaching in a Digital Age: Third Edition – General (pressbooks.pub) Chapter 7: Understanding technology in education – Teaching in a Digital Age – Second Edition (bccampus.ca) Chapter 1: Fundamental Change in Education – Teaching in a Digital Age (opentextbc.ca)	

c. Mapping of Programme Outcome with Course Outcomes

	CO1	CO2	CO3	CO4	CO5
PO1	3	3	3	3	3
PO2	3	3	3	3	3
PO3	3	3	3	3	3
PO4	3	3	3	3	3
PO5	3	2	3	3	3
PO6	2	2	3	3	3

d. Evaluation Scheme

Components	CO1	CO2	CO3	CO4	CO5	Total
Internal	5	5	10	10	10	40
External	6	6	16	16	16	60
Total	11	11	26	26	26	100

e. Mapping Course Outcomes with Internal Assessment

Components	CO1	CO2	CO3	CO4	CO5	Total
Assignments			5	5	5	15
Seminar					5	5
Test	5	5	5	5		20
Total	5	5	10	10	10	40

f. Mapping course outcomes with External Assessment

Type	CO1	CO2	CO3	CO4	CO5	Total
Objective Type	2	2	2	2	2	10
Short Answer	4	4	4	4	4	20
Long Answer			10	10	10	30
Total	6	6	16	16	16	60

g. Activities/ Internal Assessment Tasks

Sl. No	Tasks	CO
1	Creating an account in wikispace/wikipedia/mediawiki and adding/editing content.	CO3
2	Developing a multimedia e-content for a topic.	CO4
3	Enrolling and completing some MOOC courses of interest.	CO5
4	Developing a multimedia e-content for a topic.	CO4
5	Developing technology-integrated unit/lesson plans and trying them out in schools.	CO5

h. Model Question Paper

Q No	Question	Specification	Level
	PART A Answer all questions. Each question carries 1 mark.		
1	Which of the following statements has a very limited definition of educational technology? a. It is a profession composed of various job categories b. It refers to the computers used for teaching and learning c. It includes audio-visual materials, interactive multimedia and self-instructional materials. d. It is the development, application and evaluation of systems, techniques, and aids to improve human learning. Answer: b	Describe	Understand
2	Which of the following statements is correct about the domains of educational technology? a. Desing is the production stage, while development is the planning stage. b. Both design and development are in the planning stage c. Evaluation is synonymous with implementation. d. Utilization is the action phase. Answer: d	Describe	Understand
3	Which of the following is a limitation of models and real objects in teaching and learning? a. They pose problems with storage. b. They make learning more concrete c. They provide hands-on learning experiences d. They are really available in the environment, school and home. Answer: a	List	Understand
4	Which group of technologies has the highest degree of concreteness? a. Realia and computer b. Video, picture, and television c. Digital videos, films, versatile compact discs d. Book, imaginative literature, and programmed instruction. Answer: a	Cite example	Understand
5	A teacher places text together with the relevant graphics on the same page in a multimedia presentation. Which principle did she apply? a. Split attention b. Spatial contiguity	Analyse	Analyse

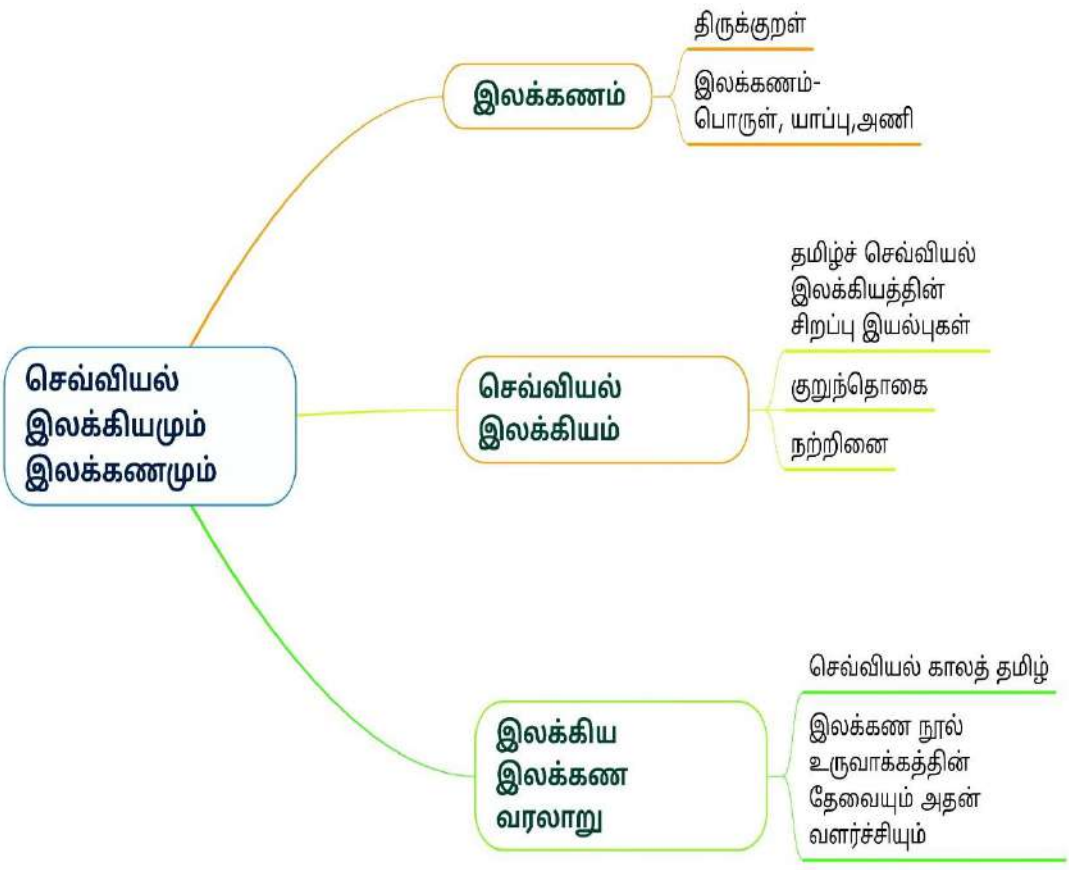
	c. Cost-effectiveness d. Communication effectiveness Answer: a		
6	A teacher presented real samples of rock in her general science class. What principle did she apply? a. Appropriateness b. Authenticity c. Responsiveness d. Simplicity Answer: b	Analyse	Analyse
7	Which of the following is the correct statement regarding Web 2.0 facilities? a. Communication on these facilities is mostly one-way b. Content on these facilities is generated mostly by users c. These facilities are much cheaper to establish d. These facilities use more advanced distribution technologies Answer; b	List	Understand
8	Which of the following is NOT an element of a good podcast? a. Focus on central theme b. Play to an audience c. Show structure d. Irregular schedule Answer: d	List	Understand
9	Which of the following is an example of an interactive tool creation tool? a. H5P b. Marble c. Avogadro d. OBS studio Answer: a	Example	Understand
10	Which of the following is NOT a criterion for evaluating an e-content? a. Reliability of the source b. Relevance c. Learner engagement d. Affiliation Answer: d	List	Understand
PART B **Answer any one question from the two given under each question number. Each question carries 4 marks.**			
11			
A	Distinguish Technology of Education and Technology in Education.	Distinguish	Understand
B	Explain the principles of Educational Technology.	Explain	Understand

12			
A	Explain different types of software.	Explain	Understand
B	Discuss the different types of ICT tools for Teaching Learning.	Discuss	Understand
13			
A	Analyse the scope of different approaches to integrating technology in constructivist classrooms.	Analyse	Analyse
B	Critically analyse the scope of ICT tools for teaching-learning of children with special needs.	Analyse	Analyse
14			
A	Explain the features of any two educational application software.	Explain	Understand
B	Discuss the meaning and educational uses of social bookmarking.	Discuss	Understand
15			
A	Explain the different elements of the analysis phase in the e-content development.	Explain	Understand
B	Discuss the meaning and importance of OER.	Explain	Understand
PART B **Answer any three questions. Each question carries 10 marks.**			
16	Discuss the trends and developments in Educational Technology in recent years.	Discuss	Understand
17	Discuss Social, Economic, and Ethical issues associated with using ICT.	Discuss	Understand
18	Analyse the applications of ICT tools for different phases of teaching-learning with suitable examples.	Analyse	Analyse
19	Explain the different Web 2.0 tools, highlighting their educational uses.	Explain	Understand
20	Describe the different steps involved in e-content development for secondary school students.	Describe	Understand

SEMESTER - IV

SEMESTER - IV					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10411T	Classical Literature and Grammar	3	0	0	3
Internal	40	External	60	Total	100

Course Content overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	தமிழ்ச் செவ்விலக்கியத்தின் சிறப்பியல்புகளைத் தெரிந்து கொள்தல்	தெரிந்து கொள்ளுதல்
CO 2	குறுந்தொகை, நற்றிணை முதலியவற்றை கண்டுணர்தல்	அறிந்து கொள்ளுதல்
CO 3	திருக்குறள், இலக்கணம் (பொருள், யாப்பு, அணி) முதலியவற்றை கண்டுணர்தல்	புரிந்து கொள்ளுதல்
CO 4	செவ்வியல்காலத் தமிழை உணர்ந்து கொள்தல்	தெரிந்து கொள்ளுதல்
CO 5	இலக்கண நூல் உருவாக்கத்தின் தேவையும் அதன் வளர்ச்சியும்	அறிந்து கொள்ளுதல்

b. Syllabus

Units	Content	Hrs.
I	**செவ்வியல் இலக்கியம்-அகம்,புறம்** குறுந்தொகை – 5 பாடல்கள் (3, 47, 52, 145, 182); நற்றிணை – 2 பாடல்கள் (23, 35); ஐங்குறுநூறு – வேட்கைப் பத்து – (முதல் ஐந்து பாடல்கள்); கலித்தொகை – 2 பாடல்கள் (34 பாலைக்கலி, 37 குறிஞ்சிக்கலி); அகநானூறு – 1 பாடல் (147); பத்துப்பாட்டு – நெடுநல்வாடை; புறநானூறு – 5 பாடல்கள் (5, 64, 91, 105, 112);	10
II	**செவ்வியல் இலக்கியம்-அற இலக்கியம்** திருக்குறள் – 3 அதிகாரங்கள் (வாய்மை, நட்பு, உழவு); நாலடியார் – 5 பாடல்கள் (25, 135, 166, 172, 215); பழமொழி நானூறு – 3 பாடல்கள் (76, 88, 97)	10
III	**இலக்கணம் அகத்திணை புறத்திணை** திணை வகைகள் : அகத்திணை – புறத்திணை; ஐவகை நிலங்கள்; முதற் பொருள்- கருப்பொருள்- உரிப்பொருள்; களவு – கற்பு; கூற்று வகைகள்; உள்ளுறை – இறைச்சி - **உவமை**;	10
IV	**இலக்கணம் (பொருள், யாப்பு, அணி)** **செய்யுள் – அசை வகைகள் – பா வகைகள்**; **வெண்பா- ஆசிரியப்பா- வஞ்சிப்பா- கலிப்பா – அணி வகைகள் – மொழிப் பயிற்சி**.	9

V	**இலக்கிய, இலக்கண வரலாறு** செவ்வியல் கால இலக்கியங்களின் தோற்றமும் வரலாற்றுப் பின்புலமும் (எட்டுத்தொகை, பத்துப்பாட்டு, பதினெண்கீழ்க்கணக்கு); இலக்கண நூல் உருவாக்கத்தின் தேவையும் அதன் வளர்ச்சியும் (பொருள், யாப்பு, அணி).	9
	பார்வை நூல்கள்: இளவரசு, சோம., இலக்கண வரலாறு, மெய்யப்பன் பதிப்பகம், சிதம்பரம். 2003. உ.வே.சா., குறுந்தொகை, உ.வே.சா பதிப்பகம், சென்னை. 2010. உ.வே.சா., நற்றிணை, உ.வே.சா பதிப்பகம், சென்னை. 2010. சங்க இலக்கியம், நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை. 2012. சண்முகம், செ.வை., உள்ளுறை இறைச்சி, மணிவாசகர் பதிப்பகம், சென்னை. 2002.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	**PO2**	**PO3**	**PO4**	**PO5**
CO1	3	3	2	2	2
CO2	3	3	2	2	2
CO3	3	3	2	2	2
CO4	3	3	2	2	2
CO5	3	3	2	2	2

d. Evaluation Scheme

	CO1	**CO2**	**CO3**	**CO4**	**CO5**	**Total**
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	**CO2**	**CO3**	**CO4**	**CO5**
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 5 x 3 = 15 marks)	3	3	3	3	3
Part – C (Essay- 5 x 7 = 35 marks)	7	7	7	7	7
Total	**12**	**12**	**12**	**12**	**12**

g. Model Question Paper

Sl. No.	Model Questions	Specifications	Level
Part – A: Objective Type 10 x 1 = 10			
1	பண்டைத் தமிழ் இலக்கியங்கள் தமிழர் வாழ்வை எவ்வாறு பிரித்துள்ளன?	Recognize	Remember
2	மூன்றடி சிற்றெல்லை ஆறடி பேரெல்லை என அடிகளால் பிரிக்கப்பட்டுள்ள சங்க நூல் எது?அது எவ்வாறு பிரிக்கப்பட்டுள்ளது?	Recall	Remember
3	மலைபடுகடாம் குறிப்பிடும் இசைக் கருவிகள் யாவை?	Recognize	Remember
4	அகத்திணையின் ஏழு பிரிவுகள் யாவை?	Recognize	Remember
5	கூற்றுக்குரியவர்கள் யாவர்?	Recognize	Remember
6	நெய்தல் நிலத்தின் பொழுதுகள் யாவை?	Recognize	Remember
7	வெண்பாவால் முதலிடம் பெற்ற எட்டுத்தொகை நூல் எது? அதன் அடிவரையரை என்ன?	Recall	Remember
8	திராவிட மொழிகள் நான்கினைக் குறிப்பிடுக	Recall	Remember
9	எட்டுத்தொகை நூல்கள் எவை?	Identify	Remember
10	பாவினம் எவை?	Identify	Remember
PART – B Short Answer The answer should not exceed 200 words 5 x 3 = 15			
11	நெடுநல்வாடை குறித்து கட்டுரை வரைக.	Describe	Analyse
12	கூற்று மரபு குறித்தச் செய்திகளை எழுதுக.	Explain Discuss	Understand
13	யாப்பு கூறும் அடி, தொடை, என்பனபற்றிய செய்திகளை கூறுக.	Assess	Skill

14	எட்டுத்தொகை நூல்கள் குறித்தச் செய்திகளை கட்டுரை வடிவில் தருக.	Explain Discuss	Understand
15	திருக்குறளில் ‘உழவு’ என்ற அதிகாரம் கூறும் கருத்துக்களை எழுதுக.	Explain Discuss	Understand
PART – C Essay Answer The answer should not exceed 400 words 5 x 7 = 35			
16	அ)‘மாமேயில் …… பாணாள்’ இடம் சுட்டிப் பொருள் விளக்கவும் (அல்லது) ஆ)ஐங்குறு நூறு நூல் குறித்தச் செய்திகளை எழுதக.	Explain	Understand
17	அ) புறநானூறு ‘அரசவாகையில்’ அதியமான் நெடுமான் அஞ்சி குறித்து ஔவையார் கூறும் கருத்துக்கள் யாவை? (அல்லது) ஆ)‘அற்றைத் திங்கள் அவ்வெண்ணிலவில்’ இடம் சுட்டிப் பொருள் விளக்கம் தருக.	Differentiate Define	Understand
18	அ)‘யாக்கை நிலையாமை குறித்து நாலடியார் கூறும் கருத்துக்களை எழுதுக. (அல்லது) ஆ)தீய ஒழுக்கமுடையவர்கள் எப்படிப்பட்டவர்கள் என்பதைப் பழமொழி நானூறு கூறுகிறது?	Cite Examples	Understand
19	அ)குறுந்தொகை – குறிப்பு வரைக. (அல்லது) ஆ)உள்ளுறை உவமம் என்றால் என்ன? குறிப்புடன் எழுதுக.	Illustrate	Apply
20	அ)செம்மொழி நூல்கள் எவை அவற்றில் மூன்று நூல்கள் பற்றி எழுதுக. (அல்லது) ஆ) முல்லை நிலத்தின் முதற் கரு உரிப்பொருட்களை பற்றி எழுதுக.	Illustrate	Apply

SEMESTER – III					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10411H1	**हिन्दी भाषा कौशल** Hindi Language Skills	3	0	0	3
Internal	40	External	60	Total	100

इकाई – 1 - वाक्य-विचार – Syntax

रचना के आधार पर-

1. सरल वाक्य (Simple Sentences)
2. मिश्र वाक्य (Mix Sentences or Complex Sentences)
3. संयुक्त वाक्य (Compound Sentences)

अर्थ के आधार पर-

4. विधिवाचक (Affirmative)
5. निषेधवाचक (Negative)
6. आज्ञावाचक (Imperative)
7. प्रश्नवाचक (Interrogative)
8. विस्मयबोधक (Exclamatory)
9. संदेहवाचक (Susceptive)

क्रिया के आधार-

10. कर्तृवाच्य (Active Voice)
11. कर्मवाच्य (Passive Voice)

इकाई – 2 - हिन्दी शब्द के विविध रूप

1. पर्यायवाची शब्द
2. विलोम शब्द
3. प्रत्यय-उपसर्ग
4. लोकोक्तियाँ-मुहावरे (दस लोकोक्तियां और दस मुहावरे)

इकाई – 3 - हिन्दी की रचनाएँ (गद्य-पद्य)

(क) कहानी

प्रेमचन्द – ईदगाह

सुदर्शन –हार की जीत

(ख) कविता

माखनलाल चतुर्वेदी-पुष्प की अभिलाषा

इकाई – 4 - पत्र एवं निबंध लेखन

(क) पत्र लेखन- (निमंत्रण पत्र, शिकायत से संबंधित पत्र, छुटटीमांगते हुए पत्र, नौकरी के लिए आवेदन पत्र)

(ख) निबंध लेखन - (व्यायाम का महत्व, अनुशासन, पर्यावरण, प्रदूषण, भूमंडलीकरण)

इकाई – 5 - हिन्दी भाषा का व्यावहारिक रूप

1. संभाषण
2. समूह चर्चा
3. नाट्य-मंचन
4. पत्रकारिता
5. दृश्य-श्रव्य माध्यमों की सहायता से हिन्दी भाषा का ज्ञान बढ़ाया जाएगा

सहायक ग्रंथ:

1. कामता प्रसाद गुरु, संक्षिप्त हिन्दी व्याकरण, नागरीप्रचारिणी सभा, वाराणसी (2005).
2. बाबू गुलाबराय, हिन्दी साहित्य का सुबोध इतिहास, लक्ष्मी नारायण अग्रवाल एजुकेशनल पब्लिशर्स, आगरा (2017).
3. विश्वनाथ त्रिपाठी, हिन्दी साहित्य का सरल इतिहास,ओरिएन्ट ब्लैकस्वेन, हैदराबाद (2007).
4. दंगल झाल्टे, प्रयोजनमूलक हिन्दी: सिद्धांत और प्रयोग, वाणी प्रकाशन, नयी दिल्ली (2015).
5. विनोद गोदरे, प्रयोजनमूलक हिन्दी, वाणी प्रकाशन, नयी दिल्ली (2016).
6. प्रेमचन्द्र, विश्व में हिन्दी, तक्षशिला प्रकाशन, नयी दिल्ली (2015).
7. विद्यानिवास मिश्र (सं.), आज के लोकप्रिय हिन्दी कवि–अज्ञेय, राजपाल एण्ड सन्ज़, दिल्ली(2002).
8. रामविलास शर्मा (सं.), राग विराग, लोकभारती प्रकाशन, इलाहाबाद(1998).
9. हरेराम समीप (सं.), समकालीन दोहा कोश, शब्दालोक प्रकाशन, दिल्ली(2015).

SEMESTER – IV					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10411H2	**हिन्दी साहित्य, प्रयोजनमूलक हिन्दी एवं अनुवाद** Modern Hindi Literature, Functional Hindi and Translation	3	0	0	3
External	40	Internal	60	Total	100

इकाई-1 प्रयोजनमूलक हिन्दी

प्रयोजनमूलक हिन्दी : परिभाषा एवं स्वरूप, समाचार लेखन एवं संपादन, विज्ञापन लेखन, कार्यालयी हिन्दी

इकाई – 2 अनुवाद सिद्धांत एवं प्रयोग

अनुवाद : अर्थ, स्वरूप एवं परिभाषा,अनुवाद के प्रकार, अनुवाद की प्रक्रिया,अनुवाद : अनुप्रयोग एवं आवश्यकता (मशीनअनुवाद)

इकाई – 3 आधुनिक हिन्दी साहित्य का इतिहास : संक्षिप्त परिचय

साहित्य का इतिहास,गद्य की विधाओं का परिचय

इकाई – 4 पाठाध्ययन एवं अध्यापन के लिए साहित्यिक पाठ

1.प्रेमचंद – कफन (कहानी)

2.चंद्रधर शर्मा 'गुलेरी'–उसने कहा था (कहानी)

3.अमरकांत – डिप्टी कलक्टरी (कहानी)

4. मन्नू भण्डारी –आपका बंटी(उपन्यास) (केवल कथावस्तु)

5.भारतेन्दु – अंधेर नगरी (नाटक)

6.हरिशंकर परसाई –भोलाराम का जीव (व्यंग्य लेख)

7.हजारी प्रसाद द्विवेदी– नाखून क्यों बढ़ते हैं (ललित निबंध)

इकाई -5 व्यावहारिक पक्ष

विज्ञापन लेखन ,प्रपत्र लेखन, टिप्पण - लेखन , फीचर लेखन, आलेखन

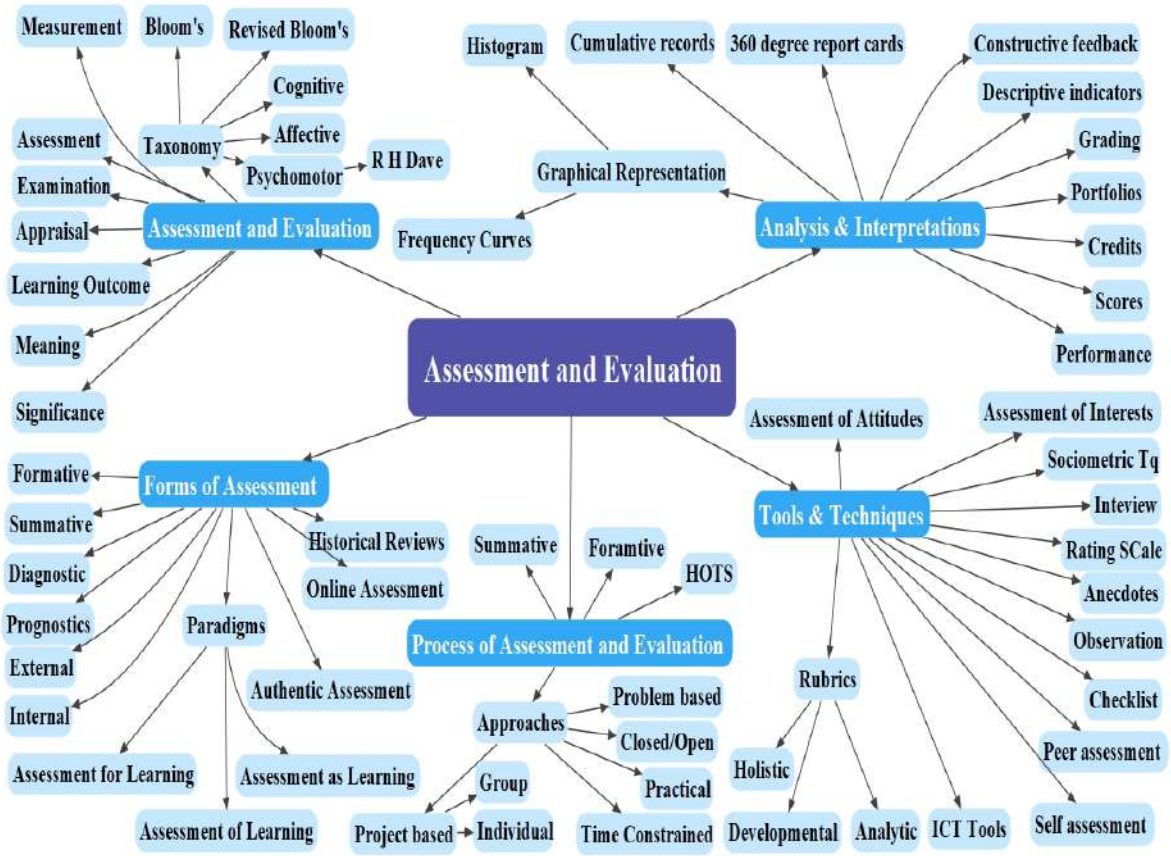
सहायक ग्रंथ:

1. दंगल झाल्टे, प्रयोजनमूलक हिन्दी : सिद्धांत और प्रयोग, वाणी प्रकाशन, नयी दिल्ली (2015).
2. विनोद गोदरे, प्रयोजनमूलक हिन्दी, वाणी प्रकाशन, नयी दिल्ली (2016).
3. बाबू गुलाबराय, हिन्दी साहित्य का सुबोध इतिहास, लक्ष्मी नारायण अग्रवाल एजुकेशनल पब्लिशर्स, आगरा (2017).
4. विश्वनाथ त्रिपाठी, हिन्दी साहित्य का सरल इतिहास, ओरिएन्ट ब्लैकस्वेन, हैदराबाद (2007).
5. भगवतीचरण वर्मा, चित्रलेखा, राजकमल प्रकाशन, नयी दिल्ली (2008).
6. प्रेमचन्द, सोज़े वतन, भारतीय साहित्य संग्रह, नयी दिल्ली (2014).

जयशंकर प्रसाद, ध्रुवस्वामिनी, लोकभारती प्रकाशन, इलाहाबाद (1994).

Semester IV					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10412	Assessment and Evaluation	0	0	2	2
Internal	100	External	0	Total	100

Course Content Overview



a. Course Outcomes (COs)

On the successful completion of the course, the student will be able to

S No	Course Outcome	Level
CO1	Understand the meaning, nature, and scope of Assessment and evaluation.	Understand
CO2	Understand different forms of assessment.	Understand
CO3	Understand the process of assessment and evaluation.	Understand
CO4	Understand different tools and techniques of assessment and evaluation.	Understand
CO5	Understand analysis and interpretation in assessment and evaluation	Understand

b. Syllabus

Units	Content	Hours
I	**Assessment and Evaluation** Meaning and significance of assessment and evaluation in the educational field- Conceptual Clarity and purpose of Measurement, Assessment, Examination, Appraisal and Evaluation in Education-Learning Outcomes across the stages and assessment- Taxonomy of Objectives (Revised in 2001) and Implications- Affective domain –Krathwohl; Psychomotor domain - Dr. R. H. Dave	13
II	**Forms of Assessment** Formative, Summative, diagnostic, prognostic- Internal and External assessment- Assessment For learning, of learning and as learning- Authentic Assessment; Online Assessment- Improving Assessment and Evaluation in Schools: Brief Historical Review (1975, 1988, 2000, 2005, 2020)	12
III	**Process of Assessment and Evaluation** Formative and Summative Assessment: Concept and Characteristics- Approaches to assess and evaluate student performance such as time-constrained examinations; closed/open-book tests; problem-based assignments; practical assignment reports; observation of practical skills; individual and group project reports; oral presentations; viva-voce interviews; computerised adaptive testing; peer and self-assessment etc- Assessing Higher Order Thinking Abilities: Problem-solving, critical thinking, creative thinking, communication skills, judgement and decision making, ethical and moral reasoning.	13
IV	**Tools and Techniques** Observation, rating scale, checklist, anecdotes, interviews- Assessment of attitudes and interests- Socio-metric techniques- Criteria for assessment of social and personal behaviour- Self-assessment and Peer Assessment. Assessment Rubrics- meaning, types, constructions- ICT Tools.	13

V	**Analysis and Interpretation** Analysis of students' performance and scores: credit and grading- Graphical representation (Histogram, Frequency Curves)- Interpretation of student's performance based on the analysis and their further uses in improving learner's performance: credit and grading, constructive feedback- Reporting student's performance: 360-degree progress reports, cumulative records and their uses, portfolios, PTA meetings, qualitative reporting based on the observations, descriptive indicators in report-cards.	12
	References: Patel, R.N. (2013). Educational Evaluation: Theory and Practice, Himalaya Publishing House, Mumbai. Aggarwal, J.C. (2006). Essentials of Examination System: Evaluation, Tests and Measurement, Vikas Publishing House Pvt. Ltd. Sharma, R.A. (2010). Essentials of Measurement in Education and Psychology, R. Lall Book Depot, Meerut. Taiwo, Adediran A. (2004). Fundamentals of Classroom Testing, Vikas Publishing House Pvt. Ltd. New Delhi. Tom Diamond, Mark Sanders. (2006). Reference Assessment and Evaluation. Routledge. M. David Miller, Robert L. Linn, and Norman Gronlund. (2012). Measurement and Assessment in Teaching, 11th ed. Person. Norman E. Gronlund. (1992). How to Make Achievement Tests and Assessments., 5th ed. Allyn & Bacon. Norman E. Gronlund. (1999). How to Write and Use Instructional Objectives, 6th ed. Pearson. Ebel, R.L. and Frisbie, D.A. (1991) Essentials of Educational Measurement. 5th Edition, Prentice-Hall, Englewood Cliffs. Rubrics for Grading – EarlyEdU Course Instructor Guide (pressbooks.pub) 13.9: Performance Assessment and Rubrics Pros-Cons - Social Sci LibreTexts Rubrics: Useful Assessment Tool | Centre for Teaching Excellence (uwaterloo.ca)	

c. Mapping of Programme Outcome with Course Outcomes

	CO1	CO2	CO3	CO4	CO5
PO1	3	3	3	3	3
PO2	3	3	3	3	3
PO3	2	0	1	3	3
PO4	3	3	3	2	2
PO5	0	3	3	3	3
PO6	3	3	3	3	3

d. Evaluation Scheme

Components	CO1	CO2	CO3	CO4	CO5	Total
Internal	20	20	20	20	20	100
Total	20	20	20	20	20	100

e. Mapping Course Outcomes with Internal Assessment (100 Marks)

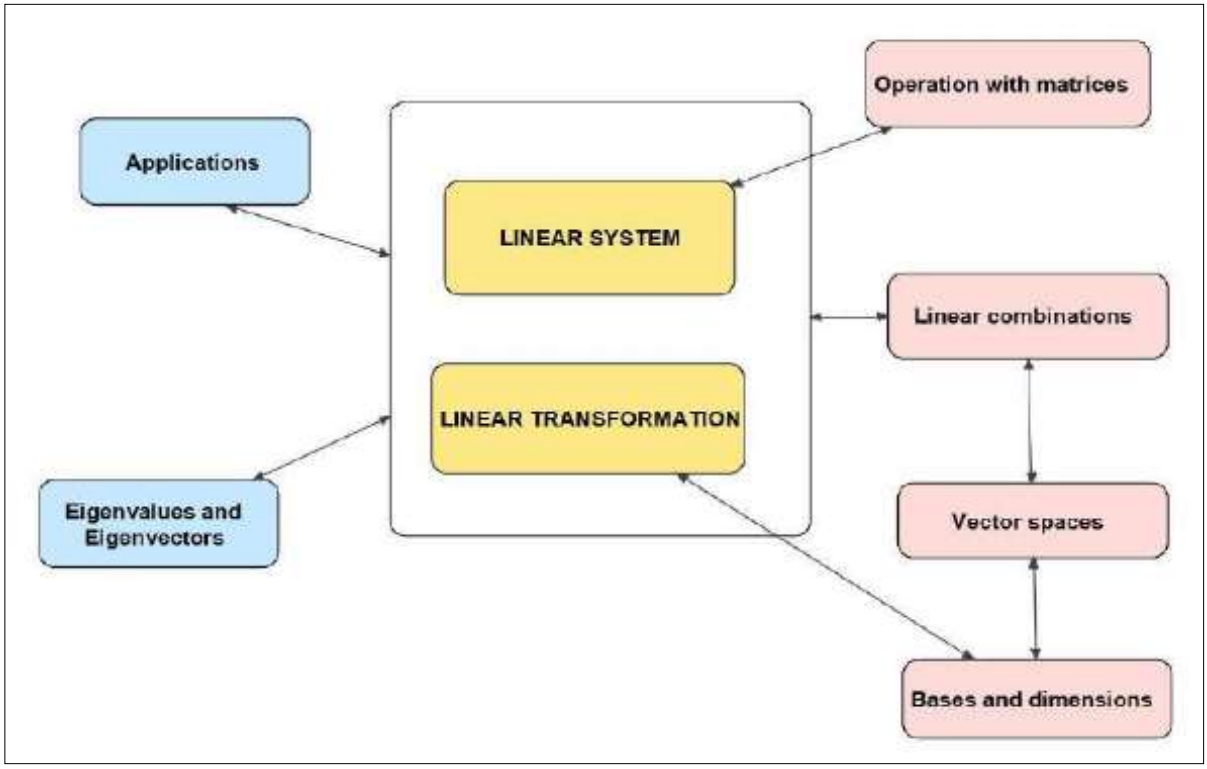
Components	CO1	CO2	CO3	CO4	CO5	Total
Assignments	10	-	10	-	10	30
Seminar	-	-	-	10	10	20
Test	10	20	10	10	-	50
Total	20	20	20	20	20	100

f. Activities/ Internal Assessment Tasks

Sl. No	Tasks	CO
1	Constructing a unit test using the table of specifications.	CO1
2	Review of learning outcomes by NCERT in different subject areas.	CO3
3	Construction of any one of the tools (rating scale, checklist, observation schedule, etc.) and administering it to a group of students or using it to observe the school and classroom environment and interpret it.	CO4 CO5
4	Analysis of question papers of various Boards.	CO5

SEMESTER - IV					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10413	Linear Algebra	4	0	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Remember the notion of vectors.	Remember
CO 2	Understand the notion of dimension.	Understand
CO 3	Distinguish spaces by dimensions.	Analyze
CO 4	Weigh the concept of vector spaces and linear maps.	Evaluate
CO 5	Construct suitable basis to work with linear maps and matrices.	Create

b. Syllabus

Units	Content	Hours
I	**Vector spaces and Dimension** Vector spaces, subspaces, examples, algebra of subspaces, quotient spaces, linear combination of vectors, linear span, linear independence, basis and dimension, dimension of subspaces.	13
II	**Linear maps and its matrix representation** Linear transformations, null space, range, rank and nullity of a linear transformation, matrix representation of a linear transformation, algebra of linear transformations. Isomorphisms, isomorphism theorems, invertibility and isomorphisms, change of coordinate matrix.	13
III	**Dual spaces** Dual spaces, dual basis, double dual, transpose of a linear transformation and its matrix in the dual basis, annihilators.	13
IV	**Eigenvalues and diagonalizability** Eigen spaces of a linear operator, diagonalizability, invariant subspaces and Cayley-Hamilton theorem, the minimal polynomial for a linear operator.	13
V	**Inner product Spaces** Inner products and norms, Gram Schmidt orthogonalization process, orthogonal complements.	12
	Tasks and Assignments: Each student is required to submit the following: ✓ Solution to homework problems. ✓ Assignment on the dimension of the solution space of the homogeneous linear or dinery differential equations of degree n. ✓ Assignment on the isometries of plane. **References:** S. H. Friedberg, A. J. Insel and L. E. Spence, Linear Algebra, Fifth Edition, Pearson, 2022. S. Axler, Linear Algebra Done Right, Second Edition, Springer, 1997.	

	S. Kumaresan, Linear Algebra - A Geometric Approach, Twelfth reprint, Prentice Hall of India, 2011. G. Strang, Linear Algebra and its applications, Eighth Indian reprint Indian Edition, Cengage Learning, 2011. K. Hoffman and R. Kunze, Linear Algebra, Second Edition, Prentice Hall of India, 2003. I. N. Herstein, Topics in Algebra, Wiley Eastern Ltd., Second Edition, 2006.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	1	1	1	3
CO2	3	3	1	3	3	3
CO3	3	3	2	3	3	3
CO4	3	3	1	3	2	3
CO5	3	3	3	3	3	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 4 x 5 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	**12**	**12**	**12**	**12**	**12**

g. Model Question Paper

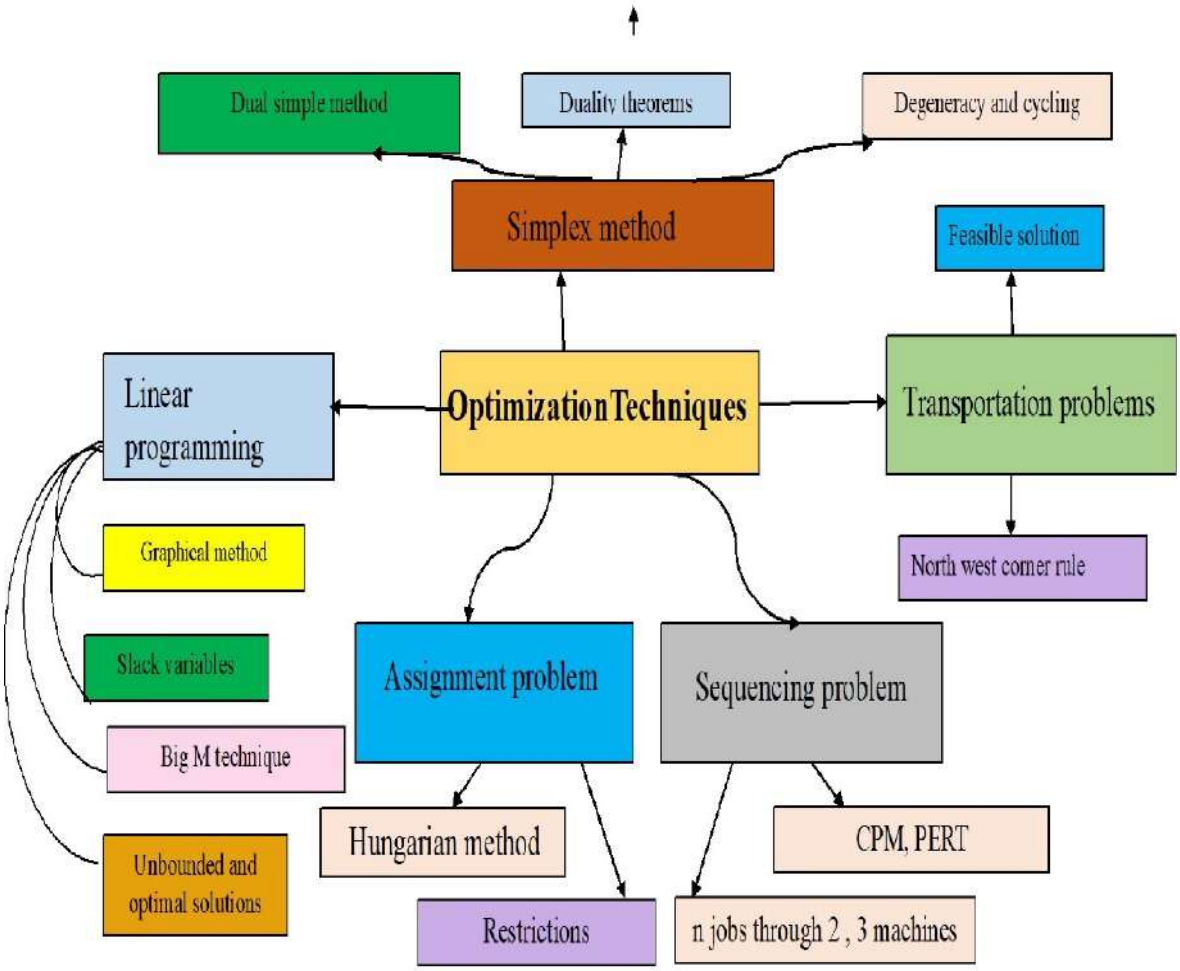
Sl. No.	Model Questions	Specification	Level
	Part – A: Objective Type **Multiple Choice Marks: 10 x 1 = 10**		
1	If Rank (A) = 2 and Rank (B) = 3 then Rank (AB) is A. 6 B. 3 C. 5 D. Data inadequate	Recognize	Remember
2	For what value of k, do the simultaneous equation 2x + 3y = 1, 4x + 6y = k have infinite solutions? A. k = 0 B. k= 1 C. k = 2 D. none of the above	Recognize	Remember
3	If A is m x n matrix such that AB and BA both are defined, then B is a matrix of order A. n x n B. m x m C. m x n D. n x m	Recognize	Remember
4	The eigenvalues of a Hermitian matrix are A. complex B. purely imaginary C. real D. None of the above	Recall	Remember
5	Eigen values of a real symmetric matrix are always A. Positive B. Negative C. Real D. Complex	Recall	Remember
6	A consistent linear system of two equations in two unknowns has A. exactly one solution B. infinitely many solutions C. exactly two solutions D. either A or B	Recognize	Remember
7	Let T: V → V be a linear operator and T(x) = λx for some scalar λ. Then x is called A. an eigenvector of T. B. an eigenvalue of T. C. an Eigen space of T. D. None of these	Recognize	Remember
8	Let U and W be subspaces of a vector space V and $U \cup W$ is also a subspace of V, then A.either $U \subseteq W$ or $W \subseteq U$ B. $U \cap W = \phi$ C. U=W D. None of these	Identify	Remember
9	Let I be the identity transformation of the finite dimensional vector space V, then the nullity of I is A. dimV B. 0 C. 1 D. Dim V – 1	Identify	Remember
10	A and B are n-square positive definite matrices. Then which of the following are positive definite. A. A+B B. ABA C. AB D. $A^2 + I$	Identify	Remember

	PART – B Short Answer **Marks: 4 x 5 = 20**		
11	(a) Let V= R cube and let T: V → V be the linear transformation defined by T (x, y, z) = (2x, 4y, 5z). Analyze find matrix of T with respect to the basis (2/3 ,0,0), (0,1/2 ,0) and (0, 0,1/4) of v. Or (b) Let X, Y be subspaces of Z. Prove that dim(X+Y) =dim(X)+dim(Y)-dim(X+Y).	Analyze	Analyze.
12	(a) In $P_n(F)$, prove that $\{1, x, ..., x^n\}$ is a basis. or (b) Find the basis for the vector subspace $\{(x, y, z, w) \in \mathbb{R}^4 : x + 2y + 5z + 7w = 0\}$.	Prove Find	Skill
13	(a) Find the Rank of a Matrix by reducing it to row reduced echelon form where a is a real number $\begin{bmatrix} a & 1 & 2 \\ 1 & 1 & 1 \\ -1 & 1 & 1-a \end{bmatrix}$ or (b) Find the matrix of T(a,b)=(a+3b,0,2a-4b) with respect to the standard basis of $\mathbb{R}^2$and $\mathbb{R}^3$.	Find	Understand
14	(a) Find a row-equivalent matrix which is in Normal form. Then determine the rank of the matrix. $\begin{bmatrix} 1 & 0 & 2 & 1 \\ 2 & 1 & 3 & 2 \\ 1 & 3 & 1 & 3 \end{bmatrix}$ or (b) Prove that T(x,y)=(x+y,x) is an injective linear map on $\mathbb{R}^2$.	Find Prove	Understand
	PART – C Essay Answer **Marks: 3 x 10 = 30**		
15	(a) Prove that S= $\left\{ \begin{bmatrix} 1 & 1 \\ 0 & 3 \end{bmatrix}, \begin{bmatrix} -1 & 0 \\ 2 & 1 \end{bmatrix}, \begin{bmatrix} -1 & 2 \\ 6 & 9 \end{bmatrix} \right\}$ is linearly dependent in M_{2x2}. Write one of the vectors as a linear combination of the others. or (b) Prove that V is isomorphic to its dual, where V is finite dimensional.	Prove	Skill
16	(a) Obtain Eigenvalues and corresponding Eigen Vectors to the following matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$ or (b) State and prove Cayley-Hamilton theorem.	Obtain	Apply
17	(a) Prove that the map T: $R^3 \rightarrow R^3$ defined by T (x_1, x_2, x_3) = $(x_1 + x_2 – x_3, 2x_1 – x_2, x_2 + 2x_3)$ is a linear transformation.	Prove	Skill

	b. Let T: $E^2 \rightarrow E^1$ be defined by T $((\boldsymbol{x_1}, \boldsymbol{x_2}) = \boldsymbol{x_1^2 + x_2^2}$. Prove that T is not linear even though $T(\boldsymbol{\theta}) = \boldsymbol{\theta}$. or (b) Using Gram-Schmidt process, construct an orthogonal basis for the vector space of polynomials over $\mathbb{R}$with degree at most 2 by using the basis $\{1, x, x^2\}$.		

SEMESTER IV					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10414	Optimization Techniques	4	0	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	understand the history, properties, and principles of operations research and linear programming.	Understand
CO 2	improve problem-solving skills related to scientific methods of operations research.	Apply
CO 3	learn the modeling and solutions of linear programming problem	Analyze
CO 4	model the assignment and transportation problems and them methods of solutions.	Evaluate
CO 5	model the real-life sequencing problems, theoretical models and their solutions	Create

b. Syllabus

Units	Content	Hrs.
I	**The linear programming problem:** Problem formulation, graphical method, definitions of bounded, unbounded, and optimal solutions, linear programming in matrix notation, definitions of basic, non-basicvariables, basic solutions, slack variables, surplus variables, and optimal solution, simplex method of solution of a linear programming problem, big M-technique.	13
II	**Simplex method:** Two-phase simplex method, degeneracy, and cycling revised simplex method, duality theory, formulation of the dual problem, duality theorems, primal-dual method, dual simplex method, sensitivity analysis.	13
III	**Balanced and unbalanced transportation problems:** Feasible solution, basic feasible solution, optimum solution, degeneracy in a transportation problem, mathematical formulation, Northwest Cornerrule, Vogel's approximation method, method of matrix minima, algorithm of optimality test.	13
IV	**Balanced and unbalanced assignment problems:** Restrictions on assignment problem, mathematical formulation, formulation and solution of an assignment problem (Hungarian method), degeneracy in an assignment problem.	13
V	**Sequencing problem:** n jobs through 2 machines, n jobs through 3 machines, two jobs through m machines, n jobs through m machines. Definition of the network, event, activity, critical path, total float, and freefloat, the difference between CPM and PERT, and problems.	12
	Tasks and Assignments: The student shall understand the simplex method of solution of a linear programming problem, big M-technique. The assignment will give scope for a student to consolidate and reproduce the subject content seen in the classroom.	

	The following are the thrust areas selected for assignment/oral presentation ✓ Understand the difference between CPM and PERT ✓ formulation and solution of the problem using the Hungarian method ✓ Know the balanced and unbalanced assignment problems. **References:** K. Swarup, P. K. Gupta and Man Mohan (2001), Operations Research, Ninth Edition, Sultan Chand & Sons, Chennai. S. I. Gauss (1964), Linear Programming, Second Edition, McGraw Hill Book Company, New York. A. Ravindran, D. T. Phillips and J. J. Solberg (1987), Operation Research: Principles and Practice, Second Edition, John Wiley & Sons. F. S. Hillier and G. J. Lieberman (2001), Introduction to Operations Research, McGraw Hill, Eighth Edition.	

c. Mapping of Program Specific Outcomes with Course Outcomes

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	2	3
CO2	3	3	3	3	3	2
CO3	3	3	3	3	3	3
CO4	3	3	3	2	2	2
CO5	2	1	3	3	2	1

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	20	20	20	20	20	100

e. Mapping course outcome with Internal assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assignment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 4 x 5 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	12	12	12	12	12

g. Model Question paper

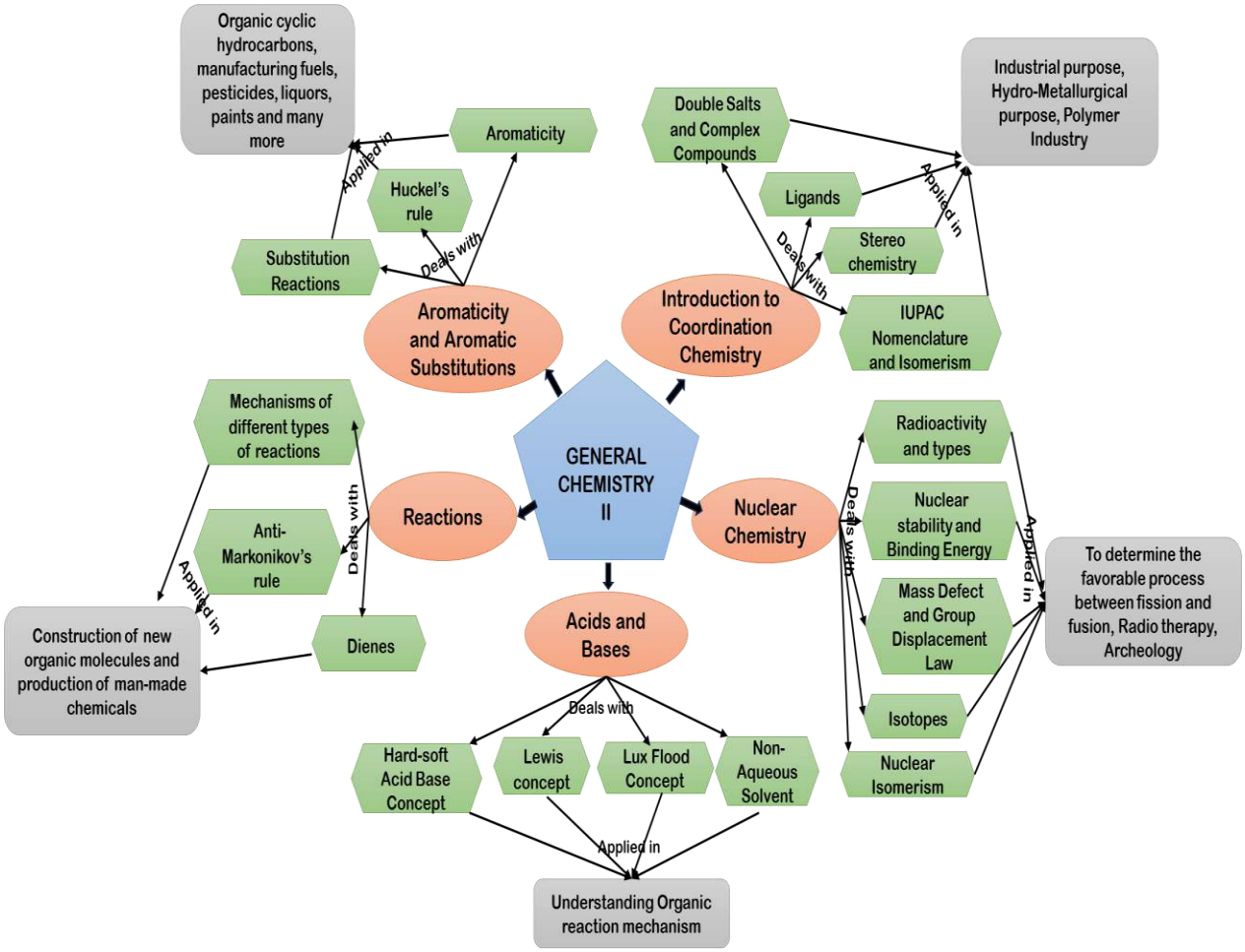
Sl. No.	Model Questions	Specifications	Level
	Part – A: Objective Type **Multiple choice 10 x 1 = 10**		
1	The technique for selecting a new point depends upon a) Scope of the problem b) Nature of the problem c) Range of the problem d) Analysis of the problem	Recognize	Remember
2	In linear programming, the solution is based on a) Tensile properties b) Strain properties c) Elementary properties d) None of the mentioned	Recall	Remember
3	Linear programming problems can be solved by a) Revised simplex method b) Termed method c) Moment derivation method d) Hollow method	Recognize	Remember
4	The present age of Aradhana and Aadrika is in the ratio of 3:4. 5 years back, the ratio of them ages were 2:3. What is the present age of Aradhana? a) 12 years b) 15 years c) 20 years d) 22 years The present age of Aradhana and Aadrika is in the ratio of 3:4. 5 years back, the ratio of them ages were 2:3. What is the present age of Aradhana? a) 12 years b) 15 years c) 20 years d) 22 years The present age of Aradhana and Aadrika is in the ratio of 5 mg of glucose introduced into the bloodstream and after 2 minutes, a sample of	Recognize	Remember

	10 c.c. of blood is taken in the increase in blood sugar is found to be 0.01mg. Estimate the volume of blood sugar in the body One of the most powerful techniques for solving non-linear programming is to transform the a) Data b) Problems c) Materials d) Labour		
5	Classify the model , x(t) is the population at time t Classify the model , x(t) is the population at time t In nonlinear programming the boundaries of the contours of the function are _____ a) Parallel line b) Zig Zag lines c) Straight lines d) Trapezoidal lines	Recognize	Remember
6	The method of feasible direction can be grouped under the _____ a) Direct methods of approach b) Sequential method of approach c) Terminate method of approach d) Laminar method of approach	Recognize	Remember
7	Solution of a Linear Programming Problem when permitted to be infinitely large is called a) Unbounded b) Bounded c) optimum solution d) no solution	Recall	Remember
8	All the basis for a transportation problem is a) square b) rectangle c) triangle d) polygon	Recall	Remember
9	The assignment algorithm was developed by a) Modi b) Hungarian c) Huhn d) Vogels	Identify	Remember
10	The coefficient of slack\surplus variables in the objective function are always assumed to be a) 0 b) 1 c) M d) –m	Identify	Remember

PART – B Short Answer **The answer should not exceed 200 words 4 x 5 = 20**			
11	a) Define saddle point and optimal strategies (or) b) Define two-person zero sum game and fair game	Explain	Understand
12	a) Take A, B, C, … H constitute a project. The precedence relationships are A<D; A<E; B<F; D<F; C<G; C<H; F<I; G<I (or) b) Write the assumptions of the sequencing problem.	Define	Understand
13	a) State the rules for the construction of the network (or) b) Write a note on linear programming, the decomposition principle and its application in linear programming	Cite Examples	Understand
14	a) Distinguish between CPM and PERT (or) b) Describe optimization and write its classification.	Illustrate	Apply
PART – C Essay Answer **The answer should not exceed 400 words 3 x 10 = 30**			
15	a) Solve the following system of equations using pivot operations $4x - 7y + 2z = -8$ $3x + 4y - 5z = -8$ $5x + y - 8z = -34$ (or) b) Find the extreme points of the functions $F(x, y) = x^3 + y^3 + 2x^2 + 4y^2 + 6$	Describe	Analyze
16	a) Using the steepest descent method minimize: $f(x, y) = x - y + 2x^2 + 2xy + y^2$ (or) b) Formulate the problem of minimum weight design of a helical spring under axial load as a geometric programming problem. Consider constraints on the shear stress, natural frequency and bucking of the spring.	Explain Discuss	Understand
17	a) Write notes on i) geometric programming problem ii) Integer non-linear programming (or) b) Solve the integer programming problem Maximize $z=7x+9y$ Subject to the constraints $-x+3y <= 6$ $7x+y<=35$ $y <=7$	Assess	Skill

SEMESTER - IV					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10415	General Chemistry II	4	0	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Compare the various theories of coordination complexes.	Understand
CO 2	Evaluate the nuclear stability based of n/p ratio, whole number rule, mass defect and packing fraction	Analyze
CO 3	Hard-Soft Acid Base Concept and its applications	Apply
CO 4	Mechanism of free radical and addition reactions	Create
CO 5	Knowledge of important organic reactions and understanding of Huckel's aromaticity and substitution reactions	Skill

b. Syllabus

Units	Content	Hrs.
I	**Introduction to Coordination Chemistry-** Double salts- complex compounds complex ion and coordination number- Ligands and their classification- chelates and their uses coordination number and stereochemistry of complexes- IUPAC Nomenclature of coordination compounds. Isomerism: ionization, hydrate, ligand, linkage, coordination, position, geometrical and optical isomerisms. Theories of Coordination Compounds: Werner's theory- Sidgwick's electronic interpretation- EAN concept- valence bond theory- outer and inner orbital complexes- Limitations of VBT Crystal field theory- Crystal field splitting in octahedral, tetragonal, square planar and tetrahedral complexes- High spin and Low spin complexes.	13
II	**Nuclear Chemistry**-Radioactivity- types of radioactivity- types of radioactive rays - nuclear stability-n/p ratio - magic numbers- nuclear binding energy- mass defect- nuclear shell & drop models - Group displacement law - decay constant – half-life period – radioactive equilibrium- transmutation-artificial transmutation - applications of artificial transmutation radioactive series. Nuclear reaction types: fission and fusion reactions-principle and working of nuclear reactors. Isotopes: Separation of isotopes- identification of isotopes - isotopes of hydrogen isotope effect application of isotopes in chemistry, agriculture and medicine - carbon dating – nuclear isomerism.	13
III	**Acids and Bases -** Lewis's concept – Classification of Lewis acids – Lux Flood concept – Hard-Soft acid base concept and its applications. Non aqueous solvents- Classification of solvents- Neutralization reaction and solvolysis in liquid ammonia- Metal-ammonia solutions. Neutralisation, solvolysis and redox reactions in liquid sulphur dioxide.	12
IV	**Reactions:** Mechanism of free radical halogenation of alkanes, Addition reactions with halogens, hydrogen halide (Markovnikov's rule, peroxide effect), hydroboration, ozonolysis, hydroxylation with KMnO4, allylic substitution by NBS; Types of dienes – Conjugated dienes: 1,3-butadiene preparation, stability- 1,2 & 1,4 - addition, Diels- Alder reaction.	13

V	**Aromaticity and Aromatic Substitutions:** Introduction to Aromaticity, Basic aspects of Aromaticity, Huckel's rule, aromaticity of benzenoid compounds. Electrophilic substitution reactions, directing groups, orientation and reactivity.	13
	Tasks and Assignments: ✓ The ability to transfer their ideas effectively, both orally and in writing. ✓ Individual / Group Seminar presentation on selected topics ✓ Report on interdisciplinary application of selected topics / concepts **References:** Lee J. D., Concise Inorganic Chemistry, 5th Edition, Blackwell Science, 1996. Sharpe G., Inorganic Chemistry, 3rd Edition, Pearson, 2010 Atkins P., Overton T., Rourke J., Weller M., and Armstrong F., Inorganic Chemistry, 5th Edition, Oxford University Press, 2010. Arnikar, H. J., Essentials of Nuclear Chemistry, 4th edition, New Age International Publishers Ltd., New Delhi, 1995. Morrison, R.T., Boyd, R.N. Organic Chemistry, 7th edn, Pearson Education, 2010. Finar I.L., Organic Chemistry, Volume 1, 6th edition, Pearson education India, 2011. Carey, F.A., and Sundberg R.J., Advanced Organic Chemistry, Part A: Structure and Mechanisms, 5th edition, 2007.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
CO1	3	3	2	3	3	3
CO2	3	3	3	3	2	3
CO3	3	3	2	2	3	3
CO4	3	3	3	3	2	3
CO5	3	3	2	3	3	2

d. Evaluation Scheme

	CO1	**CO2**	**CO3**	**CO4**	**CO5**	**Total**
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 4 x 5 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	**12**	**12**	**12**	**12**	**12**

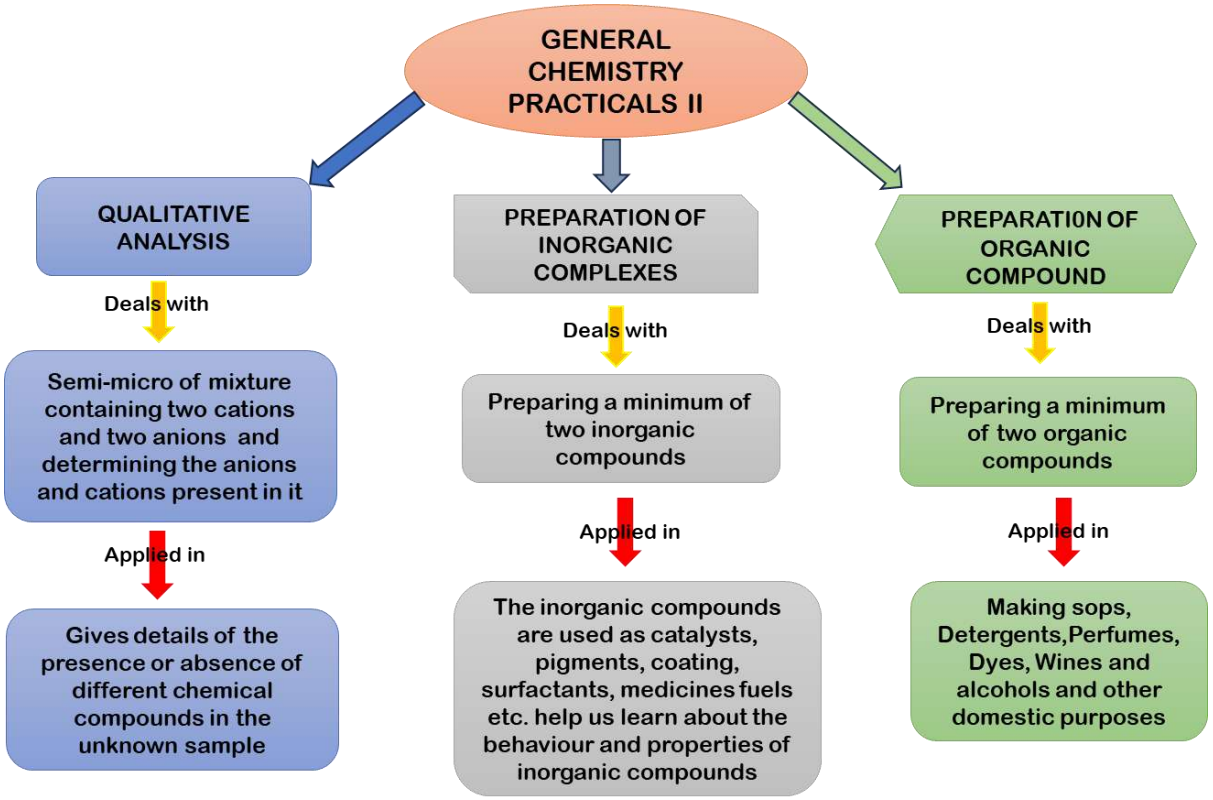
g. Model Question Paper

Sl. No.	Model Questions	Specifications	Level
	Part – A: Objective Type **Multiple choice 10 x 1 = 10**		
1	The denticity of EDTA is A. Monodentate , B. Hexadentate C.Bidentate, D. Tetradentate	Recognize	Remember
2	Accoriding to IUPAC nomenclature sodium nitroprusside is named as A. Sodium pentacyanonitrosyl ferrate (II) B. Sodium pentacyanonitrosyl ferrate (III) C. Sodium nitroferricyanide D. Sodium nitroferrocyanide	Recall	Remember
3	Number of radioactive series A. 1 B. 2 C. 3 D. 4	Recognize	Remember
4	Different elements having same number of neutrons A. Isobar B. Isotopes C. Nuclear Isomer D. Isotones	Recognize	Remember
5	Hydrogen forms Metallic Hydride with A. C B. Be C. Ni D. Cu	Recall	Remember
6	M2O2 A. Acidic oxide B. Oxide C. Super oxide D. Peroxide	Recall	Remember
7	Homolytic fission leads to A. Carbanion B. Carbocation C. Free Radical D. Carboniumion	Identify	Remember

8	Allylic substitution of bromine is carried with A. NBS B. Bromine C. HBr D. NaBr	Recognize	Remember
9	Which is anti-aromatic compound? Benzene b) Pyridine c) Furan d) cyclobutadiene	Identify	Remember
10	The second incoming group goes to which position of the phenol ring A. 1 B. 2 C. 3 D. 5	Recall	Remember
	PART – B Short Answer **The answer should not exceed 200 words 4 x 5 = 20**		
11	a) What are the postulates of Werner's coordination theory (or) b) Explain why square planar complexes do not exhibit optical isomerism.	Explain	Understand
12	a) What are the limitations of VBT? (or) b) Discuss the different types of isomerism in coordination compounds.	Describe	Analyse
13	a) Draw the curve of nuclear stability (or) b) Draw the curve by taking Binding Energy per nucleon against mass number	Differentiate Define	Understand
14	a) The half-life of C-14 is 5730 years. C-14 at the time of death of Mummy is 50 mg. Now the concentration of C-14 is 3.125mg. Calculate the age of Mummy. (or) b) What are the types of nuclear reactions? Give examples.	Assess	Skill
PART – C Essay Answer **The answer should not exceed 400 words 3 x 10 = 30**			
15	a) Explain Lewis, Lux Flood and Arrhenius concept of acids and bases. (or) b) What are hard and soft acids and bases? Explain with example	Describe	Analyse
16	a) Write a short note on Markovnikov's rule, peroxide effect, and hydroboration (or) b) How to prepare 1,3-butadiene and explain its stability	Explain	Understand
17	a) List the conditions for a compound to be aromatic, non-aromatic, and anti-aromatic with examples. (or) b) Describe the characteristic features of benzene.	Illustrate	Apply

SEMESTER - IV					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10416	General Chemistry Practical II	0	0	2	2
Internal	60	External	40	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Learn systematic analysis of cations and anions	Understand
CO 2	Design the synthesis of inorganic compounds	Create
CO 3	Preparation of organic compounds and their derivatives	Skill
CO 4	Apply the principle of analysis of organic compounds	Analyze

b. Syllabus

Units	Content	Hrs.
I	**Qualitative Analysis:** Semi-micro analysis of a mixture containing two anions (Interfering anions) and two cations.	32
II	**Preparation of inorganic complexes** minimum two complexes	8
III	**Preparation of organic compounds** 1. Single-step preparation of organic compounds (minimum two complexes)	8
IV	Qualitative analysis of simple organic compounds. (Acid, Alcohol, Aldehyde, ketone, Ester, and Phenol)	16
	Reference books V. V. Ramanujam, Inorganic Semi-micro Qualitative Analysis, 3rd Edition, National Publishing Company, l990. G. Brauer (Ed.), Handbook of Preparative Inorganic Chemistry (Vol. I and II), Academic Press, 1963. Bansal R. K., Laboratory Manual in Organic Chemistry, New Age International Pvt Ltd Publishers, 2009. Monograph on Green Chemistry Laboratory Experiments, Ranu, B. C., (Ed.) Green Chemistry Task Force Committee, DST, New Delhi, 2012	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	2	3	3	3
CO2	3	3	3	3	2	3
CO3	3	3	3	2	2	3
CO4	3	3	2	3	2	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	Total
Internal	15	15	15	15	60
External	10	10	10	10	40
Total	**25**	**25**	**25**	**25**	**100**

e. Mapping Course Outcome with Internal Assessment (60 Marks)

	CO1	CO2	CO3	CO4
Punctuality and safety measures taken	3	3	3	3
Knowledge about the experiment	4	4	4	4
Handling of apparatus and recording of observation	2	2	2	2
Maintenance of record book	4	4	4	4
Attendance	2	2	2	2
Total	15	15	15	15

f. Mapping Course Outcome with External Assessment (40 Marks)

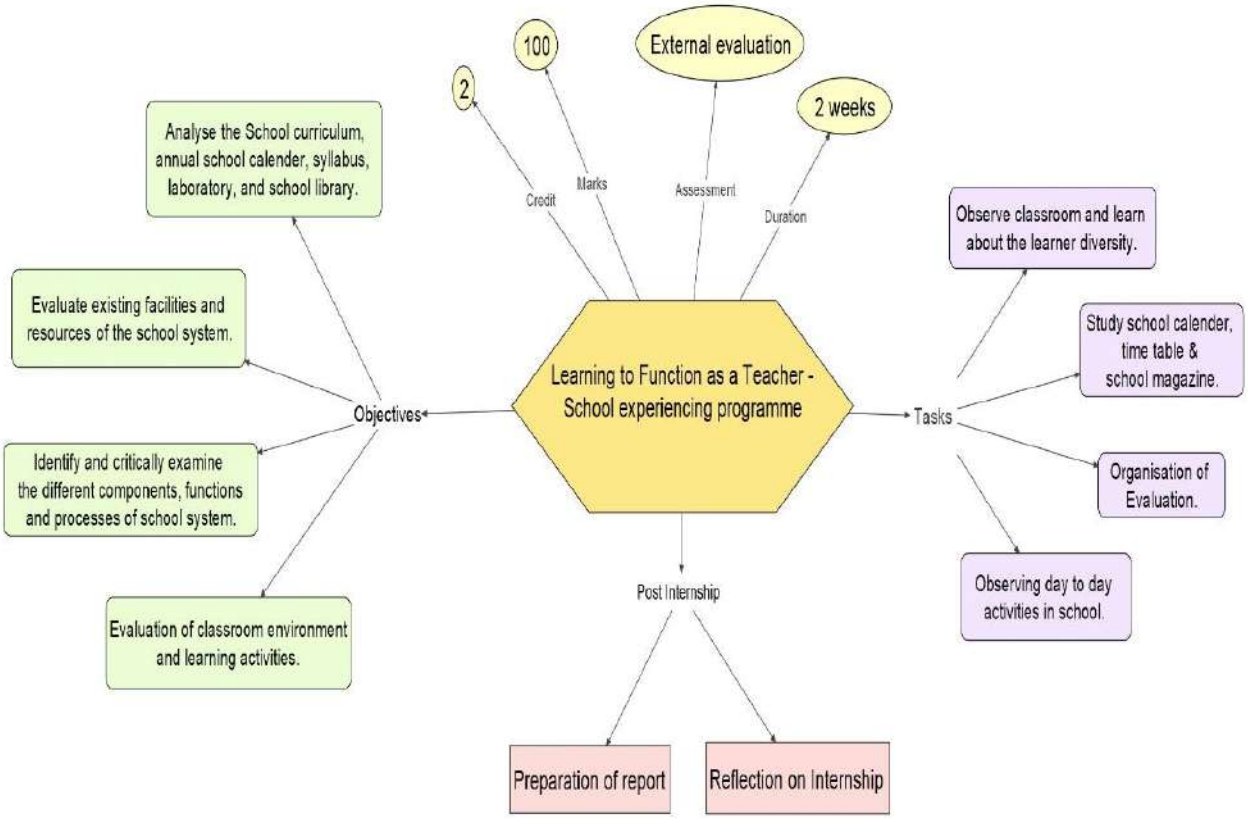
Category	CO1	CO2	CO3	CO4
Part – A	10	10	10	10
Total	**10**	**10**	**10**	**10**

g. Model Question Paper

Sl. No.	Model Questions	Specification	Level
	Part – A: Descriptive Type **1 x 40 = 40**		
1	a) Identify the acid and basic radicals from the given salt mixture. b) Synthesis of Prussian blue and report the yield of the compound	Recognize	Remember

SEMESTER - IV					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10417	School observation	0	0	2	2
Internal	100	External	0	Total	100

Course content overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Identify and critically examine the different components, functions and processes of school system.	Understand
CO 2	Making reflective diaries based on the everyday experience, interaction and observation of the school.	Apply
CO 3	Organising the school curriculum, annual school calendar, syllabus and textbook.	Analyse
CO 4	Experience and analyse classroom process with respect to methods followed, resources used and teachers and learner's role in learning process.	Create
CO 5	Evaluate the existing facilities and resources of the school system and preparing a detailed report.	Skill

b. Syllabus

S.No.	Content	Time
I	**School Experience Program** The student teachers are required to visit Government and private schools (multicultural) located in the rural and urban regions and carryout the following activities and record it in the observation file.	2 weeks
	Tasks and Assignments: Each student is required to submit the following • Observing the day to-day school activities such as morning assembly, functioning of the school library, functioning of the laboratory, games and sports. • Observe the classroom and learn about the learner diversity. • Study the school calendar, timetable, school magazine and organisation of evaluation. • Write a reflective diary on everyday experience, interaction and observations in the school. • Attendance involvement, enthusiasm commitment (based on observation made by the mentors and institution supervisors) and report presentation.	

c. Mapping of program outcomes with course outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	2	3	3
CO2	2	3	3	1	3	3
CO3	3	2	3	3	1	2
CO4	3	3	3	3	3	3
CO5	3	3	2	1	2	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	0	0	0	0	0	**0**
External	20	20	20	20	20	**100**
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping course outcome with External Evaluation (100 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Reporting of observation of school activities and preparation of school profile	20	-	-	-	-
Reporting of Participation in regular school activities and the resources of the school (attendance; engaging substitute classes; morning assembly) organization of activities	-	-	-	-	20
Report on the study of school lab, library, school playground, with respect to secondary school requirements	-	-	20	-	-
Preparation of a detailed report containing the analysis of the school system and the reflection of student teachers.	-	20	-	-	-
Observation of regular teacher lessons and analyse the methods of teaching involved	-	-	-	20	-
Total	**20**	**20**	**20**	**20**	**20**

f. Rubrics for tasks

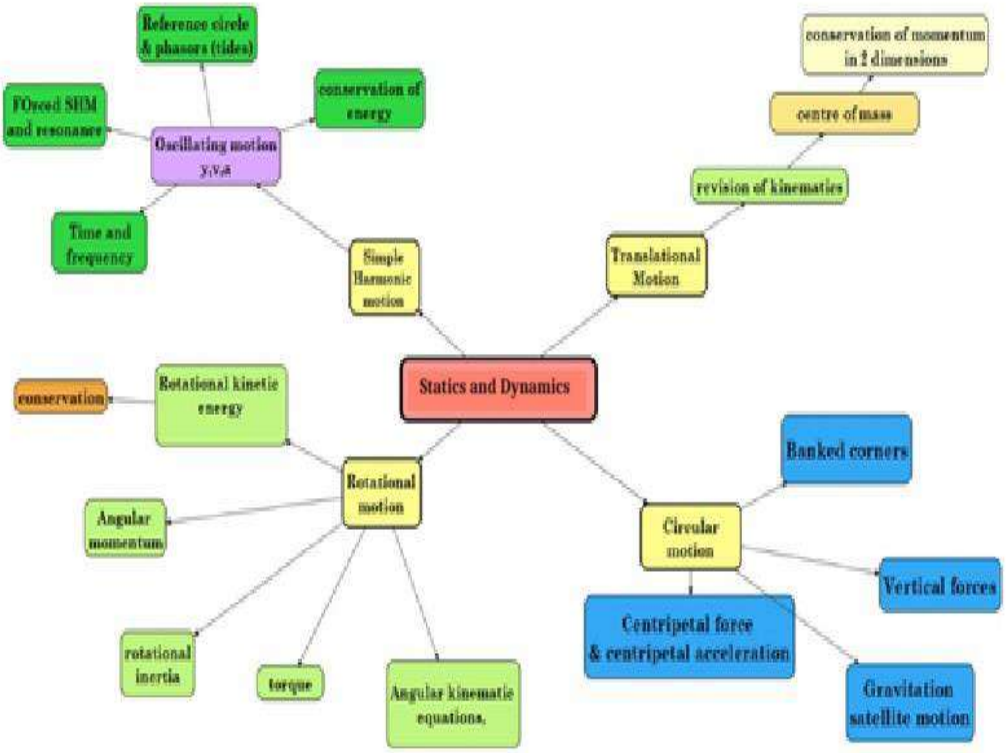
Sl.No	Criteria	100%	75%	50%	25%	0%	Relation to COs
1.	**Preparation of School profile – 50%**	Explained specific information about school in detail.	School profile was written correctly and details are mostly specific	Some details were missing in the school details.	Not enough content.	Not attended	**CO1, CO2, CO3**

2.	**Participation in school activities - 20%**	Participated in school activities like, attendance, engaging substitute classes and morning assembly regularly without any fail.	Participated in school activities like, attendance, engaging substitute classes and morning assembly frequently.	Participated in some of the school activities. Not all.	Participated in school activities very rarely	Not attended	**CO1, CO2, CO3**
3.	**Report on study of school - 10%**	Reported minute details about the school like laboratories, library, playground and other facilities in detail.	Reported about school lab, library and play ground with specific details.	Brief report about school lab, library and playground.	Not enough information.	Not attended	**C05, CO4**
4.	**Observation 20%**	Observation of lessons and reporting all of the specific details about it.	Observation and report of the class with most of the details.	Observation of the lessons and reporting them appropriately.	Not reported properly	Not attended	**CO2, CO4**

SEMESTER - V

SEMESTER V					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDUI0511	Statics and Dynamics	4	0	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcomes (COs)

On the successful completion of the course, the student will be able to

	Course Outcomes	Level
CO 1	State basic concepts and principles of statics and dynamics of particles in two and three-dimensions	Understand
CO 2	Apply Newtonian mechanics to model and predict the responses of simple dynamical systems (particle and rigid body) subjected to applied forces	Apply
CO 3	Identify the equilibrium for different mechanical systems	Analyze
CO 4	Develop problem-solving skills in mechanics through the application of concepts in statics and dynamics to complex problems	Evaluate
CO 5	Construct a simple mechanical system	Create

b. Syllabus

Units	Contents	Hrs.
I	**Forces acting at a point:** Newton's laws of motion, resultant of two forces on a particle, equilibrium of a particle, limiting equilibrium of a particle on an inclined plane.	13
II	**Parallel forces, Moments and Couple:** Moment of a force, general motion of a body, equivalent systems of forces, parallel forces, forces acting along a triangle, a specific reduction of forces, reduction of coplanar forces into a force and couple, problems involving frictional forces.	13
III	**Work, Power and Energy:** Work, conservative field of force, power, rectilinear motion under varyingforce, simple harmonic motion along a horizontal line and along a vertical line.	13
IV	**Plane motion – Projectiles**: Forces on a projectile, time of flight, range on an inclined plane.	13
V	**Coplanar motion – Central orbits:** Impulses, fundamental laws of impact, impact of a smooth sphere on a fixed smooth plane, direct and oblique impact, loss of kinetic energy due to impact. general orbits, central orbit, and conic as a centered orbit.	12
	Tasks and Assignments : The student shall understand how to solve real-world problems using various laws. The assignment will give scope for a student to consolidate and reproduce the subject content seen in	

	the classroom. The following are the thrust areas selected for assignment/oral presentation Expertise in the basics of forces and motion by applying in real-world problems. Presentations on projectiles and central orbits with the help of models Know the concept of simple harmonic motion. **References:** S. L. Loney (1904), The Elements of Statics and Dynamics, Cambridge University Press. A. Ruina and R. Pratap (2014), Introduction to Statics and Dynamics, Oxford University Press. J. L. Meriam and L. G. Kraige (2012), Engineering Mechanics: Statics, Seventh Edition, Wiley and sons Pvt ltd., New York. J. L. Meriam, L. G. Kraige and J.N. Bolton (2015), Engineering Mechanics: Dynamics, Eighth Edition, Wiley and sons Pvt ltd., New York. A. K. Dhiman, P. Dhinam and D. Kulshreshtha (2015), Engineering Mechanics (Statics and Dynamics), McGraw Hill Education (India) Private Limited, New Delhi. https://nptel.ac.in	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	2	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	2	2	3	3	2	2
CO5	1	1	2	3	2	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	20	20	20	20	20	100

e. Mapping course outcome with Internal assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assignment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 5 x 4 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	12	12	12	12	12

g. Model Question paper

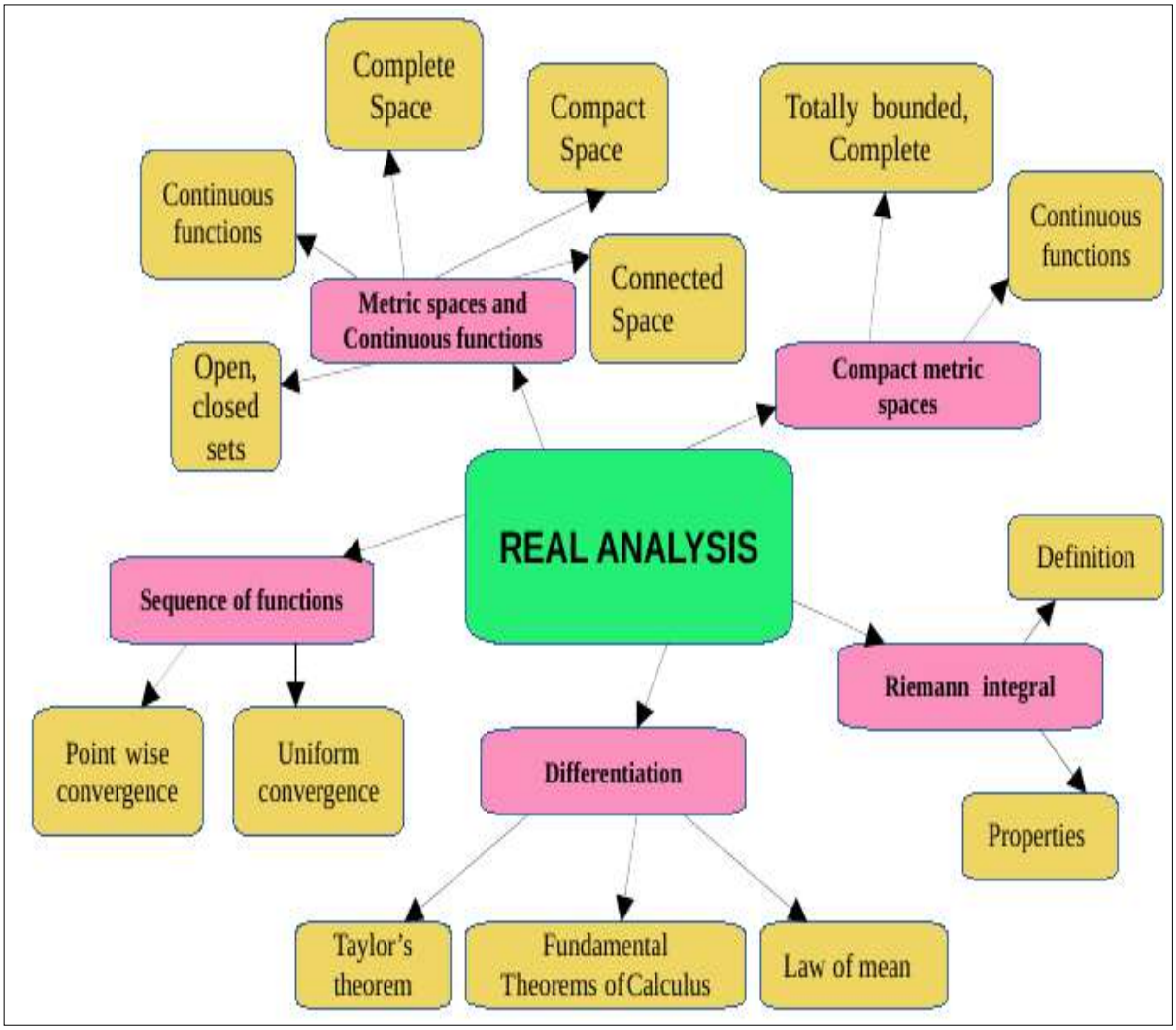
SI.NO	Model Questions	Specification	Level
	Part – A: Objective Type Multiple choice 10 x 1 = 10		
1	Forces are called concurrent when their lines of action meet in A. one point B. plane C. two points D. perpendicular planes	Recognize	Remember
2	The algebraic sum of the resolved parts of a number of forces in a given direction is equal to the resolved part of their resultant in the same direction. This is as per the principle of A. forces B. dependent of forces B. resolution of forces D. balance of forces	Infer	Understand
3	According to law of the triangle of forces, A. three forces acting at a point will be in equilibrium. B. Three forces acting at a point can be represented by a triangle, each side being proportional to the force. C. If three forces acting upon a particle are represented in magnitude and direction by the sides of a triangle, taken in order, they will be in equilibrium. D. If three forces acting at a point are in equilibrium, each force is proportional to the sine of the angle between the other two.	Infer	Understand
4	Centre of gravity of a solid cone lies on the axis at the height A. ¼ of the total height above the base. B. 1/3 of the total height above the base. C. 1/2 of the total height above the base	Indicate	Understand

	D. 3/8 of the total height above the base.		
5	The ratio of limiting friction and normal reaction is known as A. along the plane B. horizontally C. Vertically D.at an angle equal to the angle of friction to the inclined plane.	Find	Understand
6.	On the ladder resting on the ground and leaning against a smooth vertical wall, the force of friction will be A. downwards at its upper end. B. upwards at its upper end. C. perpendicular to the wall at its upper end. D. Zero at its upper end	Find	Understand
7.	Which of the following is not a vector quantity? A. Weight B. velocity C. acceleration D. force	Identify	Understand
8	A framed structure is perfect if it contains members equal to (n=number of joints in a frame) A. 2n-3 B. n-1 C. 2n-1 D. n-2	Infer	Understand
9	Centre of gravity of a thin hollow cone lies on the axis at a height of A. ¼ of the total height above the base B. 1/3 of the total height above the base C. ½ of the total height above the base D. 3/8 of the total height above the base.	Infer	Understand
10	There are two points P and Q on a planar rigid body. The relative velocity between the two points A. Should always be along PQ B. Can be oriented in any direction C. Should always be perpendicular to PQ D. Should be along QP when the body undergoes pure translation.	Calculate	Apply
PART – B Short Answer **The answer should not exceed 200 words 4 x 5 = 20**			
11	a) Explain superposition law and the law of transmissibility or	Verify	Understand

	b) B) Define the equilibrium of a body and give conditions of equilibrium when subjected to forces.		
12	a) Differentiate centroid and center of gravity? Or b) Write an impulse-momentum equation.	Solve	Understand
13	a) State work-energy theorem for a system of particles. Or b) State and parallel axis theorem	differentiate	Understand
14	a) Find the product of inertia of a rectangle of sides a and b with respect to the axes that lie along its two sides. Or b) What is the significance of Moment of Inertia?	Show	Apply
PART – C Essay Answer **The answer should not exceed 400 words 3 x 10 = 30**			
15	a) What do you understand by the term "COUPLE"? Discuss the characteristics of a couple. 0r b) Derive the expression for the work energy of a body in motion.	Solve	Apply
16	a) An isosceles triangle section ABC has a base of 100mm and 60mm in height. Determine the moment of inertia of the triangle about the centroid and about the base. Or b) State and prove the parallel axis theorem with a diagram.	Find Prove	Apply
17	a) Determine the work done by an electric motor in winding up a uniform cable that hangs from a hoisting drum if its free length is 20m and weighs 800N. The drum is rotated by the motor. Or b) Explain (i) the coefficient of friction (ii) cone of friction.	Find Illustrate	Apply

SEMESTER - V					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10512	Real Analysis	4	0	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Understand the essential properties of the distance functions	Understand
CO 2	Apply the property of completeness, connectedness and compactness	Apply
CO 3	Analyze the notion of area and the ways of measuring area of the region under a graph.	Analyze
CO 4	Appraise the mean value theorems and the Fundamental theorem of calculus.	Evaluate
CO 5	Construct approximations to functions by using simple functions like, polynomials.	Create

b. Syllabus

Units	Content	Hrs.
I	**Metric spaces and Continuous functions** Metric space, continuous functions on metric spaces, open sets, closed sets, interior, closure, discontinuous function on R, connectedness, completeness and compactness, more about open sets, connected sets.	12
II	**Compact metric spaces** Bounded sets and totally bounded sets, complete metric spaces, compact metric spaces, continuous functions on a compact metric space, continuity of inverse functions, uniform continuity.	12
III	**Riemann integral** Definition of the Riemann integral, existence of the Riemann integral,properties of Riemann integral.	12
IV	**Differentiation** Derivatives, Rolle's theorem, law of mean, fundamental theorems ofcalculus, Taylor's theorem.	13
V	**Sequence of functions** Point wise convergence of sequences of functions, uniform convergenceof sequences of functions.	12

	Tasks and Assignments: Each student is required to submit the following: ✓ Solution to homework problems. ✓ Group discussion on problem solving. ✓ Assignment on Exponential and Logarithmic functions **References:** R. R. Goldberg, Methods of Real Analysis, John Wiley &sons, Second Edition. (Indian Edition - Oxford and IBH Publishing Co, New Delhi, 2020). W. Rudin, Principles of Mathematical Analysis, Wiley International Edition, 1985. T. Apostol, Mathematical Analysis, Second Edition, Narosa Publishing House, 1985. R. G. Bartle and D. R. Sherbert, Introduction to Real Analysis, Third Edition, Wiley International Student Edition, 2001. A. Kumar and S. Kumaresan, A Basic Course in Real Analysis, CRC Press, 2014. K. A. Ross, Elementary Analysis: The theory of Calculus, Springer International Edition, Indian Reprint, New Delhi, 2004.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
CO1	3	3	3	3	2	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	2	2	1	3	2	2
CO5	1	1	1	1	2	3

d. Evaluation Scheme

	CO1	**CO2**	**CO3**	**CO4**	**CO5**	**Total**
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 4 x 5 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	**12**	**12**	**12**	**12**	**12**

g. Model Question Paper

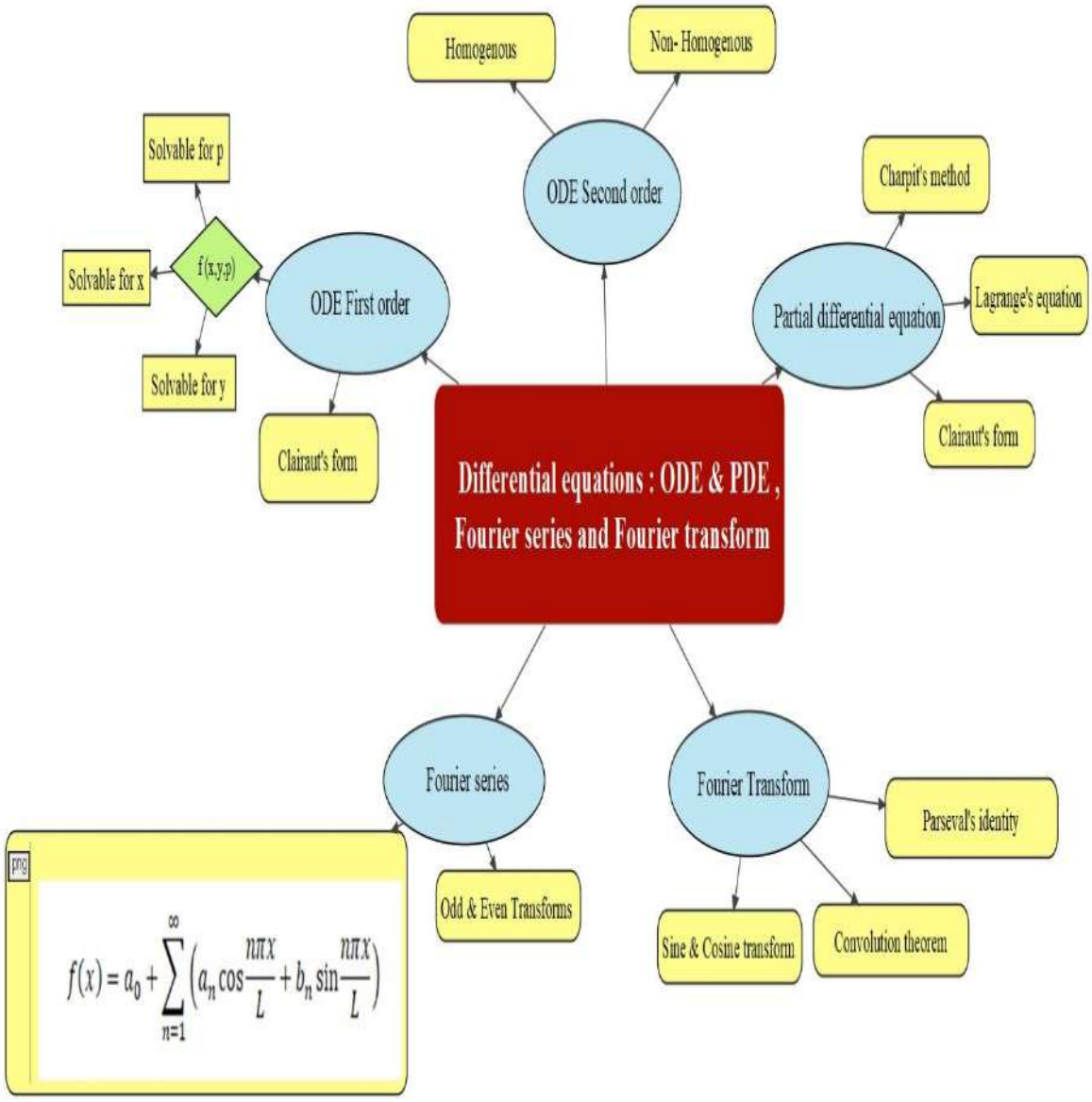
Sl. No.	Model Questions	Specifications	Level
	Part – A: Objective Type Multiple Choice Marks: 10 x 1 = 10		
1	A function f is continuous at a € M if lim f(x)= ------- $x \to a$ (a) f(b) (b) f(c) (c) f(a) (d) f(x)	Recognize	Remember
2	A subset A of M is said to be dense in M if $\bar{A}$ =_____ (a) A (b) M (c) empty set (d) $\bar{A}$	Recall	Remember
3	A Metric space <M, ρ> which is both complete and totally bounded is said to be _____ (a) connected (b) complete (c) compact (d) discrete	Recognize	Remember
4	Real valued continuous function on a compact metric space is_____ (a) bounded (b) not bounded (c) not continuous (d) continuous	Recognize	Remember

5	If f is bounded function on the closed bounded interval [a,b], we say that f is_____ (a) Riemann integrable (b) Continuous (c) Bounded (d) None	Recognize	Remember
6	Integral off(x) = 2x+1 over the interval [1,2] =_____ (a) 0 (b) 2 (c) 4 (d) -4	Identify	Remember
7	Metric space [0,1] is _____for [0,1] is a closed subset of R′ (a) Compact (b) Connect (c) Complete (d) None	Recall	Remember
8	Metric space is denoted by _____ (a) <M,p> (b) <M,ρ> (c) <m,ρ> (d) <m,p>	Recall	Remember
9	Let (f_n) converges uniformly to f. Then (a) f is continuous if f_n are continuous (b) f is differentiable if f_n are differentiable (c) f=0 (d) none of the above	Identify	Remember
10	The sequence of functions f_n(x)=x/n, converges (a) pointwise but not uniformly on [0,2023] (b) uniformly on R (c) uniformly on any interval [a,b] (d) uniformly but not point wise on [-1,1]	Identify	Remember
	PART – B Short Answer Marks: 4 x 5 = 20		
11	(a) Answer the following: (i). Define metric space (X, d). (ii). Define open ball B (x, r) in a metric space (X, d). (iii). Draw the open unit ball B (0, 1) in (R^2, $\|.\|_\infty$). or (b) Prove that the limit of a sequence in a metric space is unique.	Explain	Understand
12	(a)Verify that the map f: R → R defined by $f(x) = x^2$ is continuous or (b)Answer the following: (i). Define Cauchy sequence in a metric space (X, d). (ii). Give an example for a Cauchy sequence.	Differentiate Define	Understand
13	(a)A nonempty subset E of a metric space E is closed iff E contains all it limits points. or (b)Let U = R \ Z. Is U being open in R? Justify your answer.	Differentiate	Understand

14	(a)Answer the following: (i). Let X be a metric space and A ⊂ X. Define open cover of A. (ii). Give an example. or Prove that R is not a compact space with standard metric.	Assess	Understand
	PART – C **Essay Answer** **Marks: 3 x 10 = 30**		
15	(a)Define the following (i). Upper and lower Riemann sums. (ii). Riemann integral. or (b)Prove the linearity properties of Riemann integral.	Describe	Apply
16	(a)State and prove Mean Value Theorem for derivative. or (b) State and prove fundamental theorem of calculus for derivative.	Illustrate	Apply
17	(a)State the following. (i). Uniform convergence of a sequence of functions. (ii). Uniform norm on a set of bounded functions and prove that it is a norm. or (b)Let (f_n) converges uniformly to f. Prove that the f is continuous if f_n are continuous.	Explain Discuss	Analyze

SEMESTER V					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10513	Differential Equations	4	0	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcomes (COs)

On the successful completion of the course, the student will be able to

	Course Outcomes	Level
CO 1	Understand the origin of differential equations, its properties and solutions of first and second-order ordinary and partial differential equations	Understand
CO 2	Applying various methods in finding the solution spaces of ordinary differential equations, partial differential equations and Laplace transforms.	Apply
CO 3	Analyzing the properties of ordinary differential equations, partial differential equations and Laplace transforms.	Analyse
CO 4	Obtain the solutions of first and second-order ordinary differential equations, and partial differential equations using the methods mentioned in the syllabus.	Evaluate
CO 5	Discuss the types of solutions and the application of the Laplace transform method for the given differential equations.	Create

b. Syllabus

Units	Content	Hrs
I	**Ordinary Differential Equations:** First order: Exact equations, integrating factors (theory and problems), orthogonal trajectories. Second-order ordinary differential equations with constant coefficients (theory and problems): Homogeneous, solution space. Non-homogeneous, complimentary solution and particular solutions, method of variation of parameters.	13
II	**Laplace Transforms**: Laplace transforms of standard functions, properties of Laplace transforms, inverse Laplace transform and its properties. Dirac delta function, convolution integral. Applications of Laplace transform in solving linear ordinary differential equations with constant coefficients, ordinary differential equations with discontinuous right-hand sides.	13
III	**Partial Differential Equations**: Introduction, formation of partial differential equations, Theory and problems on first order partial differential equations, classification of integrals, Lagrange's method, Pfaffian differential equations, Charpit's method. Homogeneous and nonhomogeneous linear partial differential equations with constant coefficients: Higher order.	13
IV	**Fourier Series**: Half range series, applications to boundary value problems - the vibration of strings, one-dimensional heat equation, steady state two-dimensional heat equations.	13

V	**Fourier Transform**: Properties, applications of Fourier transform to partial differential equations.	12
	Tasks and Assignments: ✓ The student shall understand how to solve the higher order/degree ordinary and partial differential equations, Laplace transforms, and the importance of ✓ Fourier series, Fourier transforms. There will be scope for the application of ✓ the concepts learned. The assignment will give scope for a student to ✓ consolidate and reproduce the subject content seen in the classroom. ✓ This will enable continuous internal evaluation of the student on the ✓ specified objectives. ✓ The following are the thrust areas selected for assignment/oral ✓ presentation ✓ Explain in detail the concepts of higher order/degree ordinary and ✓ partial differential equations with the support of neat ✓ diagrams/charts (not more than 500 words) ✓ Solve differential equations using Laplace transforms with ✓ detailed steps ✓ Explain the concept of Fourier transforms (different types, not ✓ exceeding 10minutes for presentation+5minutes for question & ✓ answers) **References:** E. Kreyszig(2006), Advanced Engineering Mathematics, Ninth Edition, John Wiley and Sons, Singapore. K. A. Stroud (2003), Advanced Engineering Mathematics, Fourth Edition, Palgrave, London. M. Braun(1993), Differential Equations and their applications, Fourth Edition, Springer,. I. N. Sneddon(2006), Elements of Partial Differential Equations, Dover. T. Amaranath(2003), An elementary course in partial differential equations, Narosa Publishing House. T. Myint-U and L. Debnath(2014), Linear Partial Differential Equations for Scientists and Engineers, Birkhäuser, Boston.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	2	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	2	2	3	3	2	2
CO5	3	1	3	3	2	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	20	20	20	20	20	100

e. Mapping course outcome with Internal assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assignment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 5 x 4 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	**12**	**12**	**12**	**12**	**12**

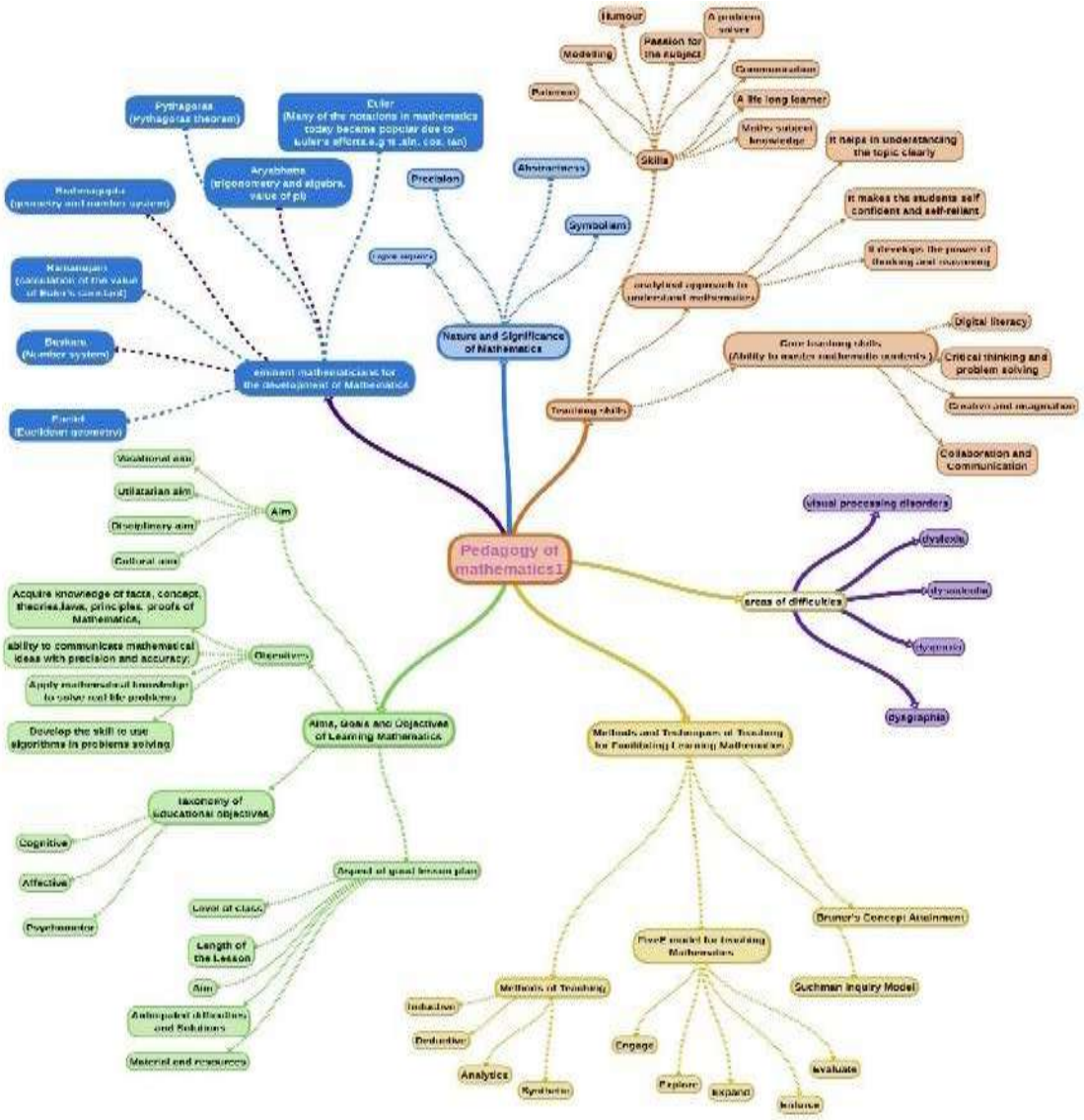
g. Model Question paper

Sl. No.	Model Questions	Specification	Level
	Part – A: Objective Type **Multiple choice 10 x 1 = 10**		
1	Classify the following differential equation $\frac{dx}{dt} = \frac{x+2xt+Cost}{1+t^2}$ A. Separable and not linear B. Linear and not separable C. Both separable and linear D. Neither separable nor linear	Classify	Understand
2	The solution of the differential equation 2 x $\frac{dy}{dx}$ -y = 3 represents a family of A. Straight lines B. Circles C. Parabolas D. Ellipse	Identify	Understand
3	The complementary function of $(D^4 + 2D^2 + 1) = x^2 \cos x$ A. $y= (C_1 + C_2 x) \cos x + (C_3 + C_4 x) \sin x$ B. $y= (C_1 - C_2 x) \cos x + (C_3 - C_4 x) \sin x$ C. $y= (C_1 + C_2 x) \cos x – (C_3 + C_4 x) \sin x$ D. $y= (C_1 - C_2 x) \cos x \_ (C_3 - C_4 x) \sin x$	Determine	Understand
4	P.I of ODE $(D^2 + D-2) y = e^x$ A. $\frac{xe^2}{3}$ B. $\frac{xe^2}{4}$ C. $\frac{xe^2}{5}$ D. $\frac{xe^2}{6}$	Recognize	Remember
5	Form the PDE from $z = (2x^2 + a) (3y - b)$ is a. 12xz = p q b. 12xy =p q c. 12xz = p d. 12xz =q	Find	Understand
6	Form the PDE from z = f (2x -6y) is a. 3q +p b. 3p +1 c. 3p+ q d. 3p =p q	Derive	Apply
7	The incorrect statement from the following choice is a. Sin x is an odd function b. Sin 2x is an odd function c. $\sin^2 x$ is an odd function d. $\sin x^2$ is an even function	Identify	Remember
8	Cos hx defined in (-π, π) is a. An odd function b. An even function c. Constant function d. Neither an odd nor an even function	Identify	Remember
9	The Fourier sine transform of e^{-x} is a. $\sqrt{\frac{2}{\pi}}\frac{s1}{s^2+1}$ b. $\sqrt{\frac{2}{\pi}}\frac{s}{3}$ c. $\sqrt{\frac{2}{\pi}}\frac{s+1}{s}$ d. $\sqrt{\frac{2}{\pi}}\frac{1}{s^2+1}$	Identify	Remember

10	The Fourier cosine transform of e^{-x} is a. $\sqrt{\frac{2}{\pi}}\frac{s}{s^2+1}$ b. $\sqrt{\frac{2}{\pi}}\frac{1}{s^2+1}$ c. $\sqrt{\frac{2}{\pi}}\frac{s^2+1}{s}$ d. $\sqrt{\frac{2}{\pi}}\frac{s}{5}$	Identify	Remember
PART – B Short Answer The answer should not exceed 200 words 4 x 5 = 20			
11	a) Solve $x y p^2 + (x^2 + xy + y^2) p + x^2 + x y = 0$ (OR) b) Solve $y = 3 px + p^2 y^2$	Solve	Understand
12	a) Find the solution of the differential equation $y'' - 8y' + 12y = 9 \cos x + e^{9x}$ (OR) b) Find a general solution to the following differential equation $y'' - 6 y' + 5y = 8 \tan (7t)$	Find	Apply
13	a) Find the complete integral of $x^2 p^2 + y^2 q^2 = z$ (OR) b) Find the complete integral of $q = 3 p^2$	Find	Understand
14	a) Let f(x) be a 2π periodic function such that $f(x) = x^2$ for $x \epsilon [-\pi, \pi]$. Find the Fourier series for the parabolic wave. (OR) b) Find the Fourier series for the triangle wave $f(x) = \{\frac{\pi}{2} + x, if \pi \leq x \leq 0 \frac{\pi}{2} - x, if 0 < x \leq \pi$	Derive	Apply
PART – C Essay Answer The answer should not exceed 400 words 3 x 10 = 30			
15	a) Prove that $\frac{1}{D^2+a^2} \cos ax = \frac{x}{2a} \sin ax$ b) Obtain the general solution of the $(D^3 - 3D^2 + 3D - 1) y = e^x$ (OR) a) Solve $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 4y = 8 (x^3 + e^{2x})$ b) Solve $\frac{dy}{dx} + 2y + xy = 0$	Prove Obtain Solve	Apply
16	a) Find the Fourier series of $f(x) = \frac{x^2}{2}$; $-\pi < x < \pi$. Hence deduce $\sum_{n=1}^{\infty} 2 \frac{1}{n^2}$. OR a) Obtain the Fourier series of $f(x) = x - x^2$ in $(-\pi, \pi)$ Hence deduce $\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \cdots = \frac{\pi^2}{12}$	Deduce	Analyse
17	a) Find Fourier Sine & Cosine transform of $\frac{1}{x}$ and $2 e^{-3x} + 3 e^{-2}$ (OR) b) i) Find Fourier transform of the bar function $f(x) = \{1 \quad if -\pi < x < \pi \frac{1}{2} \quad if x = \pm\pi 0 \quad Otherwise$ ii) Find the Fourier transform of $e^{-x\frac{2}{2}}$	Determine	Apply

SEMESTER - V					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10514	Pedagogy Course in Mathematics I	3	1	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcomes (COs)

On the successful completion of the course, the student will be able to

	Course Outcomes	Level
CO 1	Explain the nature and Significance of learning mathematics.	Remember
CO 2	Illustrate Suchman's Enquiry Model and Bruner's Concept Attainment Model.	Understand
CO 3	Analyze the Appropriate use of ICT for Teacher Professional Development.	Apply
CO 4	Develop a lesson plan based on five e model.	Analyze
CO 5	Justify the difficulties and phobias of learning mathematics.	Skill

b. Syllabus

Units	Content	Hrs.
I	**Nature, Scope and Historical Perspective of Mathematics:** Development of Mathematics from a historical perspective, Meaning and Characteristics of Mathematics – Nature of Mathematics, Precision, Logical Structure, Abstractness, Symbolism, inductive - deductive reasoning, theorems, mathematical modeling. Need and Significance of Learning Mathematics. Scope of Mathematics- Mathematics in day-to-day activities in our life, various fields, discipline,s and subjects- History of Mathematics –Vedic Mathematics Contribution of eminent mathematicians to the development of Mathematics	12
II	**Aims and Objectives of Teaching Mathematics** Aims: Practical, Disciplinary, Cultural, Vocational, Social and AestheticTaxonomy of Educational objectives: cognitive, affective, and psychomotor domains for teaching Mathematics –Revised Bloom's Taxonomy of Educational objectives with specifications – General Instructional Objectives – Writing General Instructional objectives, specific learning outcomes and teaching Points of various content are as in Mathematics–Lesson planning–different Models/approaches for writing lesson plan–Unit Plan, Year Plan.	13
III	**Pedagogical Aspects of Mathematics:** Implication of various approaches of teaching Mathematics – inductive deductive, analytical synthetical, constructivist, blended learning, experiential learning, trans-disciplinary, interdisciplinary, and multidisciplinary. Learner-centric and participative methods of teaching Mathematics: lecture cum demonstration, problem-solving, laboratory, project-based. Analytical pedagogical concerns in teaching of Mathematics for higher-order thinking skills such as critical, creative, decision-making, reflective, collaborative, and cooperative. Techniques of teaching-learning Mathematics: oral, written, drill work, homework, self-study, group study, supervised study, concept-mapping, learning, art and sports-integrated learning. Bruner's Concept Attainment Model	13
IV	**Teaching skills**: Meaning, analytical approach to understanding the teaching-learning process in Mathematics in terms of teaching skills – relevant teaching skill in teaching of mathematics – core Teaching skills, meaning, components, observation procedure, writing lesson plan.	13

V	**Research in Mathematics teaching:** Research in the field of mathematics and mathematics teaching– status of achievement in mathematics at elementary and secondary schools– areas of difficulties – phobia for and attitude towards mathematics learning–factors related to mathematics learning– Action research–the implication of research findings.	13
	Task and Assignment ✓ Practice a minimum of 3 Micro teaching skills and maintain the record. (Compulsory) ✓ Study any one of the eminent mathematicians and his contribution to the development of Mathematics– submit a report ✓ Writing specific objectives and teaching points of content are as in Mathematics. ✓ Collection of articles relevant to recent developments in Mathematics. ✓ Prepare a year plan for any standard at the Secondary level. ✓ Prepare a lesson plan for any topic in Mathematics based on the Inquiry Training Model or Concept Attainment Model. ✓ Preparation of one e-learning material in any topic of mathematics. **References:** Aggarwal,J.C.(2008).Teaching of Mathematics. UP: Vikas Publishing House Pvt Ltd Joyceand Marsha Weil (1985) Models of Teaching. New Delhi: Prentice- hall of India. Burner, J. S. (1962). The process of education. Cambridge: Harvard University PressBenjami1n. Bloom Ede (1974). Taxon E. Merril, Books Inc. Gagne, R. M. (1990). The learning principles: Analysis of concept learning. New York: Merrill Publishing Company.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	2	1	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	2	3
CO5	2	3	2	3	2	1

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 4 x 5 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	**12**	**12**	**12**	**12**	**12**

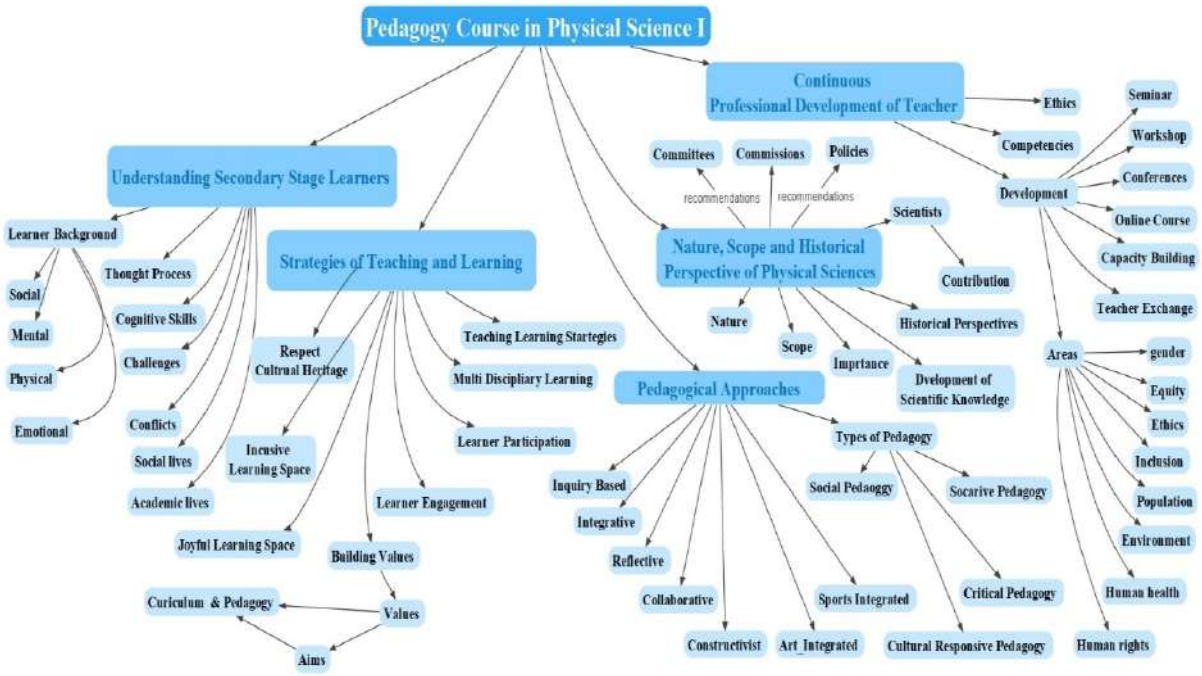
g. Model Question Paper

Sl. No.	Model Questions	Specification	Level
	Part – A: Objective Type Multiple Choice Marks: 10 x 1 = 10		
1	Identify the type of the following word problem: "I have 6 pencils. Manish has two more than me. How many pencils does Manish have?" A. Comparison addition B. Comparison subtraction C. Take away addition D. Take away subtraction	Identify	Remember
2	Things which are equal to the same things are equal to one another. This axiom is the basis to arithmetic and algebra is given by A. Euclid B. Pythagoras C. Descartes D. Euler	Recall	Remember
3	In Suchman's Inquiry Model puzzling problem is called: A. Comprehending B. Trial and error C. discrepant event D. critical	Recognize	Remember
4	The 'doing' aspect of behavior falls in the: A. Cognitive domain B. Affective domain C. Psychological domain D. Conative domain	Recognize	Remember
5	Out of the following, Mathematics is a A. Concrete Science B. Abstract Science C. Physical Science D. Relative Science	Recognize	Remember
6	The inquiry training model is why to the family of models namely A. Information processing B. Behavior modification C. Personal D. Social interaction	Recognize	Remember
7	What is teaching through the deductive method?	Recall	Remember

	A. General to specific B. specific to General C. Macro to micro D. Easy to difficult		
8	A student can gain speed in mathematical calculation by A. Discussion or debate B. Oral work C. Written work D. Practice	Recall	Remember
9	In learning disabilities, the name for mathematical disorder is: A. Dyspraxia. B. Dyslexia C. Discalculia D. Dysphasia	Identify	Remember
10	Dyslexia is a learning disorder A. Reading B. Standing C. Speaking D. Writing	Identify	Remember
PART – B Short Answers The answer should not exceed 200 word Marks: 4 x 5 = 20			
11	a) Discuss the nature of Mathematics (or) b) Discuss the Need and Significance of Learning Mathematics.	Explain	Understand
12	a) Differentiate between Inductive and Deductive methods of teaching (or) b) Define five E-Models for Teaching Mathematics.	Differentiate Define	Understand
13	a) What are the qualities of a Mathematics Teacher? or b) Define the Taxonomy of Educational objectives.	Cite Define	Understand
14	a) Illustrate Suchman's Enquiry Model (or) b) Illustrate Bruner's Concept Attainment Model.	Illustrate	Apply
PART – C Essay Answer The answer should not exceed 400 words. Marks: 3 x 10 = 30			
15	a) Describe the appropriate use of ICT for Teacher Professional Development(or) b) What are the attributes of a good lesson plan?	Describe attribute	Analyze
16	a) Explain the contribution of eminent mathematicians: Aryabhatta, Brahmagupta, Baskara, Ramanujam, Euler,(or) b) Discuss the scope of Mathematics.	Explain Discuss	Understand
17	a) Develop a lesson plan for any topic in Mathematics based on the five e model. (or) b) Justify the difficulties and phobias of learning mathematics.	Develop Justify	Create

SEMESTER V					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10515	Pedagogy Course in Physical Science I	3	1	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcomes (COs)

S No	Course Outcomes	Level
CO1	Understanding secondary-stage learners	Understand
CO2	Analyse strategies for Teaching and Learning.	Analyse
CO3	Analyse Pedagogic Approaches for Physical Science Teaching-Learning	Analyse
CO4	Understand the nature, scope and historical perspectives of Physical Science.	Understand
CO5	Understand the meaning, need and importance of continuous professional development of teachers.	Understand

b. Syllabus

Unit	Content	Hours
I	**Understanding Secondary Stage Learners** Understanding the learners and learner background - The physical, mental, social, and emotional growth of learners; Thought processes and cognitive skills of learners-Psychological and social orientations of learners- Social and academic lives of learners- Conflicts and challenges of secondary learners- Characteristics of secondary stage learners- Observing the unique capabilities of a child	12
II	**Strategies of Teaching and Learning** Understanding teaching and learning strategies: Concept, characteristics and functions of teaching; Making abstract concepts enjoyable by relating them to real-life situations; Promoting multidisciplinary learning through the integration of different disciplines; Promoting learner participation and engagement in learning; Building values through art-integrated activities, community engagement etc.; Promoting multidisciplinary learning through the integration of different disciplines; Promoting health and social sensitivities' Developing respect toward cultural heritage; Making classrooms inclusive and joyful learning spaces - Relationship between Aims and Values of Education, Curriculum and Pedagogy.	15
III	**Pedagogical Approaches** Pedagogical approaches: constructivist approach; collaborative approach; reflective approach; integrative approach, inquiry- based approach; other contemporary approaches, art-integrated learning, sports- integrated learning- Types of pedagogy: social pedagogy; critical pedagogy; culturally responsive pedagogy; Socratic pedagogy in inclusive setup -Role of pedagogy in effective learning: how does pedagogy impact the learner?	15
IV	**Nature, Scope and Historical Perspective of Physical Sciences** Nature, scope, and importance of Physical Sciences- Historical perspective of Physical Sciences-Development of scientific knowledge; facts, concepts, theories, laws - Contributions of Indian (ancient and modern) and other scientists- Physical Sciences, society and human and sustainable	12

	development- Recommendations/suggestions of various committees, commissions, and policies in reference to Physical Sciences.	
V	**Continuous Professional Development of Teacher** Meaning and need, professional and ethical competencies and need for updating content and pedagogical competencies to develop their professional competencies- Professional development activities: seminars, conferences, orientation programmes, workshops, online and offline courses, competitions, publications, development of teaching portfolio, capacity building programmes, and teacher exchange programmes- Development of professional competencies to deal with gender issues, equity and inclusion, ethical issues, environmental issues, human health and well-being, population, human rights, and various issues (emotional, mental, physical issues related to pandemic (for example covid-19).	10
References		
	National Curriculum Framework 2005, NCERT, New Delhi. Steve Alsop, Keith Hicks (2007). Teaching Science: A Handbook for Primary and Secondary School Teachers, Kogan Page, New Delhi. NCERT, Pedagogy of Science- Physical Science Part I – Text Book for B.Ed. ‘ NCERT, Pedagogy of Science- Physical Science Part II – Text Book for B.Ed. Joshi, S.R. (2005). Teaching of Science. A.P.H. Publishing Corporation, Daryaganz, New Delhi. Kaur, M., & Singh, A. (2008). Modern Approach to Teaching of Science. Modern Publishers, Jalandhar. McComas, F. W. (1998). The Nature of Science in Science Education: Rationales and Strategies (Ed.). The Netherlands: Kluwer Publishers Einstein, A. Major Contributions to Science. The Columbia Electronic Encyclopedia, 6th ed., Columbia University Press. Gupta, K. (2018). Contribution to Physics: Sir C. V. Raman. International Journal of Trend in Research and Development. Vol. 5(2), 2394-9333. https://www.famousscientists.org/images1/isaac-newton-two-prisms.png https://learnodo-newtonic.com/wp-content/uploads/2016/03/Bohrs-Complementarity.webp https://learnodo-newtonic.com/wp-content/uploads/2016/03/Diagram-explaining-wavefunction-collapse-of-the-Copenhagen-Interpretation.webp Aims and Objectives of Science (2020). https://gradeup.co/aims-and-objectives-of-science-i Arons, A.B. (1997). Teaching Introductory Physics. The University of Michigan:	

	Wiley. Gabel, D. (1994). Handbook of Research on Science Teaching and Learning. The University of Michigan: Macmillan. Heywood, D. & Parker, G. (2010). The Pedagogy of Science. https://www.researchgate.net/publication/27399992_The_Pedagogy_of_Physical_Science. OECD (1998). The Professional Development of Teachers. Retrieved June 20, 2020 from https://www.oecd.org/berlin/43541636.pdf Science in School (2017). https://www.scienceinschool.org/content/issue-4	

c. Mapping of Programme Outcome with Course Outcomes

	CO1	CO2	CO3	CO4	CO5
PO1	3	3	3	1	3
PO2	3	3	3	3	3
PO3	2	3	2	3	2
PO4	3	2	3	2	3
PO5	1	3	3	3	3
PO6	3	3	3	1	3

d. Evaluation Scheme

Components	CO1	CO2	CO3	CO4	CO5	Total
Internal	5	13	12	5	5	40
External	10	15	15	10	10	60
Total	15	18	17	15	15	100

e. Mapping Course Outcomes with Internal Assessment

Components	CO1	CO2	CO3	CO4	CO5	Total
Assignments	-	7	7	-	-	14
Seminar	-	6	-	-	-	6
Test	5	-	5	5	5	20
Total	5	13	12	5	5	40

f. Mapping Course Outcomes with External Assessment

Type	CO1	CO2	CO3	CO4	CO5	Total
Objective Type	2	2	2	2	2	10
Short Answer	4	4	4	4	4	20
Long Answer	-	10	10	5	5	30
Total	6	12	16	11	11	60

g. Activities/ Internal Assessment Tasks

Sl. No	Tasks	CO
1	Present the analysis of the scope for teaching Physical Science through a Multi-Disciplinary Approach.	CO2
2	Analyse different pedagogical approaches for teaching Physical Science	CO3

h. Model Question Paper

Q No	Question	Specification	Level

PART A Answer all questions. Each question carries 1 mark.			
1	Which of the following represents the psycho-social development stage between the ages 6-12 years? a. Initiative vs. Guilt b. Industry vs. Inferiority c. Identity vs. Role Confusion d. Intimacy vs. Isolation Answer: b	List	Understand
2	Select the best cognitive process comes under the evaluating level of the cognitive domain. a. Identify b. Describe c. Justify d. Devise Answer: c	List	Understand
3	As a secondary school teacher, you are planning for a group discussion, and you assign different roles for each group member. Which of the following is the focus here? a. The tasks assigned b. Motivate the learners c. Assuring active participation and involvement d. Reinforcement for learners Answer: c	Analyse	Analyse
4	While dealing with the topic of laws of motion, you provide an assignment which covers different subjects to explore. Here, as a teacher, you are providing…….. a. Scope for multi-disciplinary exploration b. Scope for better understanding of the laws c. Scope for collaboration and cooperation d. Scope for active participation of the learner Answer: a	Analyse	Analyse
5	While teaching acids and bases, learners take up a project of analysing different materials in the home kitchen as acid and base using litmus paper tests. Here, the learners are able to learn more	Analyse	Analyse

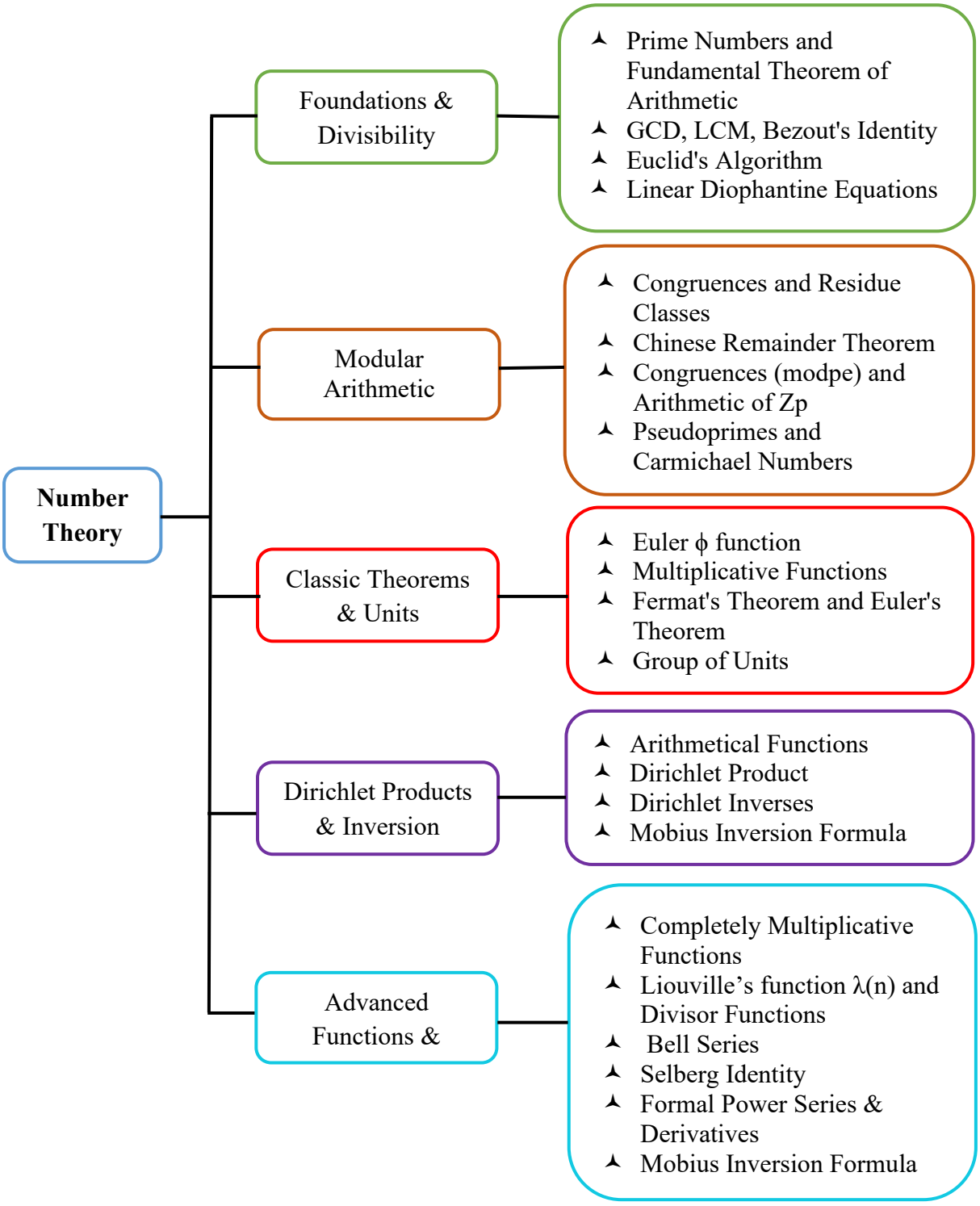
	about acids and bases through ……approach of learning. a. Constructivist b. Behaviourist c. Critical Pedagogy d. Culturally Specific Pedagogy Answer: a		
6	In your class, the majority of the students are very good at group work and inquisitive in nature. Which pedagogical approach will be suitable for addressing these students? a. Collaborative Learning b. Cooperative Learning c. Integrative approach d. Inquiry-Based approach Answer: d	Analyse	Analyse
7	Which of the following represents the static nature of science? a. Universal law of gravitation b. Models of Atom c. Building blocks of material d. Magnetic properties Answer: a	List	Understand
8	Which of the following is NOT a nature of science? a. Dynamic b. Process c. Cumulative d. Non-verifiable Answer: d	List	Understand
9	The following are examples of professional development activities except….. a. Seminars b. Conferences c. Online Courses d. Teaching Note preparation Answer: d	Cite example	Understand
10	The following are examples for professional development platforms, except….. a. SWAYAM	Cite example	Understand

	b. DIKSHA c. NISHTA d. SLACK Answer: d		
PART B **Answer any one question from the two given under each question number. Each question carries 4 marks.**			
11			
A	a. Describe the characteristics of secondary-level learners with respect to physical, mental and social development. (or) b. Discuss the salient features of the thinking process and cognitive skills of secondary-level learners.	Describe	Understanding
B		Discuss	Understanding
12			
A	Critically analyse the concept and characteristics of teaching.	Analyse	Analyse
B	Analyse the scope for making physical science classrooms inclusive and joyful with respect to the secondary level.	Analyse	Analyse
13			
A	Differentiate collaborative and reflective approaches analysing the salient features.	Analyse	Analyse
B	Analyse different types of pedagogies appropriate for secondary school physical science teaching.	Analyse	Analyse
14			
A	Discuss science as a social enterprise.	Discuss	Understand
B	Explain the recommendations of NCF 2005 about science teaching.	Explain	Understand
15			
A	Discuss the need and importance of the professional development of a physical science teacher.	Discuss	Understand
B	Explain the pedagogical competencies needed for a physical science teacher to address equity and inclusiveness.	Explain	Understand
PART C **Answer any three questions. Each question carries 10 marks.**			

16	Reflect on the challenges and conflicts of secondary-level students and explain how you will address them.	Reflect	Analysis
17	Analyse the relationship between Aims and Values of Education, Curriculum and Pedagogy.	Analyse	Analyse
18	Explain the role of pedagogy in effective learning with suitable examples.	Explain	Understand
19	Discuss the linkage between Physical Sciences, society and human and sustainable development.	Discuss	Understand
20	Explain the need and strategies for developing the content and pedagogical competencies of Physical Science teacher.	Explain	Understand

SEMESTER V					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10516	Number Theory	4	0	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcomes (COs)

On the successful completion of the course, the student will be able to

	Course Outcomes	Level
CO 1	Understand the concepts of divisibility of integers, fundamental theorem of arithmetic	Remember/ Understand
CO 2	Apply the notion of congruence, and its properties	Apply
CO 3	Examine the Dirichlet product of two arithmetic functions, Bell series and their properties	Analyze
CO 4	Solve problems on number theory	Evaluate
CO 5	Find the properties of Euler's totient function, Mobius function, Mangoldt function, Liouville's function, multiplicative functions, and completely multiplicative functions	Create

b. Syllabus

Units	Contents	Hrs.
I	(Review of Natural numbers, arithmetic and order properties) Divisibility, division algorithm, prime numbers, GCD and LCM, Bezout's identity. Euclid's algorithm, fundamental theorem of arithmetic, linear Diophantine equations.	12
II	Congruences, residue classes, arithmetic of congruences, Chinese remainder theorem, congruences with a prime-power modulus, the arithmetic of Zp, pseudoprimes and Carmichael numbers, solving congruences mod pe.	12
III	Euler phi function, multiplicative functions, Euler's theorem, Fermat's theorem, group of units.	12
IV	Arithmetical functions, the Mobius function, Euler Totient function, the Dirichlet product of arithmetical functions, Dirichlet inverses, the mobius inversion formula, the Mangoldt function.	12
V	Completely multiplicative functions, Dirichlet multiplication, the inverse of a completely multiplicative function, Liouville's function $\lambda(n)$, the divisor functions, generalized convolutions, formal power Series, the Bell series of an arithmetical function, Bell series and Dirichlet multiplication, derivatives of arithmetical functions, the Selberg Identity.	12
	Text Books: 1. G. A. Jones and J. M. Jones, Elementary Number Theory, Springer,1998. (Units I-III) 2. T. Apostol, Introduction to Analytic Number Theory, Narosa Publications, New Delhi, 2010. (Units IV,V) References: 1. D. M. Burton, Elementary Number Theory, Seventh edition,	

	Universal Book, New Delhi, 2001. 2. H. S. Davenport, Multiplicative Number Theory, Third edition, Springer, 2000. 3. K. Ireland and M. Rosen, A Classical Introduction to Modern Number Theory, Springer Verlag, New York, 1972. 4. I. Niven and H. S. Zuckerman, An Introduction to the Theory of Numbers, Fifth edition, Wiley Eastern Ltd, New Delhi, 1989.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	**1**	**1**	**0**	**1**	**1**	**1**	**1**	**0**
CO2	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**
CO3	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**
CO4	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**
CO5	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	20	20	20	20	20	100

e. Mapping course outcome with Internal assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assignment (60 Marks)

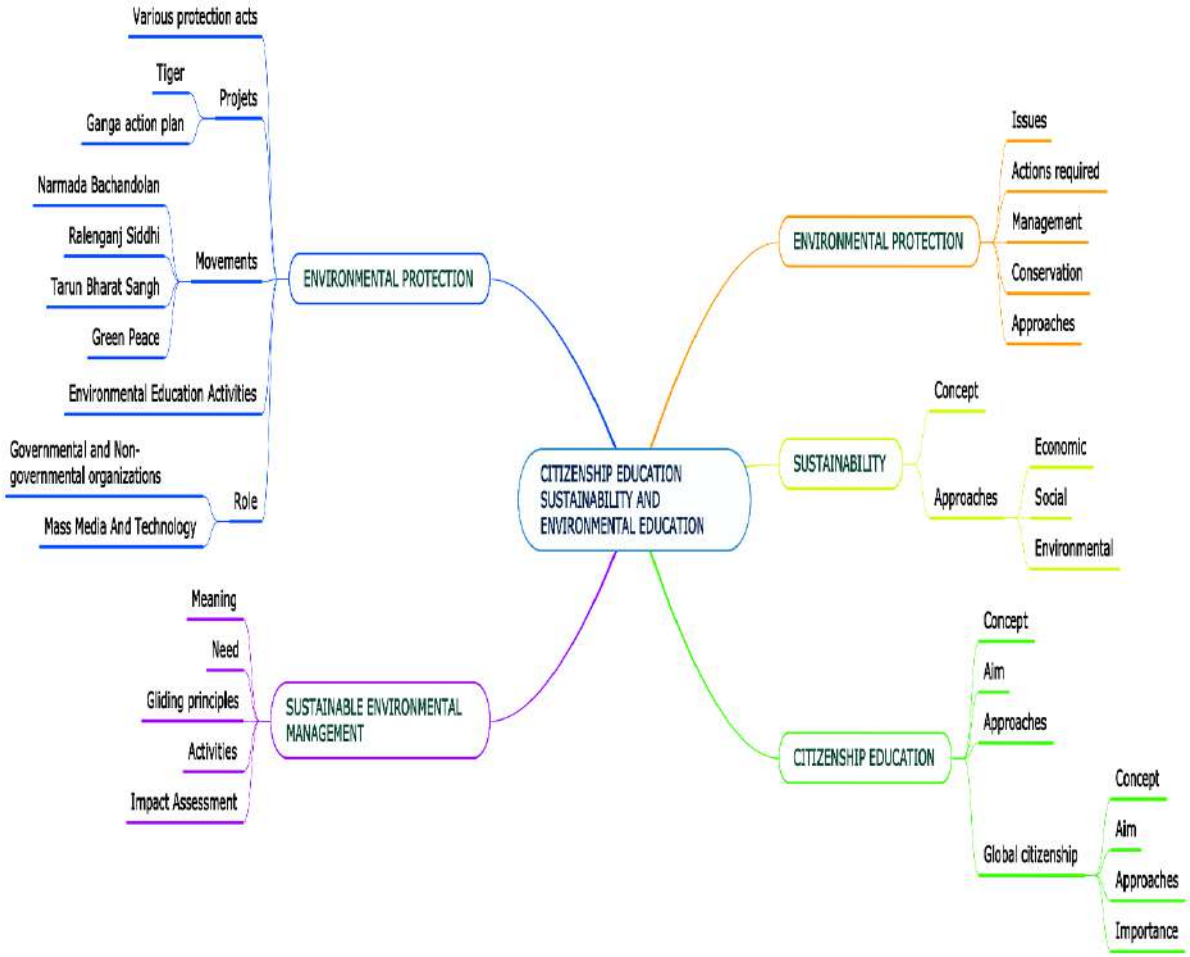
Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 5 x 4 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	12	12	12	12	12

Sl. No.	Model Questions
	Part – A: Objective Type **Multiple choice** **10 x 1 = 10**
1	Which of the following statements defines a **prime number**? a) A number divisible by 1 only b) A number divisible by 1 and itself only c) A number having exactly three factors d) A number divisible by 2
2	The Euclidean algorithm **is** used to find: a) Least Common Multiple b) Greatest Common Divisor c) Prime factors d) Remainder
3	If $a \equiv b \pmod{n}$, then which of the following is true? a) n divides (a + b) b) n divides (a − b) c) a divides n d) b divides n
4	The Chinese Remainder Theorem provides a solution for: a) Linear equations b) Polynomial equations c) Simultaneous congruences with coprime moduli d) Quadratic congruences
5	The Euler phi function φ(n) represents: a) Number of factors of n b) Number of primes less than n c) Number of integers less than n and coprime to n d) Sum of divisors of n
6	According to Euler's theorem, if gcd(a, n) = 1, then: a) $a^n \equiv 1 \pmod{n}$ b) a^φ(n) ≡ 1 (mod n) c) a^(n−1) ≡ 0 (mod n) d) a^(φ(n)+1) ≡ 1 (mod n)
7	The Mobius function μ(n**)** is equal to zero when: a) n is prime b) n has a squared prime factor c) n is even d) n is odd
8	"The Dirichlet product of f(n) and g(n) is defined as: a) $\int(n) + g(n)$ b) $\int(n).g(n)$ c) $\sum d\|n \ \int(d)g(\frac{n}{d})$ d) None of the above
9	The Liouville function λ(n) takes the value: a) (−1) raised to the number of prime factors of n b) The number of divisors of n c) φ(n) d) log(n)
10	The Bell series of an arithmetical function is expressed as: a) A polynomial series in n b) A formal power series in p^{-s} c) An infinite geometric series d) An arithmetic progression
	PART – B Short Answer **Answer the following Question** **5 x 4 = 20**
11	**a)** State and prove Bezout's identity**.** **(or)** **b)** Explain and illustrate Euclid's division algorithm**.**
12	**a)** Solve the linear Diophantine equation 12x+18*y*=6. **(or)** **b)** Find the GCD and LCM of 45 and 120 using prime factorisation**.**

13	**a)** Solve $3x \equiv 4\ (mod\ 7)$. **(or)** **b)** State and explain the Chinese Remainder Theorem
14	a) Show that if $a \equiv b\ (mod\ n)$ and $c \equiv d\ (mod\ n)$, then $a + c \equiv b + d\ (mod\ n)$. **(or)** **b)** Explain the concept of residue classes with a suitable example.
	PART – C Essay Answer **Answer the following question** **3 x 10 = 30**
15	**a)** Define the Euler phi function and prove that it is multiplicative. Illustrate your answer with suitable examples. **(or)** b) State and prove Euler's theorem and Fermat's little theorem. Explain how they are connected through the concept of the group of units modulo n.
16	**a)** Explain the Mobius inversion formula. Derive it from the Dirichlet product and show its use in number-theoretic problems. **(or)** **b)** Define arithmetical functions and explain the Dirichlet product and its basic properties with examples**.**
17	**a)** Define a completely multiplicative function. Derive the Dirichlet inverse of a completely multiplicative function and illustrate using the Liouville function λ(n). **(or)** b) What is the Bell series of an arithmetical function? Explain its relation with Dirichlet multiplication and briefly describe the Selberg identity.

SEMESTER V					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDUVA04	Citizenship Education, Sustainability, and Environmental Education	2	1	0	3
Internal	100	External	0	Total	100

Course Content Overview



a. Course Outcomes (COs)

On the successful completion of the course, the student will be able to

	Course Outcomes	Level
CO 1	Explain the concept of citizenship and citizenship education	Understand
CO 2	Describe the aims of and approaches to citizenship education.	Apply
CO 3	Appraise the development of environmental education.	Analyze
CO 4	Discuss on sustainable environmental management and protection.	Create
CO 5	Demonstrate awareness and actions towards conservation and protection.	Skill

b. Syllabus

Units	Content	Hrs.
I	**Citizenship Education** Concept of citizenship and citizenship education- Aims of and approaches to citizenship education- Concept of Global Citizenship and Global Citizenship Education- Aims of and approaches to global citizenship education-Concept of Vasudhaiva Kutumbakam, its importance in development of a holistic perspective towards local and global communities.	9
II	**Sustainability** Concept of 'Sustainability' in all fields of human activities-Approaches to achieving sustainable development in its three dimensions – economic, social, and environmental- Sustainable development goals.	9
III	**Sustainable Environmental Management** Sustainable Development: Meaning, Need, Guiding Principles-Sustainable management of natural resources-School and community-based activities-Education for sustainable development-Environmental Impact Assessment: (Meaning, Steps & Significance)	10
IV	**Environmental Education** Environmental issues- Actions required for mitigating the effects of climate change, reducing environmental degradation, pollution etc., -Initiatives required for effective waste management, conservation of biological diversity, management of biological/natural resources, forest and wildlife conservation, and sustainable development & living-Approaches to delivering Environmental Education.	10
V	**Environmental Protection** Role of Mass Media and Technology in delivering environmental education- Roles of Governmental and Non-Governmental Organizations in promoting Environmental Education-School and community-based environmental education activities- Movements: Raleganj Siddhi Movement, Narmada Bachao Andolan, Tarun Bharat Sangh, Green Peace Movement- Projects: Tiger Project, Ganga Action Plan- Laws of Conservation & Protection: Wild-life Protection Act-1972, Environment Protection Act, 1986 and Noise Pollution Act-2000.	10

Practicum:

- ✓ Prepare an Environmental Audit Report for an individual process.
- ✓ Write a report on the roles of governmental and non-governmental organizations in promoting Environmental Education.
- ✓ Conduct a Life Cycle Assessment of any item/commodity of daily use and prepare a report

References:

Citizenship in Globalising World- Ashok Acharya, Pearson, New Delhi

Environmental Education- T. Pradeep Kumar, A.P.H. Publications

Environment Pollution-Management, Control for Sustainable Development-R. K. Khitoliy, S. Chand and Company, New Delhi

Methods of Environmental Education – Dr. Joseph Catherine, Neel Kamal Publications

Environmental Education-V. Krishnamachayulu, G.S. Reddy, Neelkamal publications.

Environmental Education and training – Trends, Traditions and Transformation –M.A. Chaudhary & S.M. Tripathy, Global Vision Publishing house.

Environmental Pollution - N.H. Gopal Dutt, Neelkamal Publications.

Techniques Of Teaching Environmental Science - Swamy, K.R. & Rao,

D.B., New Delhi: Sonali publication.

Environmental Studies –R. A. Sharma, Chand publication

The Hindu – Survey of the Environment.

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	0	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	2	3	3	3
CO4	3	3	0	3	3	3
CO5	3	3	1	3	3	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	20	20	20	20	20	100
External	-	-	-	-	-	-
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (100 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	9	9	9	-	-
Seminar	-	-	-	9	9
Test	10	10	10	10	10
Attendance	1	1	1	1	1
Total	20	20	20	20	20

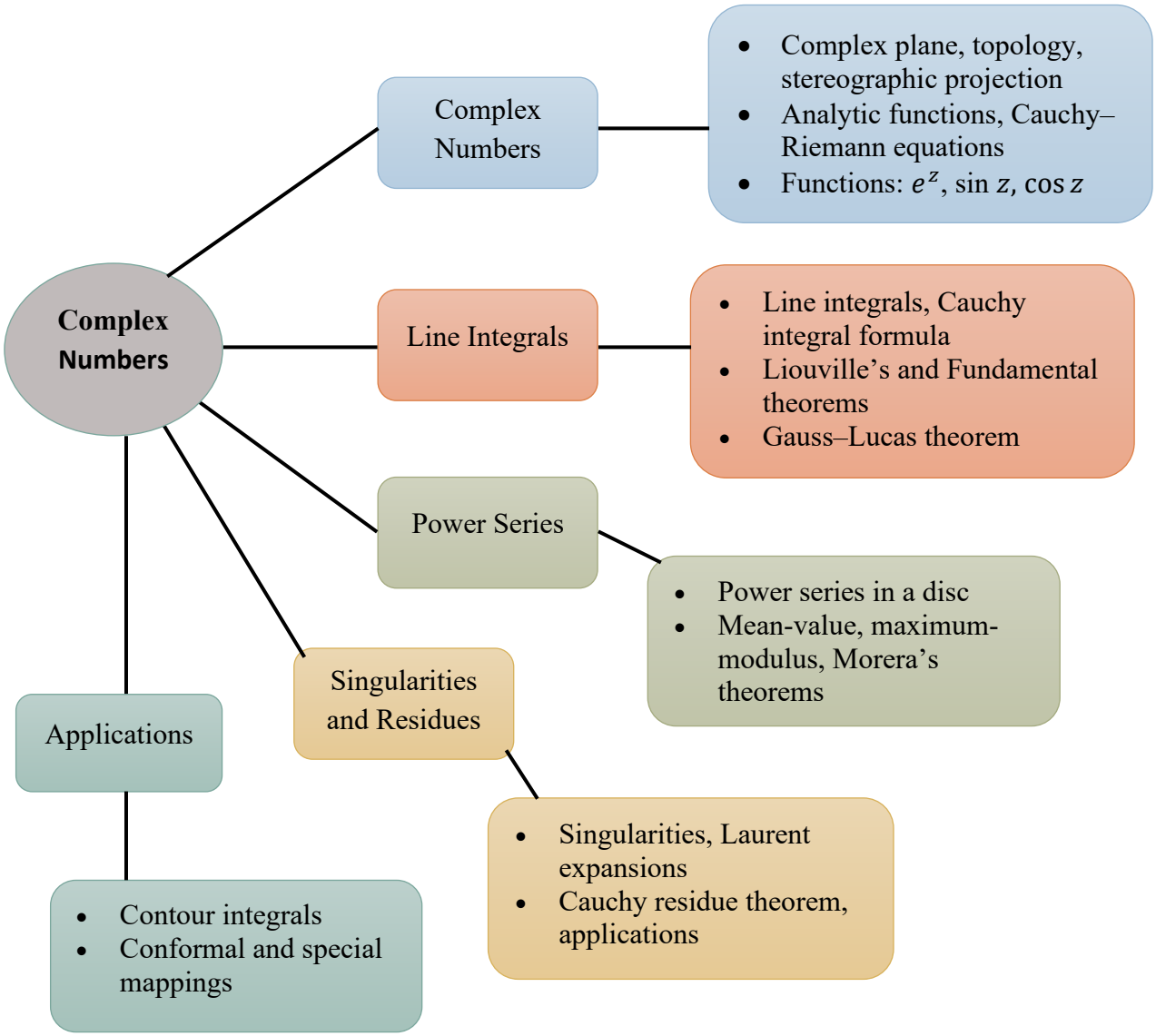
f. Activities/ Internal assessment:

S.No	Activity/ assignment	CO
1	Community participation in natural resource management	CO1
2	Prepare an environmental audit report for an individual process.	CO2
3	Prepare a poster on climate change.	CO2
4	Discussion on approaches of teaching Environmental Education.	CO3
5	Debate on Sustainable Management.	CO4
6	Conduct a Life Cycle Assessment of any item/commodity of daily use and prepare a report	CO4
7	Seminar on Ganga Action Plan	CO5
8	Write an essay on the efficiency of Indian Laws of environment conservation and protection act.	CO5

SEMESTER - VI

SEMESTER VI					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10611	Complex Analysis	4	0	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcomes (COs)

On the successful completion of the course, the student will be able to

	Course Outcomes	Level
CO 1	Learn and understand the basics of analytic functions	Remember/ Understand
CO 2	Solve problems using Cauchy's integral formula and Cauchy's residue theorem	Apply
CO 3	Check the analyticity of a given function, apply C-R equations to find the harmonic conjugate, find the radius of convergence of a power series	Analyze
CO 4	Compute Laurent series expansion and classify the types of singularities, the number of zeroes of a polynomial in an annulus with centre zero	Evaluate
CO 5	Find a linear fractional transform with a given values at three specific points, cross ratios, and to check if the given three points are on a line or a circle	Create

b. Syllabus

Units	Contents	Hrs.
I	(Quick Review: Complex numbers and geometrical representations, Cauchy-Schwarz inequality principal argument of a complex number, nth root of a complex number). The complex plane, topological aspects of the complex plane, stereographic projection, the point at infinity, analytic polynomials, power series, differentiability and uniqueness of power series, analyticity and the Cauchy-Riemann equations, the functions ez , sin z, cos z	12
II	Line integrals and their properties, the closed curve theorem for entire functions, the Cauchy integral formula and Taylor expansion for entire functions, Liouville theorems and the fundamental theorem of algebra, the Gauss-Lucas theorem	12
III	The power series representation for functions analytic in a disc, the uniqueness, mean-value, maximum-modulus theorem, the converse of Cauchy's theorem: Morera's theorem	12
IV	Classification of isolated singularities, Riemann's principle, the CasoratiWeierstrass theorem, Laurent expansions, winding numbers, the Cauchy residue theorem, applications of the residue theorem	12
V	Evaluation of definite integrals by contour integral techniques, introduction to conformal mapping, special mappings	12

	Text Book: 1. J. Bak and D. J. Newman, Complex Analysis, Third Edition, Springer International Edition, Indian Reprint, 2010 **References**: 1. J. W. Brown and R. V. Churchill, Complex Variables and Applications, McGraw Hill, 2008. 2. S. Ponnusamy, Foundations of Complex Analysis, Second Edition, Narosa Publishing House, 2005.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	**1**	**0**	**1**	**1**	**0**	**0**	**1**	**0**
CO2	**1**	**1**	**0**	**1**	**1**	**1**	**1**	**1**
CO3	**1**	**1**	**1**	**1**	**0**	**1**	**1**	**1**
CO4	**1**	**1**	**0**	**1**	**0**	**0**	**1**	**1**
CO5	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	20	20	20	20	20	100

e. Mapping course outcome with Internal assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assignment (60 Marks)

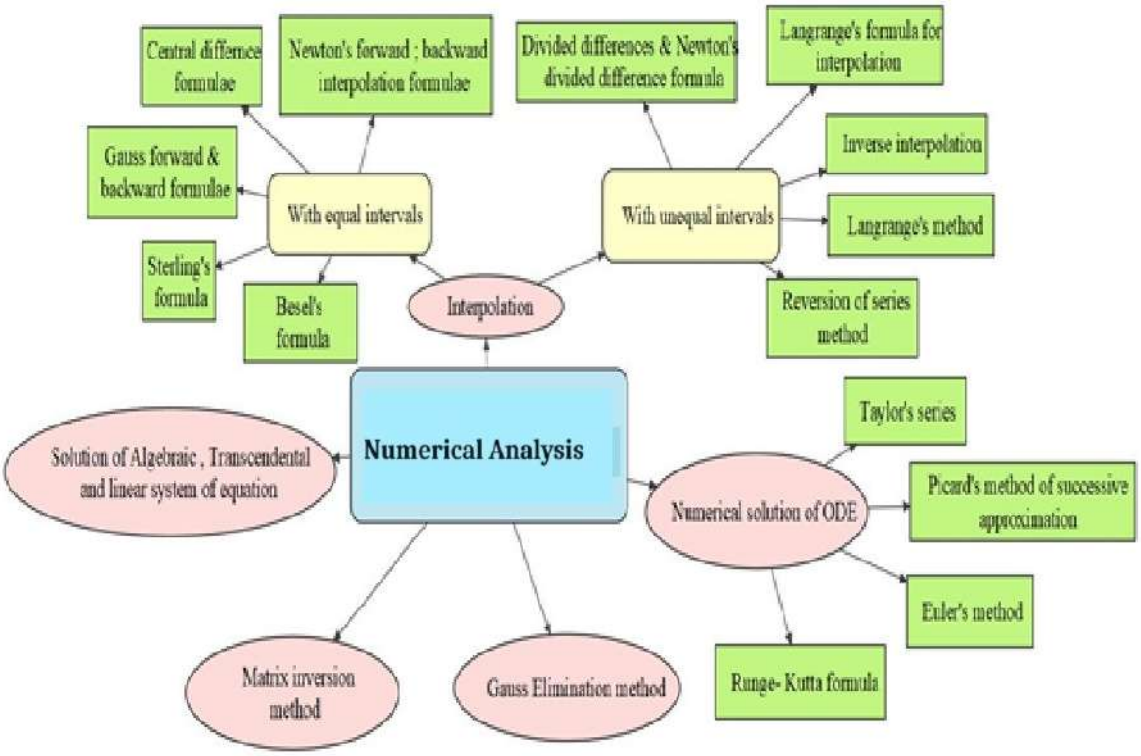
Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 5 x 4 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	12	12	12	12	12

Sl. No.	Model Questions
	Part – A: Objective Type **Multiple choice** **10 x 1 = 10**
1	The principal argument of $-1 + i\sqrt{3}$ is: a) π/6 b) π/3 c) 2π/3 d) 5π/6
2	Cauchy–Riemann equations in Cartesian form are: a) $u_x = u_x, u_y = u_y$ b) $u_x = u_y, u_y = u_x$ c) $u_x = -u_y, u_y = -u_x$ d) None of these
3	Liouville's theorem states that a bounded entire function is: a) Periodic b) Constant c) Polynomial d) Zero
4	The Cauchy Integral Formula is valid for: a) Continuous functions b) Differentiable functions c) Analytic functions d) Real functions
5	The modulus of $z = 3 - 4i$ is: a) 5 b) 7 c) 25 d) 1
6	The power series of an analytic function converges a) Only on the real axis b) Nowhere in the complex plane c) Within a certain radius of convergence d) For all complex numbers
7	A function $\int(z)$ has a pole of order n at $z = a$ if a) $(z-a)^n \int(z)$ is analytic and non-zero at $z = a$ b)$\int(z)$ is analytic at $z = a$ c) $\int(z)$ has a removable singularity at $= a$ d) $\int(z)$ is undefined for all z
8	The residue theorem is used to evaluate: a) Definite real integrals b) Improper integrals c) Indefinite integrals d) All of these
9	A integral $\int_{-\infty}^{\infty} \frac{dx}{x^2+1}$ evaluated using contour integration is a) $\boldsymbol{\pi}$ b) $2\boldsymbol{\pi}$ c) $\frac{\pi}{2}$ d) 0
10	The mapping $\omega = 1/z$ represents: a) Translation b) Rotation c) Reflection d) Inversion
	PART – B Short Answer **Answer all the Question** **5 x 4 = 20**
11	**a)** Show that the equality in the Cauchy–Schwarz inequality holds if and only if the vectors are linearly dependent. OR b) Find all cube roots of unity and represent them geometrically in the Argand

	plane.
12	**a)** Find the principal argument and modulus of the complex number $\boldsymbol{z = -3 + 3i}$ **(or)** b) Represent $\boldsymbol{1 + i\sqrt{3}}$ on the complex plane and determine its trigonometric form.
13	a) Define a line integral in the complex plane and state its basic properties. **(or)** b) State and prove the Cauchy Integral Formula for an analytic function.
14	a) Find the critical points of the polynomial P(z)=Z^3−3z+1 and verify the Gauss–Lucas theorem for it. **(or)** **b)** Expand $\int(\boldsymbol{z}) = \frac{\boldsymbol{1}}{\boldsymbol{z-1}}$ in a Taylor series about $\boldsymbol{z = 0}$, valid for $\boldsymbol{\mid z \mid < 1}$.
	PART – C Essay Answer **Answer all the following question** **3 x 10 = 30**
15	**a)** Prove the Maximum Modulus Theorem and discuss its implications**.** **(or)** **b)** Prove the Mean Value Theorem for analytic functions in a disc.
16	**a)** Classify isolated singularities **and** explain Casorati–Weierstrass Theorem **(or)** **b)** State and explain Riemann's removable singularity principle**.**
17	a) Evaluate the integral $$\int_0^{\infty} \frac{x^2}{(x^2+1)(x^2+4)}\,dx$$ using the contour integration technique in the complex plane. **(or)** b) Explain the concept of conformal mapping and find the image of the region $\boldsymbol{\mid z \mid < 1}$ under the mapping $$\omega = \frac{1+z}{1-z}$$

SEMESTER VI					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10612	Numerical Analysis	4	0	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Demonstrate the theory about polynomials and the error/accuracy of numerical methods.	Understand
CO 2	Use methods to solve algebraic and transcendental equations and study the rate of convergence	Apply
CO 3	Analyze the methods to perform approximate solutions for integration and differentiations numerically.	Analyze
CO 4	Evaluate numerically the approximate solution of complex ordinary differential equations	Evaluate
CO 5	Formulate numerical procedures when real-world problems are modelled by the system and understand how the iteration gives an approximate solution to the system.	Create

b. Syllabus

Units	Content	Hrs.
I	**Solution to algebraic and transcendental equations:** Introduction to error analysis, algebraic and transcendental equations: Bisection method, iteration method, Regula-Falsi method, secant method, Newton-Raphson's method, error analysis, rate of convergence.	13
II	**Solving system of equations**: Linear system (Direct methods): Gauss elimination, pivoting strategies, vector and matrix norms, error estimates and condition number, LU decomposition. Linear system (Iterative methods): Gauss-Jacobi and Gauss-Seidel Convergence analysis, eigenvalue problem, power method, Jacobi for a real symmetric matrix.	13
III	**Interpolation**: Lagrange's interpolation, error analysis, Newton's divided differences, Newton's finite difference interpolation, optimal points for interpolation, Piecewise polynomial interpolation: Piecewise linear and spline interpolation	13
IV	**Numerical differentiation and integration**: Numerical differentiation based on interpolation, finite differences. Numerical integration: Newton Cotes formulae, Gaussian quadrature, Trapezoidal and Simpson's rules, error analysis. Quadrature rules for multiple integrals.	13
V	**Ordinary differential equations**: Single-step methods, Euler's method and Modified Euler's method, Taylor series method, Runge-Kutta method of fourth order, Multistep methods: Adams-Bashforth -Moulton methods, stability analysis, Boundary value problems: Finite Difference method.	12
	Tasks and Assignments : The student shall understand how to solve the algebraic and transcendental equations using different numerical methods. They will know the different types of error occurring during calculations. They will also know the various numerical methods to solve ordinary differential equations through	

	differentiation and integration. The assignment will give scope for a student to consolidate and reproduce the subject content seen in the classroom. The following are the thrust areas selected for assignment/oral presentation ✓ Expertise in the methods by solving complex linear equations to yield approximate solutions ✓ Solve ordinary differential equations using single-step and multi-step methods ✓ Know the concept of Interpolation. **References:** K. Atkinson, W. Han and D. Stewart (2009), Numerical Solution of Ordinary Differential Equations, John Wiley & Sons,. K. E. Atkinson (1989), An Introduction to Numerical Analysis, Wiley. R. L. Burden and J. D. Faires (2011) , Numerical Analysis, Ninth Edition, Cengage Learning. S. D. Conte and C. de Boo(1983), Elementary Numerical Analysis, Third Edition, McGraw-Hill Book Company. B. Bradie(2007) , A Friendly Introduction to Numerical Analysis, First Edition, Pearson Education, New Delhi.	

c. Mapping of Program Specific Outcomes with Course Outcomes

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	2	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	2	2	3	3	2	2
CO5	3	1	3	3	2	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	**8**	**8**	**8**	**8**	**8**	**40**
External	**12**	**12**	**12**	**12**	**12**	**60**
Total	20	20	20	20	20	100

e. Mapping course outcome with Internal assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assignment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 4 x 5 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	**12**	**12**	**12**	**12**	**12**

g. Model Question paper

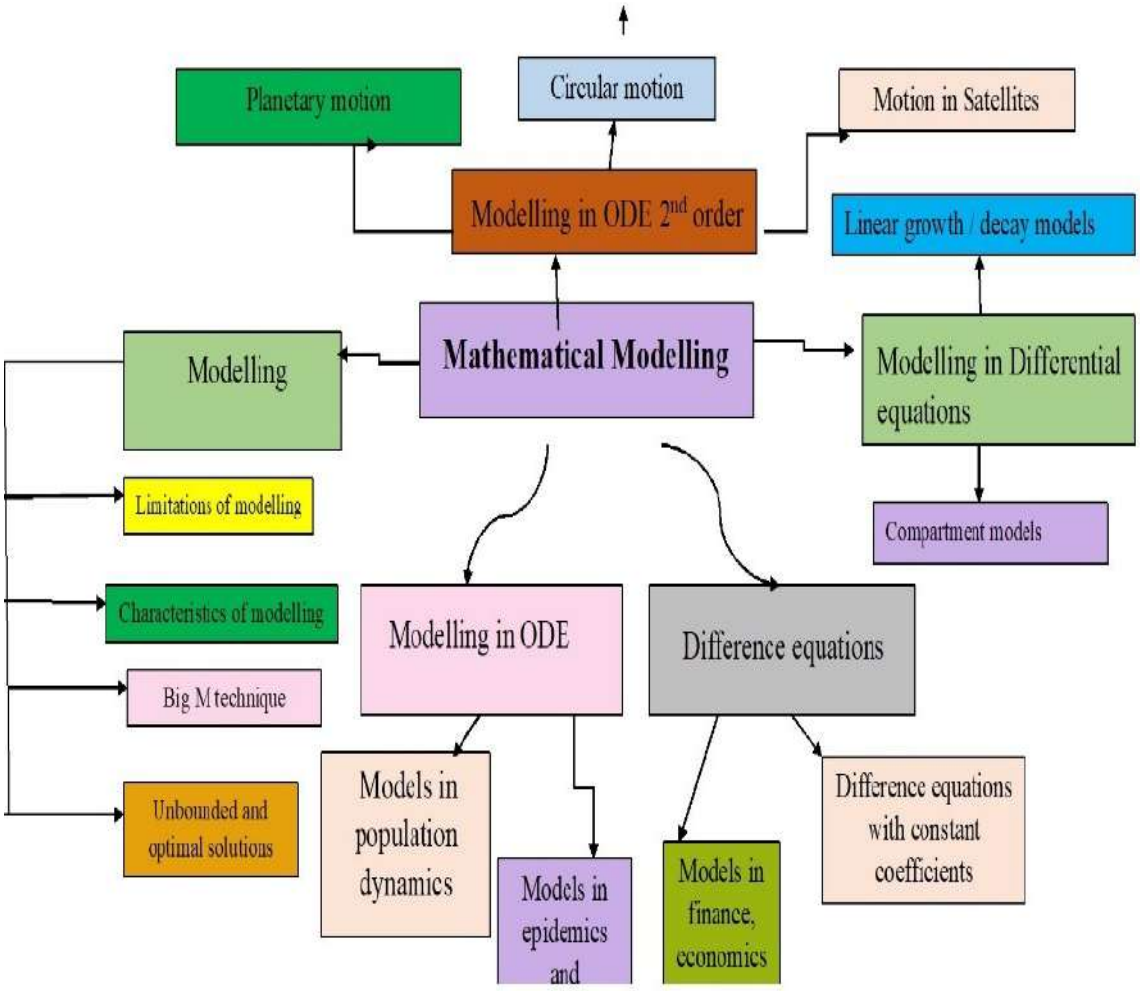
Sl. No.	Model Questions	Specification	Level
	Part – A: Objective Type **Multiple choice 10 x 1 = 10**		
1	The convergence of which of the following method depends on the initial assumed value? a) False position b) Gauss-Seidel method c) Newton Raphson method d) Euler method	Recognize	Remember
2	Matrix inverse in for systems of the equation is used to determine which of the following? a) identified set of equations b) variable set of equation c) solution set of equations d) constant set of equations	Recall	Remember
3	Multiplicative inverse matrix generalized form to solve is which of the following? a) $AA^{-1} = A^{-1}A = I$ b) $AA^{-2} = A^{-3}A = I$ c) $3AA^{4} = A^{-1}A = I$ d) $AA^{-1} = 2A^{-5}A = Q$	Recognize	Remember
4	Equations are linearly dependent, in a system of linear equations, if and only if? a) A^{-2} exist b) A^{-1} does not exist c) A^{-3} does not exist d) A^{-4} must exist	Recognize	Remember
5	The problems which deal with the analysis of electronic circuits consisting of invariant elements depend a) The solution of simultaneous algebraic equations b) Solution of transcendental equations c)Interpolation problems, d) Finite difference method	Recognize	Remember
6	Which of the methods is the direct method for solving simultaneous algebraic equations? a) Jacobi's method b) Relaxation method c) Cramer'rule d) Gauss Seidel method	Recognize	Remember
7	Which of the following method generally converges the solution? a) Hit and trial method b) Approximation method c) Iterative method d) Direct method	Recall	Remember

8	Regula falsi method uses (a) Equation of tangent (b) Equation of chord (c) Equation of straight line (d) None	Recall	Remember
9	Taylor's method is a (a) Multistep method (b) Iterative method (c) Single step method (d) None	Identify	Remember
10	Newton-Raphson method is also known as (a) Method of secants (b) Method of tangent (c) Horner's method (d) None	Identify	Remember
PART – B Short Answer The answer should not exceed 200 words 4 x 5 = 20			
11	a) Estimate $\sqrt{2} = 1.41421356$ using Newton's Method (or) b) Apply bisection method to find a root of the equation $x^4 + 2x^3 - x - 1 = 0$.	Explain	Understand
12	(or) b) Distinguish the advantages of iterative methods over the direct method of solving a system of linear algebraic equations.	Define	Understand
13	a) Compare Gauss Elimination, Gauss Jordan method With examples (or) b) Given y (0) = 3x + and y(0) = 1. Find the values of y(0.1) using Taylor's series 2 method.	Cite Examples	Understand
14	a) Solve x^3-2x-5=0 form the positive root by iteration method correct upto four decimal places. (or) b) Explain Gauss-Jacobi method.	Illustrate	Apply
PART – C Essay Answer The answer should not exceed 400 words 3 x 10 = 30			
15	a) Using the Newton-Raphson method, Establish the formula and also calculate the square root of N. Find the square root of 5 correct to 4 places of decimals. (or) b) Solve the following system of equations using Gauss Jacobi's method. $5x - 2y + 3z = -1$ $-3x + 9y + z = 2$ $2x - y - 7z = 3$.	Describe	Analyze
16	a) Using the Newton-Raphson method, please find at what time the two processes whose temperatures T1 and T2 are governed by $T1(t) = 100 \cdot (1 - e^{(-0.2t)})$ and $T2(t) = 40 \cdot e^{-t}$ will reach equal temperature? Take initial guess t0 = 1. Find t1, t2, and t3. (Report numbers till 4th decimal throughout the answer) (or)	Explain Discuss	Understand

<table>
<tr><td></td><td>b) Using the Runge - Kutta method, tabulate the solution of the system dy/dx = x+z, dz/dx = x − y, y = 0, z = 1 when x = 0 at intervals of h = 0.1 from x = 0.0 to x = 0.1.</td><td></td><td></td></tr>
<tr><td>17</td><td>a) Consider the following interpolation problem: Find values for a, b, c, and d, for y = ax3 + bx2 + cx + d to interpolate a cubic polynomial assuming you are given four points (x1, y1),(x2, y2),(x3, y3),(x4, y4). We are going to use matrix inverse methods to solve for these points rather than our polynomial interpolation formulas.
(or)
b) Using Gauss's interpolation formula, obtain f (3.5) from the following table.
<table>
<tr><td>x</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>f (x)</td><td>2.626</td><td>3.454</td><td>4.784</td><td>6.986</td></tr>
</table>
</td><td>Assess</td><td>Skill</td></tr>
</table>

SEMESTER VI					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10613	Mathematical Modelling	4	0	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcomes (COs)

On the successful completion of the course, the student will be able to

	Course Outcomes	Level
CO 1	Recognize the relationship between real-life problems and mathematics	Understand
CO 2	Apply various models using difference and differential equations interms of linear growth, decay models and etc.	Apply
CO 3	Analyze the characteristics and limitations of mathematical modelling.	Analyze
CO 4	Make predictions of the behavior of a given system based on the analysisof its mathematical model.	Evaluate
CO 5	Construct mathematical models related to the current situation in epidemics, economics, etc.	Create

b. Syllabus

Units	Content	Hours
I	**Mathematical Modelling:** Simple situations requiring mathematical modelling, techniques of mathematical modelling, characteristics of mathematical models, limitation of mathematical modelling, mathematicalmodels through geometry, algebra, trigonometry and calculus.	13
II	**Mathematical modelling through differential equations:** Linear growth and decay models. non-linear growth and decay models, compartment models.	13
III	**Mathematical modelling through system of ordinary differential equationsof first order:** Mathematical modelling in population dynamics, mathematical models of epidemics, economics and medicine.	13
IV	**Mathematical modeling through ordinary differential equations of the second order:** Mathematical modeling of planetary motions, mathematical modeling of circular motion and motion of satellites, mathematical modeling through linear differential equations of the second order, miscellaneous mathematical models through ordinary differential equations of the second order	13
V	**Mathematical modelling through difference equations:** Basic theory of linear difference equations with constant coefficients, mathematical modelling through difference equation in economics, finance, population dynamics	12
	Tasks and Assignments : ✓ The student shall understand how to construct models for planetary motions, and population dynamics. The assignment will give scope for a student to consolidate and reproduce the subject content seen in the classroom. ✓ The following are the thrust areas selected for assignment/oral ✓ presentation ✓ Expertise in constructing models for simple real-world problems ✓ Construct mathematical modeling through difference equation in economics	

	✓ Know mathematical models through ordinary differential equations of the second order. **References:** J. N. Kapur (2009), Mathematical Modeling, New Age International publishers. E. A. Bender (2002), An introduction to Mathematical Modeling,CRC Press. S. Banerjee (2014), Mathematical Modeling Models, Analysis and Applications, CRC Press, Taylor & Francis group. M. M. Meerschaert (2007), Mathematical Modeling, Elsevier Publishers. W. J. Meyer(2000), Concepts of Mathematical Modeling, Dover Publ.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	2	3
CO2	3	3	3	3	3	2
CO3	3	3	3	3	3	3
CO4	3	3	3	2	2	2
CO5	1	1	3	3	2	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	**8**	**8**	**8**	**8**	**8**	**40**
External	**12**	**12**	**12**	**12**	**12**	**60**
Total	20	20	20	20	20	100

e. Mapping course outcome with Internal assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assignment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 5 x 4 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	12	12	12	12	12

g. Model Question paper

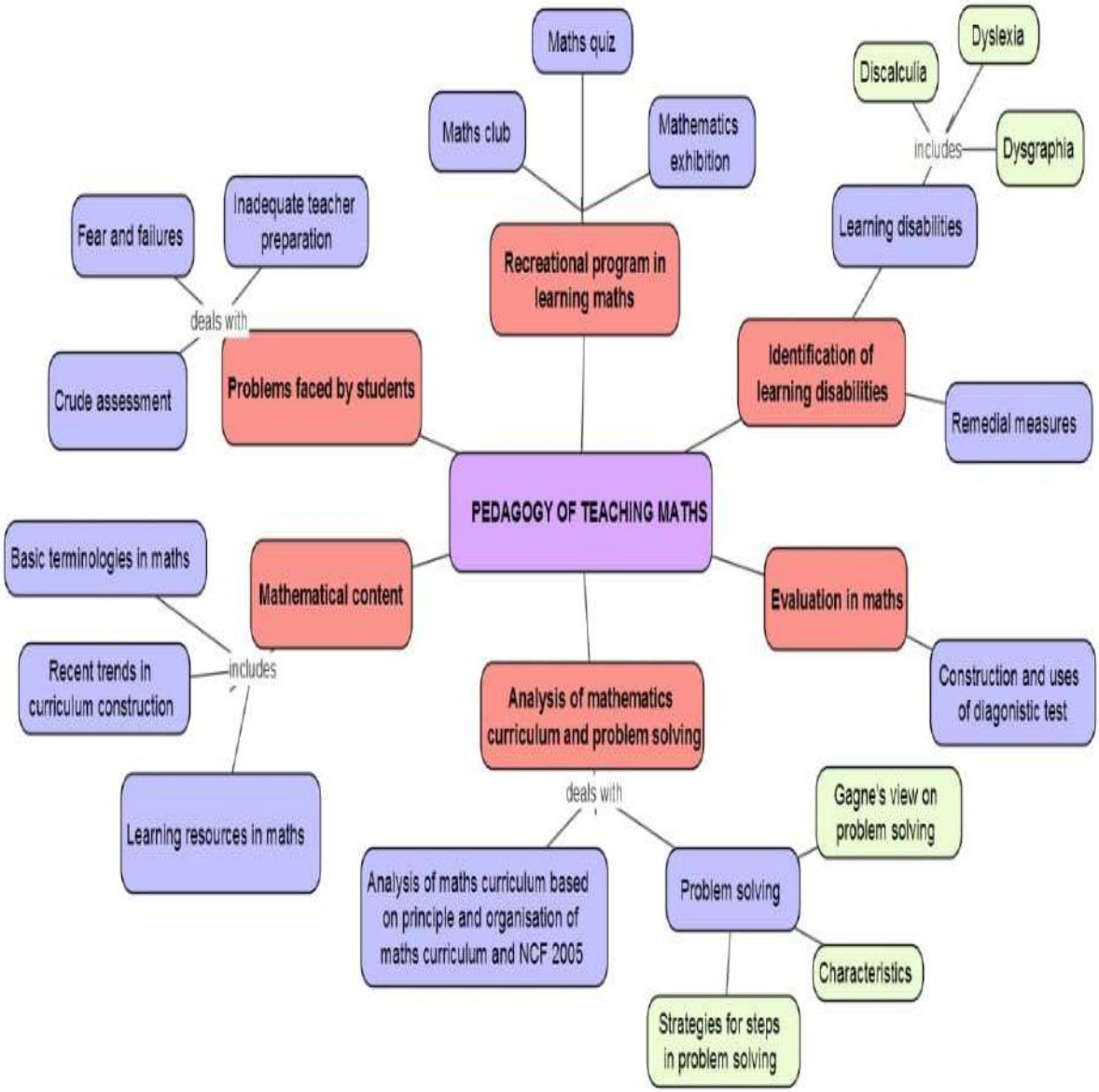
Sl. No.	Model Questions	Specification	Level
	Part – A: Objective Type **Multiple choice 10 x 1 = 10**		
1	If the pair of linear equations x+2y=3 and 2x+4y=k coincide then the value of k is a) 3 b) 6 c) -3 d) -6	Recognize	Remember
2	The n^{th} term of an arithmetic progression is $a_n = 4n + 5$ then the 3rd term is a) 5 b) 9 c) 13 d) 17	Recall	Remember
3	If the roots of the quadratic equation $x^{2} + 6x + k = 0$ is equal then the values of k are a) 9 b) -9 c) 8 d) 5	Recognize	Remember
4	3:4:5 years back, the ratio of their ages was 2:3. What is the present age of boy a) 12 b) -15 c) 20 d) 22	Recognize	Remember
5	Which one of the following statements related to the modelling of the system is not true a) The transfer function is not changed by a linear transformation of the state b) A given state description can be transformed to a controllable canonical form if the controllability matrix is nonsingular c) A change of state by a nonsingular linear transformation does not change d) Zeros cannot be computed from its state description matrices.	Recognize	Remember
6	A dynamic system is a kind of system whose behaviour is a a) Function of time b) Function in space c) Transfer function d) Linear function	Recognize	Remember
7	How long does it take $1700 to double if it is invested at 5% interest, compounded monthly? Round your answer to the nearest tenth.	Recall	Remember

	a) 13.9 years b) 12.2 years c) 15.1 years d) 14.9 years		
8	120 ft of fencing is used to fence a rectangular yard. The short sides of the rectangle are x and the long side is $2x + 4$. The side of a cabin makes up the other long side so it does not need any fencing material. How long is that side of the cabin? a) 62 feet b) 40 feet c) 29 feet d) 120 feet	Recall	Remember
9	John is building a wall and would like the width to be 3 times as long as the length. If the length is 10, what are the values of the width and perimeter? a) w=30, p=80 b) w=30, p=40 c) w=3.3, p=13.3 d) w=3.3, p=26.6	Identify	Remember
10	In a college physics class, students are measuring how high several professional tennis players usually hit the ball when it clears the net. They described them with the following functions. Which of them has a maximum height of 1.33? a) -5x2 + 2x + 1 b) -x2 + 2x + 1 c) -2x2 + 2x + 1 d) -3x2 + 2x + 1	Identify	Remember
PART – B Short Answer The answer should not exceed 200 words 4 x 5 = 20			
11	a) Explain the characteristics of Mathematical modeling (or) b) Explain the population of growth models	Explain	Understand
12	a) Explain the simple epidemic model with carriers (or) b) Derive non-linear birth-death process.	Define	Understand
13	a) Write the need for stochastic models. (or) b) Derive linear birth-death immigration–emigration	Cite Examples	Understand
14	a) 5 mgs of glucose are introduced into the bloodstream and after 2 minutes a sample of 10 c.c. of blood is taken in which the increase in blood sugar is found to be 0.01 mg. Estimate the volume of blood sugar in the body. (or) b) Develop a mathematical model to estimate the pollution of water of the river Ganges at various points in its course.	Illustrate	Apply
PART – C Essay Answer The answer should not exceed 400 words 3 x 10 = 30			
15	a) Write the relation between doubling, tripling, and quadrupling of population models. (or) b) Obtain the steady-state solution of Leontief's model	Describe	Analyse
16	a) A pound initially contains 500,000 gallons of unpolluted water and has an outlet that releases 10,000 gallons of water per day. A stream flows into the pond at 12, 000 gallons per day containing water with a concentration of 2 grams per gallon of a pollutant. Find a differential equation that models this process and	Explain Discuss	Understand

	determine what the concentration of pollutant will be after 10 days. (or) b) A population of insects in a region will grow at a rate that is proportional to their current population. In the absence of any outside factors, the population will triple in two weeks on time. On any given day there is a net migration into the area of 15 insects 16 are eaten by the local bird population and 7 die of natural causes. If there are initially 100 insects in the area will the population survive? If not, when do they die out?		
17	a) A colony of bacteria grow according to the law of uninhibited growth $P(t) = 100e^{0.045t}$ where P is measured in grams and t is measured in days 1. Determine the initial amount of bacteria 2. What is the growth rate of the bacteria 3. What is the doubling time for the population? 4. What is the population after 5 days (or) b) Solve SIS model when β is a known function of t	Assess	Skill

SEMESTER - VI					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10614	Pedagogy of Mathematics II	3	1	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Explain the nature of mathematics.	Remember
CO 2	Examine/Investigate the mathematics curriculum.	Understand
CO 3	Construct appropriate assessment tools for evaluating mathematics learners.	Apply
CO 4	Use various learner-centered methods in the teaching of mathematics.	Analyze
CO 5	Discuss the learning difficulties and their remedial measures.	Skill

b. Syllabus

Units	Content	Hrs.
I	**Content in Mathematics** Definitions, Concepts, Generalizations, Formulae, Laws, Rules, Properties, Axioms, Structures, Constructions, Graphs, Operations, Procedures and Processes, Axioms and Postulates, Theorems and their converse, Propositions, Proofs, Problems, etc. in Mathematics, Critical analysis of the content course of Standard VI to X Mathematics. - Basic concepts in Secondary School Mathematics. Mathematics Curriculum Need and importance of Mathematics in School Curriculum - Recent trends in Curriculum Construction - Principles of formulating Mathematics Curriculum - Organization of Syllabus – Topical and Spiral, Logical and Psychological Approaches	12
II	**Critical Analysis of Mathematics Curriculum and Problem-Solving** Critical Analysis of Mathematics Curriculum at the secondary level (state board) based on principles and organization of Mathematics curriculum and NCF 2005. Development of Problem-Solving Ability and Creativity in Mathematics: Meaning – Problems, Problem-Solving and Problem Posing – Characteristics of a Good Problem - Problem-solving Strategies and steps in Problem-Solving - Gagne's views on Problem-Solving - Strategies of Mathematics Problem posing - Divergent Thinking and Creativity in Mathematics - The relation of Creativity to Problem-solving and Problem Posing in Mathematics.	13
III	**Evaluation in Mathematics** Construction and Use of Diagnostic test in Mathematics: Stages, Preparation of Diagnostic Chart (Error Analysis)-Co-operative and collaborative strategies: Learning together, Jigsaw technique – steps – Meaning.	13
IV	**Recreational program in learning Mathematics and Problems faced by students** Mathematics Recreational activities and Mathematics Quiz - importance and Organization. - Music and Mathematics. - Problems: fear and failure, crude assessment - inadequate teacher preparation.	13
V	**ICT Integration and Applications in Teaching of Mathematics** Scope and importance of ICT for teaching and learning Mathematics. Use of ICT (digital repository, Augmented Reality (AR), Virtual Reality (VR) and Artificial Intelligence (AI) based digital resources, open education resources, blogs, forums, interactive boards, and devices) in	13

	the teaching learning, assessment and resource management of secondary Mathematics. Use of tools, software, and platforms such as GeoGebra, Khan Academy along with national teacher's portal, DIKSHA, SWAYAM. Developing ICT integrated lesson plans using Technological Pedagogical Content Knowledge (TPCK) for Mathematics classroom and online teaching.	
	Task and Assignment (any three) ✓ Critically analyze the Mathematics Curriculum at the Secondary Level and prepare a report. ✓ Prepare any two improvised teaching aids. ✓ Prepare the stick album based on the mathematical shapes. ✓ Search and collect the scrap for Mathematics. ✓ Prepare a power-point presentation on Mathematical Concepts, Principles, and Properties. ✓ Prepare remedial measures for any difficulties in learning Mathematics or prepare enrichment programs for gifted children. ✓ Create a collection of mathematical puzzles, riddles for secondary students. ✓ Collect the mathematical shapes and record them. ✓ Search the NET about the mathematical correlation with other subjects. ✓ Construct any five problems that have multiple right solutions. **References**: Anice James (2014). The teaching of Mathematics. Hyderabad: Neelkamal Publications Pvt. Ltd. Arul Jothi, Balaji D.L. and NishitMathur (2009). The teaching of Mathematics II. New Delhi: Centrum Press. Bagyanathan, D. (2007). The teaching of Mathematics. Chennai: Tamil Nadu Text Book Society. Bolt, B., & Hobbs, D. (2005). 101 Mathematical projects. New Delhi: Cambridge University. Goel, Amit. (2006). Learn and teach Mathematics. Delhi: Authors Press. Michael A. Lorber and Walter D. Pierce (1990) Objectives, Methods and Evaluation for Secondary Teaching. New Jersey: Prentice-Hall. https://www.youtube.com/watch?v=vMPjqnQYAQE http://study.com/academy/lesson/teaching-math-methods-strategies.html	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	0	3	3	3
CO2	3	3	0	3	3	2
CO3	3	3	2	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	1

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 4 x 5 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	**12**	**12**	**12**	**12**	**12**

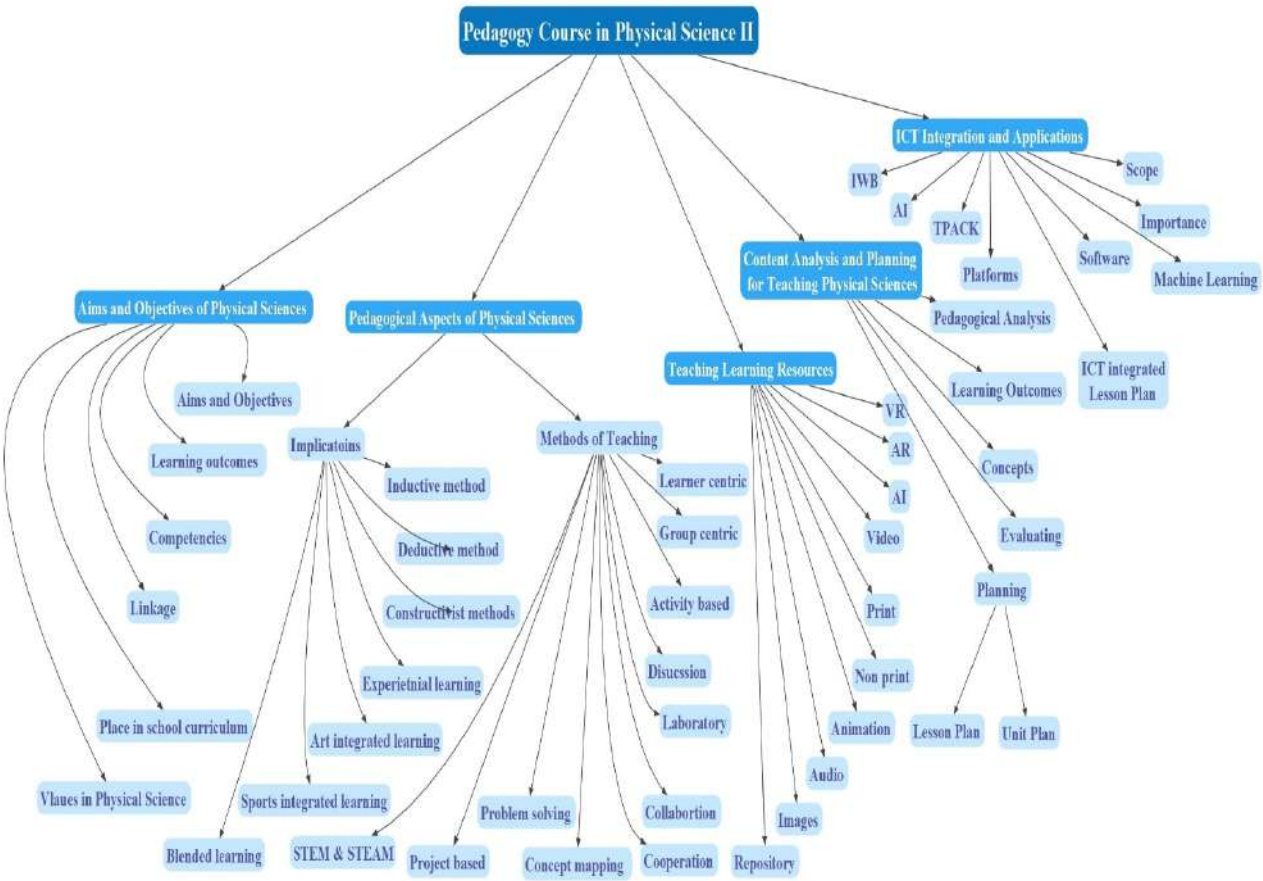
g. Model Question Paper

Sl. No.	Model Questions	Specification	Level
	Part – A: Objective Type **Multiple Choice Marks: 10 x 1 = 10**		
1	Mathematics is the science that draws necessary conclusions. A. Benjamin Peirce B. Hogben C. Locke D. S. Back Bell	Recall	Remember
2	A curriculum in which the key concepts are presented repeatedly throughout the curriculum is A. Topical B. Logical C. Spiral D. Psychological	Recall	Remember
3	Mathematics starts with A. Addition B. Counting C. Subtraction D. Multiplication	Recall	Remember
4	Problem-solving as a strategy of doing mathematics involves A. Using clues to arrive at a solution B. Extensive practice C. Activity-based approach D. Estimation	Recognize	Remember
5	The class is broken down into groups and each is assigned a piece of a task in A. Quiz and Find B. Pass a problem C. Think – pair – share D. Jigsaw technique	Identify	Remember

6	Which of the following is not a type of diagnostic test? A. Pre-tests B. Self-assessment C. Peer assessment D. Interview	Recognize	Remember
7	Recreational activities in learning mathematics include A. Maths puzzles B. Maths exhibition C. Maths Quiz D. All the above	Recall	Remember
8	Fear of mathematics is A. Aerophobia B. Numerophobia C. Agoraphobia D. Glob phobia	Recognize	Remember
9	Reading disorder is A. Dysgraphia B. Dyscalculia C. Dyslexia D. Dyspraxia	Identify	Remember
10	IQ of the slow learner is between A.70 and 85 B. 65 and 85 C.70 and 80 D. 75 and 85	Identify	Remember
PART – B Short Answer **The answer should not exceed 200 words Marks: 4 x 5 = 20**			
11	a) Explain the nature of Mathematics. (or) b) Define the following: (i) Concepts (ii) Generalizations (iii) Laws (iv) Rules (v) Axioms (vi) Postulates	Explain Define	Understand
12	a) Explain Gagne's view of problem-solving. (or) b) Discuss the characteristics of a good problem.	Explain Discuss	Understand
13	a) Differentiate topical with that of spiral approach in curriculum construction. (or) b) Explain the advantages of using Audio-visual aids in teaching mathematics.	Differentiate Explain	Understand
14	a) Point out the strategies in mathematics problem posing. (or) b) Investigate the relation of creativity to problem-solving in mathematics	Point out Investigate	Analyze
PART – C Essay Answer **The answer should not exceed 400 words. Marks: 3 x 10 = 30**			
15	a) Describe the steps in the construction of a diagnostic chart. (or) b) Illustrate the Jigsaw technique for a topic of your own.	Describe Illustrate	Analyze
16	a) Explain the importance of mathematics recreational activities in learning mathematics (or) b) Discuss the relationship between music and mathematics.	Explain Discuss	Understand
17	a) Generalize the use of Geogebra for learners with learning difficulties. (or) b) Examine the use of Artificial Intelligence in learning mathematics.	Generalize Examine	Apply

SEMESTER VI					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10615	Pedagogy Course in Physical Science II	3	1	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcomes

CO No.	Course Outcome	Level
CO1	Understand the aims and objectives of Physical Science	Understand
CO2	Understand pedagogical aspects of Physical Science.	Understand
CO3	Understand various teaching-learning resources.	Understand
CO4	Develop different plans for Physical Science teaching-learning	Create
CO5	Understand ICT integration and application in Physical Science Teaching Learning.	Understand

b. Syllabus

Units	Content	Hours
Unit 1	**Aims and Objectives of Physical Sciences** Aims and objectives of teaching Physical Sciences- Learning outcomes and competencies of teaching Physical Sciences at the secondary stage- Linkages of Physical Sciences with other school subjects and place of the Physical Sciences in school curriculum- Values of Physical Sciences: scientific attitude and appreciating other systems of knowledge / alternative knowledge systems.	12
Unit 2	**Pedagogical Aspects of Physical Sciences** Implication of various approaches - inductive deductive, constructivist, experiential learning, art integrated learning, sports integrated learning, blended learning, interdisciplinary and multidisciplinary approaches in Physical Sciences.- Analytical pedagogical concerns in the teaching of Physical Sciences for higher order thinking skills such as critical, creative, communication, decision making, and reflective- Methods of teaching-learning Physical Sciences: learner-centric and group-centric, lecture cum demonstration, activity based, discussion, problem-solving, laboratory, STEM and STEAM, project-based, scientific inquiry, hands-on activity, discovery, experimentation, concept-mapping, collaborative and cooperative learning.	12
Unit 3	**Teaching Learning Resources** Teaching learning aids/materials: concept, definition, role and importance in classroom teaching learning the physical sciences- Types of teaching-learning aids/ materials: print media such as textbook, teachers' manual/ handbook, laboratory manual and other print materials, non-print and digital media such as radio, TV, websites, animations, audios, videos, images, simulations, digital repository, Augmented Reality (AR), Virtual Reality (VR) and Artificial Intelligence (AI) based digital resources and Open Educational Resources (OERs) for offline/ online classroom teaching learning reflective journals, charts, 2-D and 3-D models, games, cards, worksheets, multimedia- Identification and use of learning resources in physical sciences from the local environment- Resource room/ laboratory/ library, virtual laboratories, teaching-learning kits, physical sciences clubs, fairs, exhibitions, educational parks, excursions, community resources and pooling of resources.	12

Unit 4	**Content Analysis and Planning for Teaching Physical Sciences** Pedagogical analysis of content, taking examples from topics of physical sciences textbooks at the secondary stage, identification of concepts, listing learning outcomes and competencies, planning, and evaluating learning experiences in an inclusive setup- Concept, types and importance of unit and lesson planning. Developing unit plans and lesson plans based on learning outcomes and experiential learning by selecting topics from textbooks of physical sciences at the secondary stage	16
Unit 5	**ICT Integration and Applications** Scope and importance of ICT in physical sciences- Use of ICT such as Artificial Intelligence, machine learning, and smart boards in the teaching-learning, assessment, and resource management- Tools, software, and platforms for teaching learning of physical sciences at the secondary stage- Developing ICT integrated lesson plans by taking topics of physical sciences at secondary stage using Technological Pedagogical Content Knowledge (TPCK) for classroom and online teaching.	14
References		
	National Curriculum Framework 2005, NCERT, New Delhi. Steve Alsop, Keith Hicks (2007). Teaching Science: A Handbook for Primary and Secondary School Teachers, Kogan Page, New Delhi. NCERT, Pedagogy of Science- Physical Science Part I – Text Book for B.Ed. ‘ NCERT, Pedagogy of Science- Physical Science Part II – Text Book for B.Ed. Joshi, S.R. (2005). Teaching of Science. A.P.H. Publishing Corporation, Daryaganz, New Delhi. Kaur, M., & Singh, A. (2008). Modern Approach to Teaching of Science. Modern Publishers, Jalandhar. McComas, F. W. (1998). The Nature of Science in Science Education: Rationales and Strategies (Ed.). The Netherlands: Kluwer Publishers Einstein, A. Major Contributions to Science. The Columbia Electronic Encyclopedia, 6th ed., Columbia University Press. Gupta, K. (2018). Contribution to Physics: Sir C. V. Raman. International Journal of Trend in Research and Development. Vol. 5(2), 2394-9333. https://www.famousscientists.org/images1/isaac-newton-two-prisms.png https://learnodo-newtonic.com/wp-content/uploads/2016/03/Bohrs-Complementarity.webp https://learnodo-newtonic.com/wp-content/uploads/2016/03/Diagram-explaining-wavefunction-collapse-of-the-Copenhagen-Interpretation.webp Aims and Objectives of Science (2020). https://gradeup.co/aims-and-objectives-of-science-i Arons, A.B. (1997). Teaching Introductory Physics. The University of Michigan:	

	Wiley. Gabel, D. (1994). Handbook of Research on Science Teaching and Learning. The University of Michigan: Macmillan. Heywood, D. & Parker, G. (2010). The Pedagogy of Science. https://www.researchgate.net/publication/27399992_The_Pedagogy_of_Physical_Science. OECD (1998). The Professional Development of Teachers. Retrieved June 20, 2020 from https://www.oecd.org/berlin/43541636.pdf Science in School (2017). https://www.scienceinschool.org/content/issue-4	

c. Mapping of Programme Outcome with Course Outcomes

	CO1	CO2	CO3	CO4	CO5
PO1	X	X		X	X
PO2		X		X	X
PO3	X	X	X	X	X
PO4	X	X	X	X	X
PO5		X	X	X	X
PO6		X	X	X	X

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	5	10	5	10	10	40
External	10	15	10	15	10	60
Total	15	25	15	25	20	100

e. Mapping Course Outcomes with Internal Assessment

	CO1	CO2	CO3	CO4	CO5	Total
Assignments		5		5		10
Seminar					5	5
Test	5	5	5	5	5	25
Total	5	10	5	10	10	40

f. Mapping course outcomes with External Assessment

Type	CO1	CO2	CO3	CO4	CO5	Total
Objective Type	2	2	2	2	2	10
Short Answer	4	4	4	4	4	20
Long Answer		10	10	5	5	30
Total	6	12	16	11	11	60

g. Activities/ Internal Assessment Tasks

Sl. No	Tasks	CO
1	Develop a project on the concepts of Physical Sciences using interdisciplinary and multidisciplinary approaches as recommended in NEP 2020.	CO2
2	Prepare learning outcomes and experiential learning-based lesson plans for the concepts of Physical Sciences.	CO4
3	Demonstrate different ICT-integrated pedagogical approaches and strategies for transacting concepts of Physical Sciences.	CO5

h. Model Question Paper

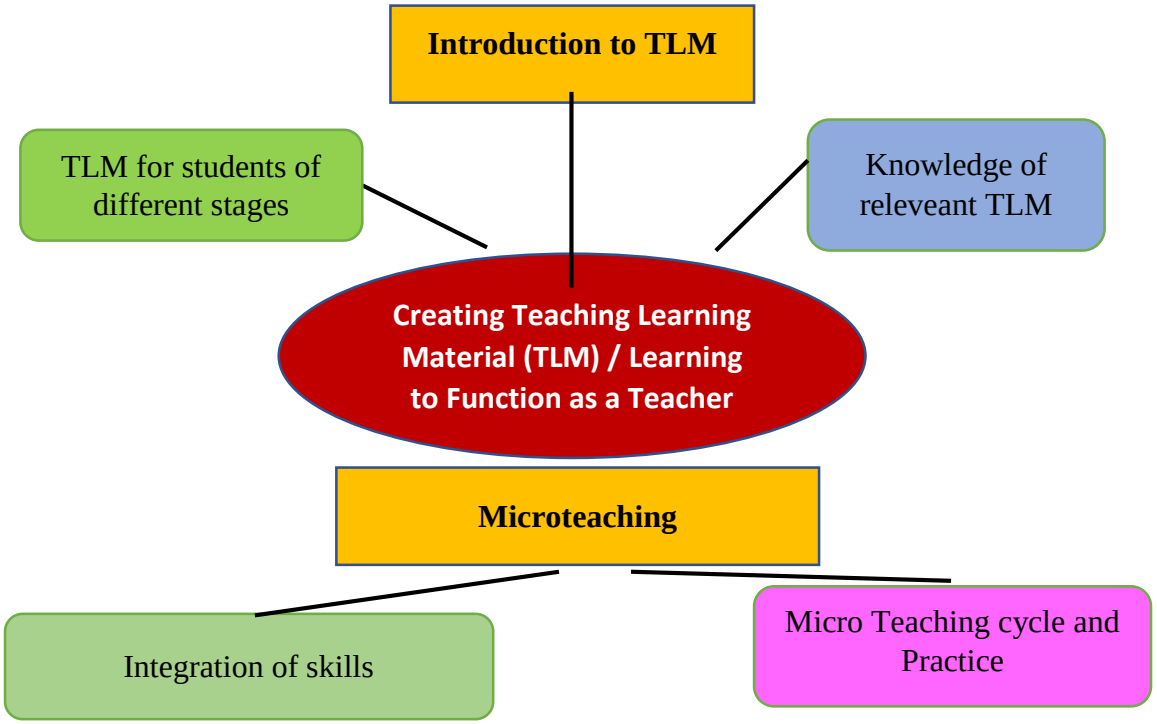
Q No	Question	Specification	Level
	Part A **Answer all questions. Each question carries 1 mark.**		
1	Which of the following is NOT the major objective of teaching physical science at the secondary level? a. To familiarise the pupil with the world in which he lives and to make him understand the impact of science on society so as to enable him to adjust himself to his environment. b. To acquaint him with the 'scientific method' and to enable him to develop a scientific attitude. c. To give the pupil a historical perspective so that he may understand the evolution of scientific development. d. To prepare the pupil for higher education	List	Understand
2	Which of the following is NOT an objective of teaching Physical Science at the secondary level according to NCF 2005 a. The students should be engaged in learning science as a composite discipline. b. The students should be engaged in working with hands and tools to design more advanced technological modules than at the upper primary stage. c. Scientific concepts are to be arrived at mainly from activities and experiments. d. The students should be engaged in systematic experimentation as a tool to discover/verify theoretical principles.	List	Understand
3	Teaching …….is a series of related and progressive acts performed by a teacher. a. Strategy, b. Approach, c. Technique, d. Method	List	Understand
4	The method which is convenient for larger classroom sizes is …… a.Project, b. Discussion, c. Lecture,d. Demonstration	List	Understand

5	Which of the following is not true in teaching learning materials? a. a blackboard can be used for putting the cutouts of newspapers and magazines b. teaching can be effective through audio-visual aids c. audio-visual aids help comprehend difficult or monotonous content d. textbooks are one of the main teaching-learning materials used in classrooms.	Explain	Understand
6	Which of the following methods is NOT appropriate for science teaching? a. Demonstration b. Experimental c. Semantic d. Heuristic	List	Understand
7	Which of the following is an example of a concept? a. Force b. Metals are solids c. Light travels in a straight line d. Magnets have two poles	Example	Understand
8	Which of the following is NOT connected with a concept? a. Attributes b. Attribute Values c. Rules d. Explanation	List	Understand
9	Which of the following is an example of an ICT tool for Teaching Physical Science? a. PhET b. Animato c. Socrative d. Kahoot	Example	Understand
10	Which of the following is an example of a simulation tool teaching Physical Science? a. Exe b. Free Mind c. C-map d. PhET	Example	Understand

Part B **Answer any one question from each question number. Each question carries 4 marks.**			
11			
A	List any four learning outcomes specific to secondary-level Physical Science as suggested by NCERT.	List	Understand
B	Discuss any four values of teaching Physical Science at the secondary level.	Discuss	Understand
12			
A	Explain the implications of inductive and deductive methods of teaching in Physical Science.	Explain	Understand
B	Describe the scope of collaboration and cooperation in teaching learning Physical Science.	Describe	Understand
13			
A	Explain the pedagogical uses of any two types of teaching-learning resources with examples.	Explain	Understand
B	Discuss the scope of the community as a teaching-learning resource in Physical science.	Discuss	Understand
14			
A	List any four different pedagogic content components from the topic “Laws of Motion”.	List	Understand
B	Create any two learning experiences in the ‘Extent’ phase of 5E approach lesson planning.	Create	Create
15			
A	Explain the pedagogical uses of any four FOSS tools in teaching Physical Science.	Explain	Understand
B	Discuss the different criteria for selecting any ICT tool for teaching Physical science.	Discuss	Understand
Part C **Answer any three questions. Each question carries 10 marks.**			
16	Discuss the objectives of teaching Physical Science at the secondary level, highlighting the scope of the school curriculum.	Explain	Understand
17	Explain the analytical pedagogical concerns in the teaching of Physical Sciences for higher-order thinking skills with suitable examples.	Explain	Understand
18	Discuss different criteria for selecting teaching-learning resources and explain the pedagogic uses of any five teaching-learning resources for Physical Science.	Discuss	Understand
19	Prepare a constructivist lesson plan from any topic you choose from Secondary level Physical Science.	Create	Create
20	Elucidate the uses and concerns of integrating ICT tools in teaching Physical Science.	Elucidate	Understand

SEMESTER - VI					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10616	Creating Teaching Learning Material (TLM) and Learning to function as a Teacher	0	0	2	2
Internal	100	External	0	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Preapes TLM	Skill
CO 2	Writes Record	Apply
CO 3	Defines Microteaching	Knowledge
CO 4	Practice Individual Skills	Skill
CO 5	Practice Integration of Skills	Skill

b. Syllabus

S.No.	Content	Time
UNIT- I	**Introduction to TLM** Understands the need for TLM: Different Stages - Creation of Dynamic and Static TLM – Improvised Aids	8
UNIT- II	**Record for TLM** Preparation for Record for TLM	12
UNIT- III	**Microteaching to macro-teaching** Microteaching: Principles, Skills & Cycle – Micro Lesson Plan - Objective and Subjective Skills	12
UNIT- IV	**Individual Skills** Practicing Skills: Initiation, Explanation, Demonstration, Questioning, Black Board Work, Reinforcement, Stimulus Variation, Closure.	32
UNIT- V	**Integration of Skills** Integration of any one Objective Skill with any one Subjective Skills and Practice	8

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	2	3	3
CO5	3	3	3	3	3	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	20	20	20	20	20	20
External	0	0	0	0	0	0
Total	20	20	20	20	20	**100**

e. Mapping Course Outcome with Internal Assessment (100 Marks)

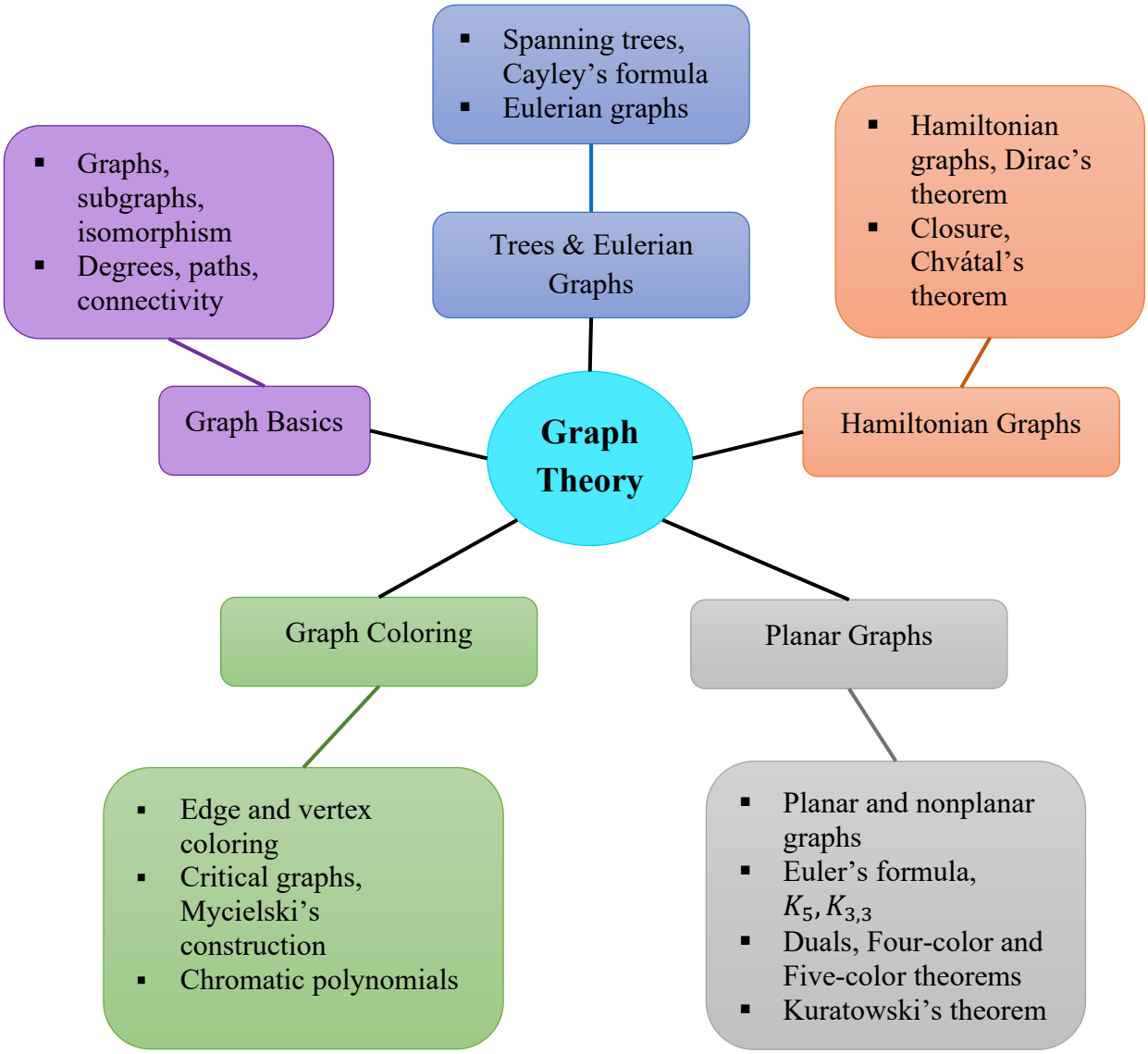
Category	CO1	CO2	CO3	CO4	CO5	Total
Creation of Dynamic and Static TLM	20	-	-	-	-	20
Record of TLM Creation	-	20	-	-	-	20
Micro Lesson Plans	-	-	20	-	-	20
Microteaching	-	-	-	20	`-	20
Bridge Course – Integration of Objective and Subjective Micro Teaching Skills	-	-	-	-	20	20
Total	**20**	**20**	**20**	**20**	**20**	**100**

f. Rubric for Tasks

Sl. No.	Criteria	100%	75%	50%	25%	0%	CO
1	**Development of low-cost learning resources**	Developed low-cost learning resources with perfection and demonstrated.	Developed with perfection	Developed resources but not with perfection.	Submitted only one or two resources.	Not submitted	CO1
1	**Record of TLM for Pedagogical subjects**	The report was a detailed record with specific details	The report was written correctly with the details.	The report was correctly written but missing major details.	Attended but not active	Not attended	CO2
3	**Development of Micro Lessons for each skill**	Preparation of lesson plans for each skill with perfection and demonstration.	Developed with perfection	Developed but not with perfection.	Submitted only for a few components	Not submitted	CO3
4	**Practicing Skills**	Practicing Skills with perfection	Practicing Skills with perfection for a few skills	Practicing Skills without perfection	Just Practice.	Not Practiced	CO4
5	**Integration of Skills**	Integrated Skills with perfection	Integrated Skills with perfection for a few skills	Integrated Skills without perfection	Just Practice.	Not Practiced	CO5

SEMESTER VI					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10617	Graph Theory	4	0	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcomes (COs)

On the successful completion of the course, the student will be able to

	Course Outcomes	Level
CO 1	Understand the concept of graphs, subgraphs and graph isomorphisms	Remember/ Understand
CO 2	Demonstrate Cayleys's formula to count the spanning trees of K	Apply
CO 3	Distinguish between connectivity and edge connectivity, between vertex coloring and edge coloring	Analyze
CO 4	Determine Eulerian graphs, planar graphs and chromatic polynomial of a given graph	Evaluate
CO 5	Translate real-world problems in to graph theoretic models	Create

b. Syllabus

Units	Contents	Hrs.
I	Graphs, subgraphs, isomorphism of graphs, degrees of vertices, paths and connectedness, automorphisms, vertex cuts, edge cuts, connectivity, edge-connectivity, blocks.	12
II	Trees, counting the number of spanning trees, Cayley's formula, Eulerian graphs.	12
III	Hamiltonian graphs, necessary conditions, Dirac's theorem, closure of a graph, a criterion for Hamilton graphs using closure of a graph, Chvatal's theorem.	12
IV	Edge colorings, vertex colorings, critical graph, properties of critical graphs, Mycielski's construction, chromatic polynomials	12
V	Planar and nonplanar graphs, Euler's formula and its consequences, K5 and K3,3 are nonplanar graphs, dual of a plane graph, the Four-color theorem (without proof), the Heawood Five-color theorem, Kuratowski's theorem (without proof).	12
	Text Book: 1. R. Balakrishnan and K. Ranganathan, A Text book of Graph Theory, Second Edition, Springer, 2012. **References**: 1. J. A. Bondy and U.S.R. Murty, Graph Theory with Applications, North-Holland, 1982. 2. G. Chartrand, L. Lesniak, and P. Zhang, Graphs and Digraphs, Fifth Edition, CRC press, 2011. 3. D. B. West, Introduction to Graph Theory, Second Edition, PHI L earning Private Ltd, New Delhi, 2011.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	**1**	**1**	**1**	**0**	**1**	**1**	**1**	**1**
CO2	**1**	**1**	**0**	**0**	**1**	**1**	**1**	**1**
CO3	**1**	**1**	**1**	**0**	**1**	**1**	**1**	**1**
CO4	**1**	**1**	**0**	**0**	**1**	**1**	**1**	**1**
CO5	**1**	**1**	**1**	**0**	**1**	**1**	**1**	**1**

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	20	20	20	20	20	100

e. Mapping course outcome with Internal assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assignment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 5 x 4 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	12	12	12	12	12

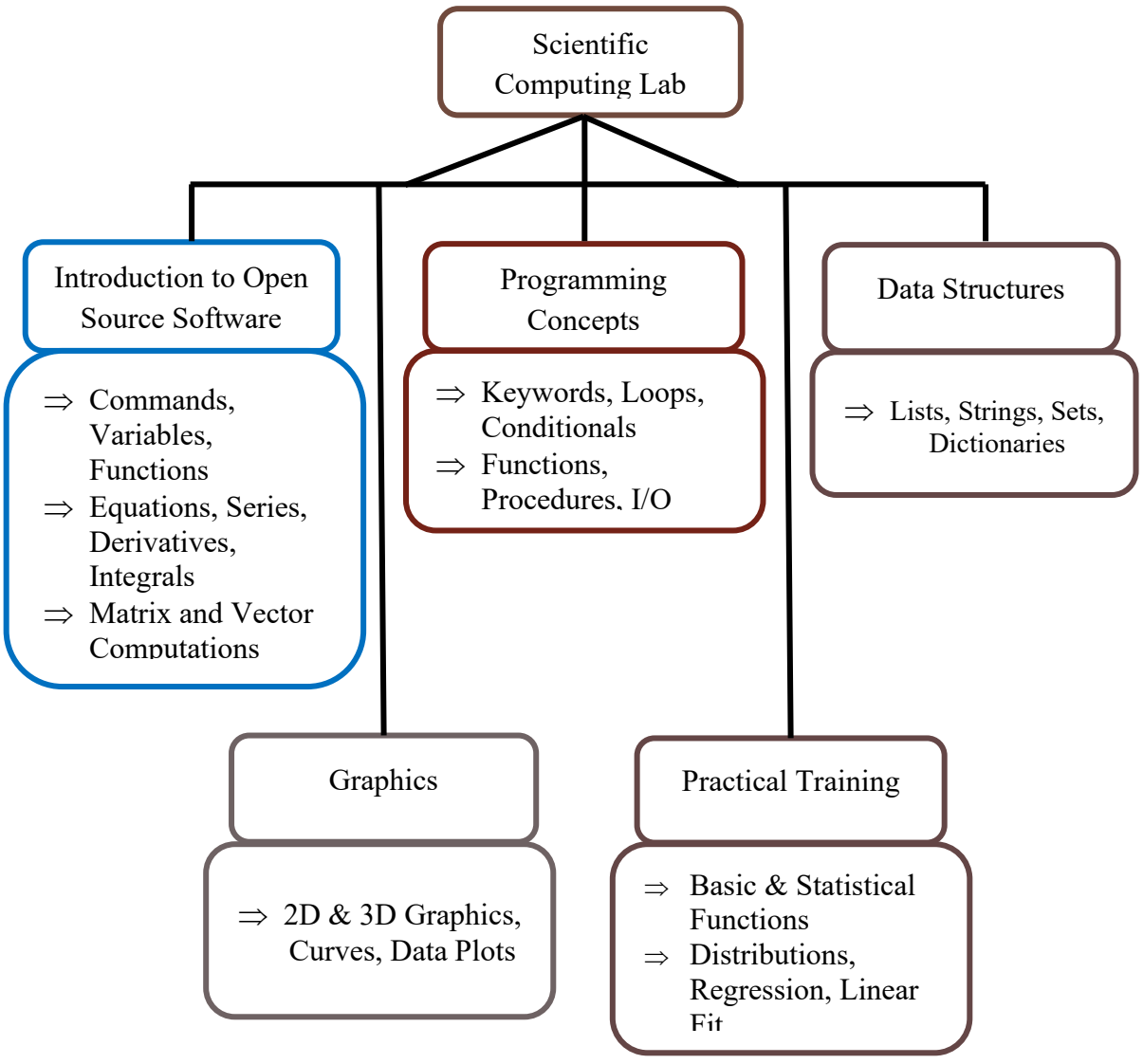
Sl. No.	**Model Questions**
	Part – A: Objective Type **Multiple choice** **10 x 1 = 10**
1	The degree of each vertex in a complete graph K_n is: a) $\boldsymbol{n}$ b) $\boldsymbol{n-1}$ c) $\boldsymbol{n+1}$ d) None of these

2	The sum of the degrees of all vertices in a graph is always equal to: a) Number of vertices b) Twice the number of edges c) Number of edges d) Number of connected components
3	A tree with n vertices has: a) n edges b) $n-1$ edges c) $n+1$ edges d) n^2 edges
4	A connected graph is Eulerian if and only if: a) All vertices have odd degree b) All vertices have even degree c) Exactly two vertices have odd degree d) The graph has at least one cycle
5	A Hamiltonian **cycle** in a graph is a cycle that: a) Passes through all edges b) Passes through all vertices exactly once c) Passes through half the vertices d) Contains no cycles
6	The closure of a graph G is obtained by: a) Adding edges to make the graph Eulerian b) Adding edges between nonadjacent vertices whose degree sum is at least n c) Removing all vertices of degree 1 d) Removing all cycles
7	The chromatic number of a bipartite graph is: a) 1 b) 2 c) 3 d) 4
8	A graph is called k-critical if: a) Its chromatic number is k and removing any edge decreases it b) Its chromatic number is k and removing any vertex decreases it c) It has exactly $k$vertices d) It is Eulerian and Hamiltonian
9	The dual of a plane graph is obtained by: a) Removing all vertices b) Placing a vertex in each face and connecting faces that share edges c) Reversing edge directions d) Coloring vertices differently
10	Euler's formula for a connected planar graph is: a) $\boldsymbol{V-E=FV}$ b) $\boldsymbol{V+E=F+2V}$ c) $\boldsymbol{V-E+F=2V}$ d) $\boldsymbol{V+E-F=1}$
PART – B Short Answer **Answer all following Question** **5 x 4 = 20**	
11	a) Define the degree of a vertex. If a graph has 5 vertices with degrees 2,3,3,2,2 determine whether it is possible. OR b) Determine if two given graphs (provide small adjacency matrices) are isomorphic.

12	**a)** Find the connectivity and edge-connectivity of the given graph: V={1,2,3,4}, E={(1,2),(2,3),(3,4),(4,1),(2,4)}. **OR** b) Determine all blocks of the given graph: V={1,2,3,4,5},E={(1,2),(2,3),(3,1),(3,4),(4,5)}.
13	**a)** Define tre**e** and prove that a tree with n vertices has n−1n edges. **(or)** b) Explain Cayley's formula for counting spanning trees
14	**a)** Show that a connected graph is Eulerian if every vertex has an even degree**. (or)** **b)** Determine whether the given graph (describe or draw) is Eulerian **or not.**
PART – C Essay Answer **Answer all following Question** **3 x 10 = 30**	
15	**a)** State Dirac's theorem and determine whether the graph below is Hamiltonian: V={1,2,3,4,5,6}, E={(1,2),(2,3),(3,4),(4,5),(5,6),(6,1),(1,4),(2,5)}. *(Use Dirac's theorem and discuss necessary conditions.)* **OR** b) Explain the concept of closure **of a** graph and apply it to determine whether the graph GGG with vertices V={1,2,3,4,5} and edges E={(1,2),(2,3),(3,4),(4,5)} is Hamiltonian using closure.
16	a) Define **a** critical graph**.** Construct a 4-vertex graph that is 3-chromatic and explain why it is critical. **OR** **b)** Find the chromatic polynomial of the cycle C4C_4C4 and determine the number of proper 3-colorings.
17	a) Using Euler's formula**,** show that the graph K5K_5K5 is nonplanar. Explain each step. **OR** **b)** Define the dual of a plane graph and construct the dual of the planar graph: V={1,2,3,4}, E={(1,2),(2,3),(3,4),(4,1),(1,3)}.

SEMESTER VI					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10618	Scientific Computing Lab	0	0	2	2
Internal	60	External	40	Total	100

Course Content Overview



a. Course Outcomes (COs)

On the successful completion of the course, the student will be able to

	Course Outcomes	Level
CO 1	Use open source software built-in commands/functions.	Remember/ Understand
CO 2	Define functions and run several numerical methods in open source software.	Apply
CO 3	Create and manipulate data structures like lists and dictionaries in open source software.	Analyze
CO 4	Visualize graphs and other objects in two and three dimensions in open source software.	Evaluate
CO 5	Perform basic statistical analysis of a given data using open source software.	Create

b. Syllabus

Units	Contents	Hrs.
I	Introduction To Open Source Software Commands, Variables, Symbolic Variables, First Computations, Elementary Functions And Usual Constants, Auto Completion, Simple Plotting, Symbolic Expressions And Simplification, Transforming Expressions, Usual Mathematical Functions, Assumptions And Pitfalls, Explicit Solving Of Equations, Equation With No Explicit Solution, Sums, Limits, Sequences, Power Series Expansions, Series, Derivatives, Partial Derivatives, Integrals, Solving Linear Systems, Vector Computations, Matrix Computations, Reduction Of A Square Matrix.	12
II	Programming With Open Source Software, Keywords, Special Symbols And Their Uses, Function Calls, Algorithms, Loops, Approximation Of Sequence Limits, Conditionals, Procedures And Functions, Iterative And Recursive Methods, Input And Output.	12
III	Lists And Other Data Structures, List Creation And Access, Global List Operations, Main Methods On Lists, Examples Of List Manipulations, Character Strings, Shared Or Duplicated Data Structures, Mutable And Immutable Data Structures, Finite Sets, Dictionaries.	12
IV	2D Graphics Graphical Representation Of A Function, Parametric Curve, Curves In Polar Coordinates, Curve Defined By An Implicit Function, Data Plot, Displaying Solutions Of Differential Equations, Evolute Of A Curve, 3D Graphics.	12
V	Training The Commands With Open Source Software: Basic Functions Random, Mean, Median, Mode, Moving Average, Std, Variance, Min, Max, Plot, Histogram, Product, Sum, Distributions, Norm, Uniform, Exponential, Bernoulli, Poisson, Statistical Functions, Geometric Mean, Harmonic Mean, Skew, Kurtosis, Linear Regression, Statistical Model, Linear Fit, Glm.	12

	References: 1. P. Zimmermann Et.Al., Mathematical Computation With Sage, SIAM, Philadelphia, 2018. (Http://Sagebook.Gforge.Inria.Fr/English.Html) 2. R. A. Mezei, An Introduction To SAGE Programming: With Applications To SAGE Interacts For Numerical Methods, John Wiley & Sons, 2015. 3. G. A. Anastassiou, R. A. Mezei, Numerical Analysis Using Sage, Springer, 2015. 4. R. A. Beezer, A First Course In Linear Algebra, University Press Of Florida, 2009. 5. A. Kumar & S. G. Lee, Linear Algebra With Sage, Kyobo Books,2015. (Http://Matrix.Skku.Ac.Kr/2015-Album/Big Book-Linearalgebra-Eng-2015.Pdf). 6. Https://Docs.Scipy.Org/Doc/Scipy/Reference/Stats.Html 7. N. Matloff, R For Everyone: Advanced Analytics And Graphics, Pearson Education, Second Edition, Pearson India, 2018. 8. N. Matloff, The Art Of R Programming, No Starch Press, First Edition, 2011. 9. A. Quarteroni, F. Saleri And P. Gervasio, Scientific Computing With MATLAB And Octave, Springer-Verlag, Berlin, 2010. 10. S. Nagar, Introduction To Scilab: For Engineers And Scientists, Apress, First Edition, 2017.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	**0**	**1**	**1**	**0**	**1**	**1**	**0**	**1**
CO2	**0**	**1**	**1**	**0**	**1**	**1**	**0**	**1**
CO3	**0**	**1**	**1**	**0**	**1**	**1**	**0**	**1**
CO4	**0**	**1**	**1**	**0**	**1**	**1**	**0**	**1**
CO5	**0**	**1**	**1**	**0**	**1**	**1**	**0**	**1**

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	20	20	20	20	20	100

e. Mapping course outcome with Internal assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assignment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 5 x 4 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	12	12	12	12	12

Sl. No.	Model Questions
	Part – A: Objective Type **Multiple choice** **10 x 1 = 10**
1	Which of the following is an open-source operating system**?** a) Windows b) macOS c) Linux d) Android
2	In open-source software, the source code is: a) Hidden b) Paid c) Freely available d) Encrypted
3	The command used to list files in Linux is: a) list b) ls c) dir d) show
4	A symbolic variable in computation is used for: a) Approximation b) Algebraic computation c) Numerical values d) File input
5	The derivative of x^2 is: a) x b) 2x c) x^3 d) 1
6	A loop in programming is used for: a) Decision-making b) Iteration c) Compilation d) Termination
7	The evolute of a curve represents: a) The tangent to the curve at any point b) The locus of centers of curvature of the given curve c) The curve passing through the midpoints of normals d) The curve obtained by rotating the original curve about an axis

8	A parametric curve in 2D graphics is represented as: a) $y = f(x)$ b) $x = f(t), y = g(t)$ c) $r = f(0)$ d) $z = f(x, y)$
9	A histogram is used to represent: a) Linear data b) Statistical frequency c) Logical conditions d) String values
10	The mean of [4, 8, 12] is: a) 8 b) 6 c) 12 d) 4
	PART – B Short Answer **Answer all the following Question 5 x 4 = 20**
11	**a)** Explain the concept of open-source software with examples. **OR** b) Explain the difference between **simplify( )** and **expand( )** commands in symbolic computation.
12	a) Define symbolic variables and explain their use in mathematical computation. (or) b) Write short notes on elementary functions and constants in open-source platforms.
13	a) What are loops and conditionals? Give examples of each. (or) b) Explain iterative and recursive methods with suitable examples.
14	a) Describe input and output operations in open-source programming.(or) b) Write an algorithm to approximate the limit of a sequence using iteration.
	PART – C Essay Answer **The answer should not exceed 400 words 3 x 10 = 30**
15	**a)** Define lists and explain different methods for list manipulation with examples**.** **OR** **b)** Differentiate between mutable and immutable data structures with examples.
19	a) Write notes on 2D and 3D graphical representations of mathematical functions. **OR** **b)** Define the evolute of a curve and find the evolute of the parabola y2=4ax.
20	**a)** Explain the linear regression and linear fit models used in statistical analysis**.** **OR** **b)** Define linear regression and explain how it can be implemented using open-source software. Write the commands used for finding the line of best fit and interpret the results.

EDUON061/62/63/64 - MOOC - SWAYAM

SEMESTER – VI	
Credits	**3 or 4**

Each student should register for a MOOC-SWAYAM course in their respective domain and graduation level in their Sixth Semester.

In each academic year for the students of the Sixth Semester, a possible number of courses have to be identified from MOOC-SWAYAM and NPTEL platforms and informed to the students to choose any one among them. The courses should be of 3 or 4 credits and should not be part of any of the courses in the respective program's curriculum. The student should register on their own in the portal by using the university allocated E-mail ID.

For each of the selected MOOC-SWAYAM courses, a faculty member in the department, by considering their expertise with the selected course may be assigned to follow the progress of the study of registered students.

New option introduced by UGC (Nov-2024) to choose the end-semester examinations conducted by MOOC-SWAYAM itself or the institution (CUTN) of the Students who enrolled for the programme for the Credit transfer. With this option, CUTN will conduct the end-semester examinations for the respective MOOC-SWAYAM Courses along with other regular courses, for 70 Marks through the assigned faculty members.

The internal marks of 30 will be taken care by the respective Program coordinators of MOOC-SWAYAM. The internal marks will be taken form the SWAYAM website through the University SWAYAM coordinators' access to the SWAYAM database. After, getting the internal marks from MOOC-SWAYAM, the same will be added with the CUTN conducted end-semester examination scores, the credits will be added to the Grade Card by the Controller of Examinations, CUTN.

The external marks will be uploaded to the SWAYAM website to SWAYAM coordinator for the credit transfer processes.

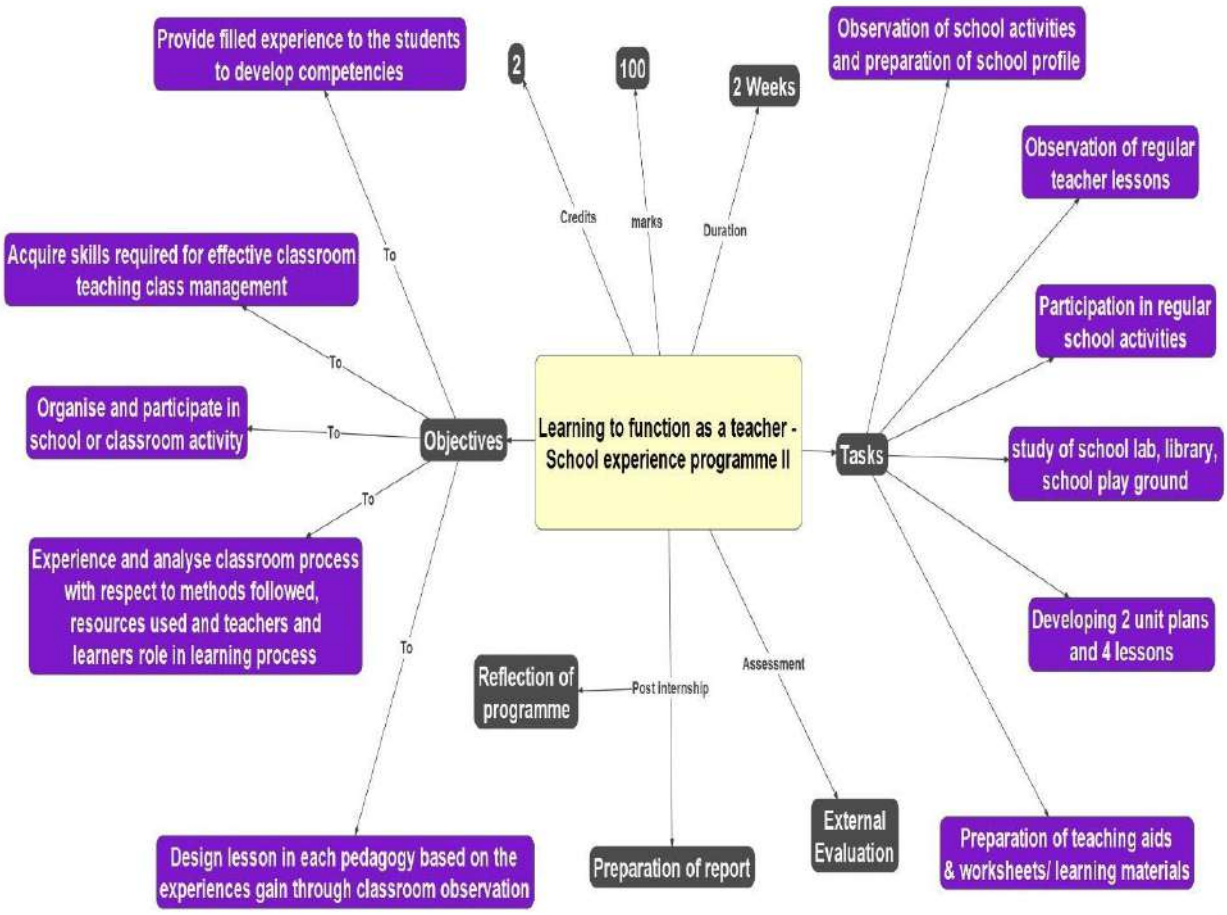
If any of the students fail to clear the selected MOOC-SWAYAM course in the particular semester, they will get another opportunity to clear in the next respective odd/even semester.

Those students who have opted for the end-semester examinations conducted by MOOC-SWAYAM have to register for the external end-semester examination in the SWAYAM Portal and attend the examinations in the selected Examination centers. After the declaration of results by the SWAYAM, the credits will be transferred to the University and will be reflected in the Grade cards.

SEMESTER - VII

SEMESTER - VII					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10711	Pre Internship (2 Weeks)	0	0	2	2
Internal	100	External	0	Total	100

Course Content Overview



a.Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Provide field experience to the students to develop competencies	Understand
CO 2	Acquire skills required for effective classroom teaching class management	Apply
CO 3	Organize and participate in school or classroom activity	Analyze
CO 4	Experience and analyze classroom process concerning methods followed, resources used, and teachers and learner's role in the learning process	Create
CO 5	Design lesson in each pedagogy based on the experiences gained through classroom observation	Skill

b. Practicum

S.No.	Tasks	Time
	Each student is required to do the following: ✓ Observation of school structure, infrastructure, and facilities; school activities starting from morning assembly onwards. ✓ Assisting classroom teacher is taking attendance ✓ Conducting morning assembly on any one day under the guidance of a mentor. ✓ Studying in detail –the school lab, library, school playground, concerning secondary school requirements ✓ Participating in organizing co-curricular activities. ✓ Engage the substitute classes given. ✓ Organizing any activity related to the subject in the class (example: science quiz, language games, mathematics puzzle, etc.) ✓ Developing 2-unit plans in each pedagogy and 4 lesson plans-2 LPs in each pedagogy under the guidance of Inst. Supervisor and the school mentor. ✓ Preparation of worksheets or learning materials on the lessons developed in each pedagogy. ✓ Preparation of teaching aids on the lessons developed in each pedagogy. ✓ Observing 10 lessons of regular teachers 5 in each pedagogy using the observation schedule. ✓ Two Day's Training of Trainers	2 weeks

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	2	3	3
CO5	3	3	3	3	3	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	0	0	0	0	0	0
External	10	10	20	20	40	100
Total	**10**	**10**	**20**	**20**	**40**	**100**

e. Mapping Course Outcome with External Assessment (100 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Reporting of Observation of school activities and preparation of school profile	-	-	10	-	-
Reporting of Participation in regular school activities (attendance; engaging substitute classes; morning assembly) organization of activities	-	-	10	-	-
Report on the study of school lab, library, school playground, concerning secondary school requirements	-	10	-	-	-
Developing 2-unit plans and 4 lessons (two lessons in each pedagogy).	-	-	-	-	`40
Preparation of teaching aids & worksheets/ learning materials on the lessons developed in each pedagogy	10	-	-	-	-
Observation of regular teacher lessons (10 lessons- 5 in each pedagogy)	-	-	-	20	-
Total	**10**	**10**	**20**	**20**	**40**

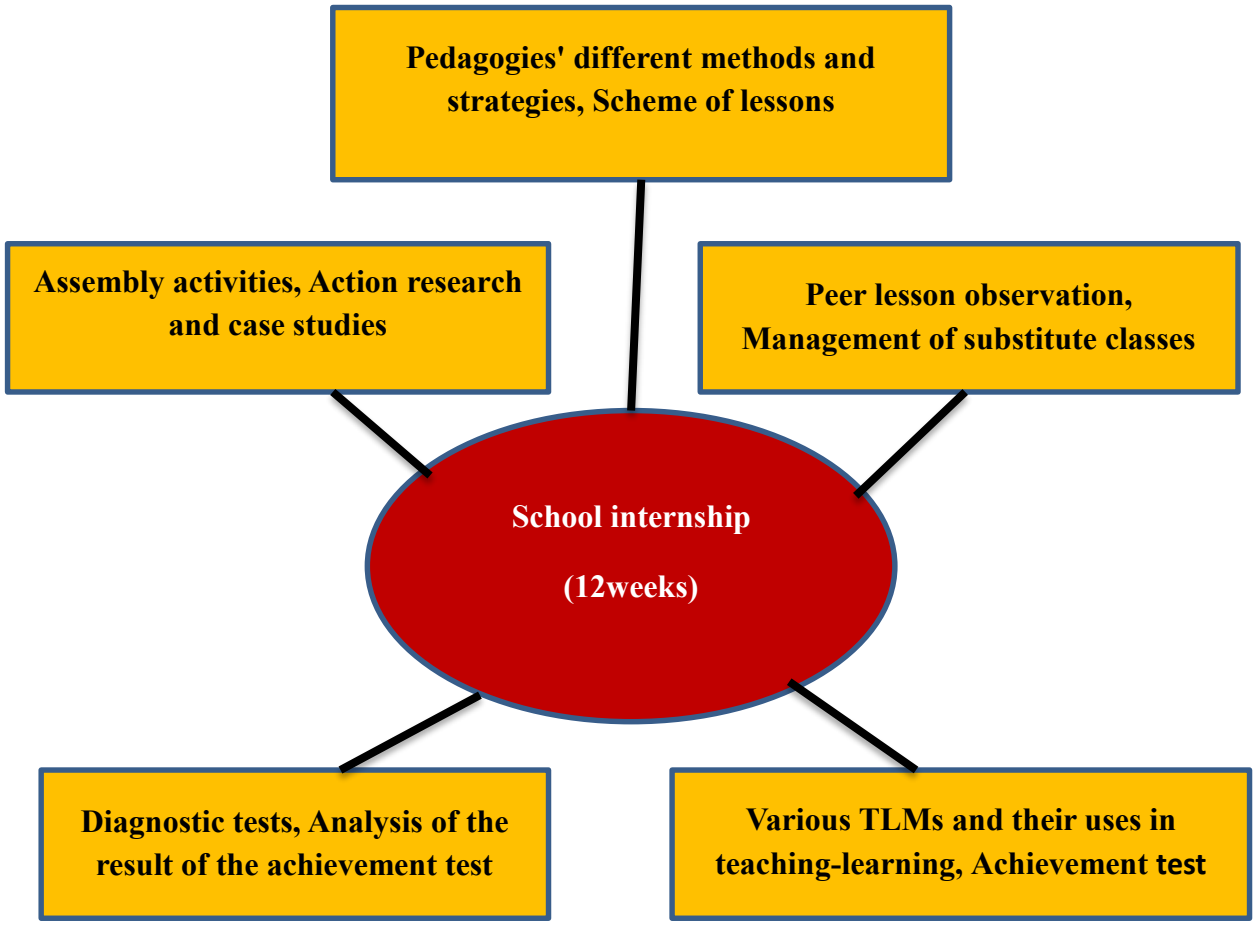
f. Rubric for Tasks

Sl. No.	Criteria	100%	75%	50%	25%	0%	Relation to COs
1	**Preparation of School profile – 10%**	The school profile was detailed. Explained specific detail about the school.	The school profile was written correctly and the details are most specific.	The school profile was written properly but missing major details.	Content is not enough	Not attended	CO3
2	**Participation in school activities 10%**	Participated in school activities like attendance, engaging substitute classes, and morning assembly regularly without any fail.	Participated in school activities like attendance, engaging substitute classes, and morning assembly frequently.	Participated in some of the school activities. Not all.	Participated in school activities very rarely	Not participated	CO3
3	**Report on the study of school 10%**	Reported about school lab, library, and playground with specific and minute details.	Reported about school lab, library, and playground with specific details.	Reported about school lab, library and playground briefly.	Reported. But missing some major details.	Not reported	CO2
4	**Developing lesson and unit plans 40%**	Developed all 4 lesson plans and 2-unit plans in time.	Developed almost all the plans missing anyone plan	Developed lesson and unit plans to miss some 2 or 3 plans.	Submitted only one or two plans.	Not submitted	CO5
5	**TLM's and worksheet 10%**	In each pedagogy, the teacher has developed TLM's and worksheets with exceptional knowledge.	The teacher has developed TLM's and worksheets with detailed knowledge .	Developed either TLM or Worksheet properly.	TLM or Worksheet is not properly prepared.	Not prepared.	CO1

6	**Observation 20%**	Observed all 10 lessons (5 lessons from each pedagogy) and reported it with all specific details.	Observed all 10 lessons and reported mostly specific details.	Observed some lessons and reported them properly.	Only observed the lessons and not reported properly	Not observed any lessons.	CO4

SEMESTER – VII					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10712	Internship in teaching (12weeks)	0	0	10	10
Internal	100	External	0	Total	100

Course Content Overview



a.Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Understands the Pedagogical strategies in the learning environment, observation, and TLM contexts in classrooms.	Understand
CO2	Unit plan and lesson plan application in the Practice teaching as Experience-based Learning	Apply
CO 3	Develop professional capacities and teacher dispositions in Test, Blueprint, and action research.	Skill
CO 4	Through observation and interaction, Participation in the school level activities.	Apply
CO5	Develop a broad repertoire of teaching respective pedagogic Subjects by feedback performance	Skill

b.Syllabus

School Internship/ Field Attachment aims at engaging the student-teachers with field-based situations and works in secondary or senior secondary government/recognized private schools and to provide an opportunity for reflection and writing on the same. This is to provide first-hand experience of the different kinds of school education-related work. This also facilitates a bridge between what students learn in the classroom and observing in the field. For each student-teacher, the internship should be conducted preferably in one school for the entire 16 weeks. The Principal/Head of the Institution shall assign a Supervisor to each student for Internship work

SL No	Content	Hours
Unit 1	Pedagogies' different methods and strategies, Scheme of lessons	12 Weeks
Unit 2	Peer lesson observation, Management of substitute classes	
Unit 3	Various TLMs (including ICT tools) and their uses in teaching-learning, Achievement test	
Unit 4	Diagnostic tests, Analysis of the result of the achievement test	
Unit 5	Assembly activities, Action research and case studies	
	Internship: Tasks and Assignments: Each student is required to submit the following: ✓ Meet the subject-based mentors, collect timetables of classes VI to VIII and develop a scheme of lessons from the syllabus to be covered during the internship. ✓ Get acquainted with the school within 2-3 days. Observe classroom teaching of school teachers. ✓ Plan and transact minimum 80 lessons (40+40), including 4 stray lessons (2+2). Stray lessons are class appropriate lessons on any topic(s) to be transacted by student teachers as per their convenience to build up confidence gradually. The last 5 lessons in each pedagogy course may be transacted using lesson notes.	

	✓ Lesson plans should include activities to promote creativity, inquiry, inquisitiveness, experimentation, exploration, analytical thinking, synthesis to understand the coherent whole, problem-solving, and application of knowledge in real-life situations. ✓ Lesson plans must promote education for sustainability, including equity, environment, global citizenship, pride and rootedness in Indian culture and character building. ✓ Participate in post-lesson discussions with peers, mentor(s) and teacher educators. ✓ Observe peer lessons and discuss with the group. ✓ Conduct laboratory activities (Atal Tinkering Lab, Science, Mathematics, Languages, Social Science, Computer), sports, and arts and crafts activities. ✓ Participate in student support services- guidance and counselling, NCC, health and wellness programme. ✓ Create teaching-learning materials, including ICT tools for opted pedagogic courses. ✓ Plan assessment, prepare material and formative and summative assessment tools, and analyze the results. ✓ Prepare and conduct diagnostic tests to identify learning difficulties, analyze data and prepare learning enhancement plan. ✓ Experience classes as a substitute teacher. ✓ Participate in library functioning and literary activities. ✓ Participate in teacher development and training activities. ✓ Organize school assemblies and other events (cultural, sports, yoga, and other development activities). ✓ Attend Parents-Teachers Association (PTA) meetings if held during the internship. ✓ Attend School Management Committee (SMC) meeting if held during the internship. ✓ Study the process of parent and community engagement for the school development programme. ✓ Conduct action research /case study. ✓ Prepare a sample student portfolio, ✓ Write a reflective diary daily and prepare a report of each activity.	

c.Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	2	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3

d.Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	20	20	20	20	20	100
External	0	0	0	0	0	0
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mode of Assessment

Competence/Artifact	Method of assessment	Assessed By	Credits	Marks
Observation of classroom practices	Observation of a Minimum of 6 lessons of School Teachers (3+3) Observation of a Minimum of 10 lessons of Peers (5+5)	Teacher-Educator	Non-evaluative	
Unit planning, Lesson Planning & Transaction	40 lessons transaction for each pedagogical subject * Unit plans and lesson plans * Minimum 2 Innovative lesson plans in each pedagogy subject	Teacher-Educator, School Mentor	6.0	20x40x2=160 10x1x2=20(UP) 20x2=40(LP) 20x2x2= 80
Assessment Planning and execution	Preparation of report on assessment plan in each lesson transacted Preparation of a Blue Print and preparation of Assessment tools Conduct of Unit Test & analysis of results (for both Pedagogical course/s) Development of plan for learning enhancement of students related to subjects (for both Pedagogical course/s)	Teacher-Educator, School-Mentor	1.5	10x2x2= 40(BP) 10x1x2=20(UT)

Participation/Organization of assembly and other school-level activities, PTM & SMC Meetings	Observation & Interaction	School Mentor	0.5	20x1x1= 20 (Each school 20)
Preparation of Logbook /Teachers diary Min 5 lessons for each pedagogical method	Review	Teacher-Educator, School Mentor	0.5	20x1x2=40
Overall feedback on student-teacher performance by School Head	Observation and Interaction	School Head	0.5	20x1x2 =40
Test lesson (one in each pedagogical method)		Teacher-Educator	1.0	20x1x2= 40

f.Mapping Course Outcome with internal Assesment

(final score will be converted to Percentage)

S L No	**Description**	CO1	CO2	CO3	CO4	CO5	Total
1	Observation of classroom practices- Observation of a Minimum of 6 lessons of School Teachers (3+3) Observation of a Minimum of 10 lessons of Peers (5+5) -: Non evaluative	40					
2	Unit planning, Lesson Planning & Transaction- 40 lessons transaction for each pedagogical subject * Unit plans and lesson plans * Minimum 2 Innovative lesson plans in each pedagogy subject (Eg: Storytelling, Drama based, Arts and crafts, Use of Technology)			300			300
3	Assessment Planning and execution- Preparation of report on assessment plan in each lesson transacted i.e., within lesson transaction and lesson end activities. Preparation of **a Blue Print** (For one/two Pedagogical course/s) and preparation of Assessment tools - Conduct of **Unit Test & analysis of results** (for both Pedagogical course/s) Development of plan for learning enhancement of students related to subjects (for both Pedagogical course/s)-	60					60

4	Participation/Organization of assembly and other school-level activities, PTM & SMC Meetings- Preparation of Logbook /Teachers diary Min 5 lessons for each pedagogical method- Review		20		40		60
5	Overall feedback on student-teacher performance by School Head- Observation and Interaction -Test lesson (one in each pedagogical method) - Presentation					40	40
	Total						500

g. Rubric for (TLM)

Sl. No.	Criteria	100%	75%	50%	25%	0%
1	**Low cost**	Highly cheap and highly best	Moderately cheap and best	Low cheap and best	Very low cheap and best	High cost and good
2	**Relevance to Objectives**	Highly related	Moderately related	Low related	Very low related	No relevance
3	**Age appropriateness**	Highly appropriate	Moderate appropriate	Low appropriate	Very low appropriate	No appropriate
4	**Promoting gender equality**	Promoting highly	Promoting moderately	Promoting low	Promoting very low	No gender equality

h. Rubric for (lesson plans)

	Criteria	100%	75%	50%	25%	0%
1	**Introduction**	Highly effective methods used	Effective methods are used	Low use of effective methods	The use of effective methods is very low	Methods used are ineffective
2	**Development**	The role of the teacher as a facilitator is high	The role of the teacher as a facilitator is moderate	The role of the teacher as a facilitator is low	The role of the teacher as a facilitator is very low	The teacher's role is not to facilitate learners
3	**Application**	Creation of situation is high for the application	The creation of situations is moderate for the application	Creation of situation is low for the application	Creation of situation for application is very low	Situations are not created for the application
4	**Review & Assessment**	Techniques used to review the major points is highly appreciated	Techniques used to review the major points is high	Techniques used to review the major points is low	Techniques used to review the major points is very low	Techniques are not used to review the major points

i. Rubric for record of observation of peer intern

S.No.	Criteria	100%	75%	50%	25%	0%
1	Introduction	Connection to prior knowledge is high	Connection to prior knowledge is moderate	Connection to prior knowledge is low	Connection to prior knowledge is very low	No linkage to prior knowledge
2	Focus questions	Leading to Learning is high	Leading to Learning is moderate	Leading to Learning is low	Leading to Learning is very low	Question does not lead to learn
3	Content competence	High Integration between and amongthe concept	Moderate Integration between and among the concept	Low Integration between and among the concept	Very low Integration between and among the concept	No Integration between and among the concept
4	Questions	High variety of questions based on HOTS & LOTS	Moderate questions based on HOTS & LOTS	Low questions based on HOTS & LOTS	Very low questions based on HOTS & LOTS	No questioning
5	Explanation	Effective Explanation	Moderate Explanation	Little Explanation	Very little Explanation	No Explanation
6	Application	Highly related and effective	Moderate related and effective	Low related and effective	Very low related and effective	No application
7	Assessment	Continuity of Assessment is high	Continuity of assessment is moderate	Continuity of assessment is low	Continuity of assessment is very low	No assessment
8	Review and closure	Attainment of learning objectives is high	Attainment of learning objectives is moderate	Attainment of learning objectives are low	Attainment of learning objectives is very low	No attainment of learning objectives

9	**Classroom management**	Ways of creating an appropriate learning environment are high	Ways of creating an appropriate learning environmenta re moderate	Ways of creating an appropriatee-learningenviron mentare low	Ways of creating an appropriate learning environme ntare very low	No Way of creating an appropriate learning environment

j. Stakeholders Responsibilities

Role of Head of ITEP Institution

- ✓ Identification of the adequate number of internship schools
- ✓ Signing the MoU with the schools
- ✓ Sharing of mutual expectations of ITEP institutions and the participating schools
- ✓ Identification of the internship programme coordinator
- ✓ Monitor the progress of the entire School Experience Programme

Role of Teacher-Educators of the ITEP Institution

- ✓ Guide the student teachers in preparing lessons and activities, assessment, observation of lessons on peer teaching, action research, and case studies conducting school activities preparation and report writing on Teaching Learning Materials.
- ✓ Conduct pre- and post-lesson discussions regularly.
- ✓ Assess the transaction of lessons for the complete duration of the lesson in the rating proforma developed by the teacher education institute and give feedback/remarks to the student teachers for lesson improvement.
- ✓ Submission of monitoring and supervision reports to the institute in time.
- ✓ Discuss with the student teachers frequently and organize a phase-end meeting of the student teachers and mentors to assess the progress and performance of the student teachers.

Role of School Head

- ✓ To introduce the student teachers to the students and staff of the school in the assembly on the first day.
- ✓ To facilitate student teachers to take classes as per stage requirements- Foundational, Preparatory, Middle, and Secondary.
- ✓ Ensure the alignment of the timetable, scheme of lessons and plan of activities/ assignments of the student teachers to be carried out during the programme in the school.
- ✓ Countersign on the attendance register maintained by the group leader/ mentor of the school.
- ✓ Ensure that all facilities and provisions are available to the student teachers to teach their lessons and carry out their assignments smoothly.
- ✓ grant of leave applications of the student teachers in exceptional circumstances.
- ✓ Involve student teachers in different activities of the school.
- ✓ Facilitate phase-end meetings of the student teachers and the mentors to assess the progress and removal of difficulties.
- ✓ Countersign/ certify the report/ documents of the activities/ assignments conducted by the student teachers towards the end of the internship programme.
- ✓ Provide input about student-teacher performance.
- ✓ Provide suggestions for improvement of the programme to the ITEP institution.

Role of Mentors

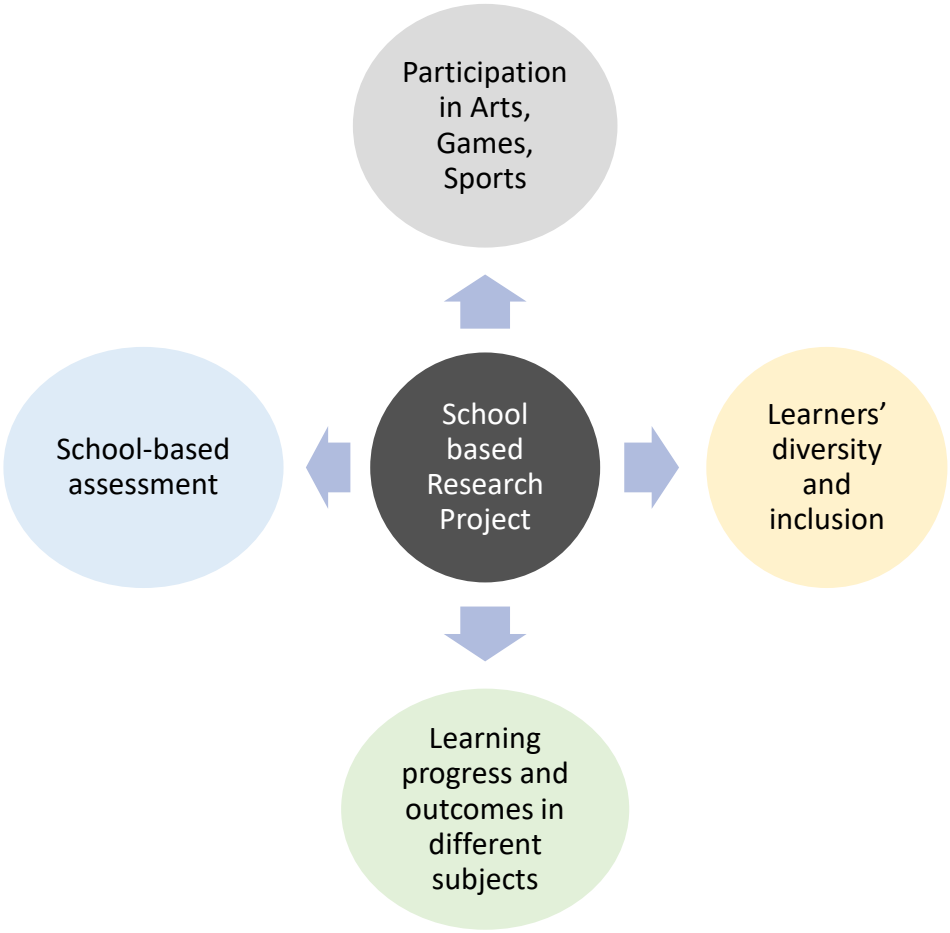
- ✓ Guide student teachers to prepare detailed lesson plans, brief lesson notes and plans of activities/ assignments to be conducted by them in school.
- ✓ Review the lesson plan before a student-teacher transacts the lesson in the class.
- ✓ Observe the classes of student teachers.
- ✓ Assess each lesson on the prescribed proforma and write remarks in the lesson plan book provided by the student teachers.
- ✓ Give feedback continuously to the student teachers for their improvement in their teaching and other curricular activities.
- ✓ Conduct post-lesson discussions regularly.
- ✓ Countersign in the peer-teaching observation schedules after their observations in the classroom.
- ✓ Organize frequent meetings with the student teachers and supervisors to discuss the progress, difficulties faced, and experience gained by student teachers.

Role of Student-Teacher

- ✓ Report to the school head of the participating school at least one day before the start of the internship placement.
- ✓ Seek information about the classes, timetable, and topics to teach in stage-specific pedagogic courses from the mentors on the first day of the internship program.
- ✓ Mark your attendance as per the school practice.
- ✓ Plan all the assignments/ activities with the help of the mentor/ supervisors.
- ✓ Seek cooperation from mentors and supervisors in case of difficulty.
- ✓ Prepare the lesson plan and get approval from the mentor/ supervisor before transacting every lesson.
- ✓ Take classes according to the timetable of the participating school.
- ✓ Take substitute classes and participate in other school duties assigned by the school.
- ✓ Follow the conduct and dress code of the participating school.
- ✓ Get prior leave approval from the head of the participating school in case of emergency.
- ✓ Maintain a diary and regularly list all the innovations, challenges faced and reflections for improvement.
- ✓ Check with mentor before attempting learning activities that depart from routine classroom procedures.
- ✓ Carry out the activities planed for school students according to your approved plans.
- ✓ Maintain cordial relationships with the students and staff of the school.
- ✓ Refrain from making negative comments about the school or the school's personnel, especially when talking with fellow student teachers.
- ✓ Submit student teaching profiles, one each, to the supervisor and mentor who supervises teaching.
- ✓ Before the completion of the internship programme, make sure to return all textbooks and materials to the school.

SEMESTER – VII					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10713	School-Based Research Project	0	0	2	2
Internal	100	External	0	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO1	Presents contextual problems, an appropriate research design, and a plan of action for undertaking school-based research,	Understand
CO2	Demonstrates the tools and techniques used for the collection of relevant data,	Apply
CO3	Summarizes the analyzed data used to identify the causes	Analysed
CO4	Demonstrates the interventions used for addressing the problems,	Apply
CO5	Present the effectiveness of the intervention(s)	Understand
CO6	Shares the school-based research experiences through reports and presentation	Understand

b. Syllabus:

The student teachers during previous semesters have studied different courses in Foundations of Education, Disciplinary Courses, Stage-specific pedagogy courses, Ability Enhancement, and Value-Added Courses. The required knowledge of action research and case study includes- the concept and importance of action research/case study, the steps of conducting action research/case study (objectives, methods, research design, design tools, data collection, and data analysis), and report writing.

References:

Efron, S. E., & Ravid, R. (2019). *Action research in education: A practical guide*. Guilford Publications.

Elliott, J. (1991). *Action research for education*. Open University Press.

Stringer, E. T. (2008). *Action research in education*. Upper Saddle River, NJ: Pearson Prentice Hall.

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
CO6	3	3	3	3	3	3

d. Evaluation Scheme

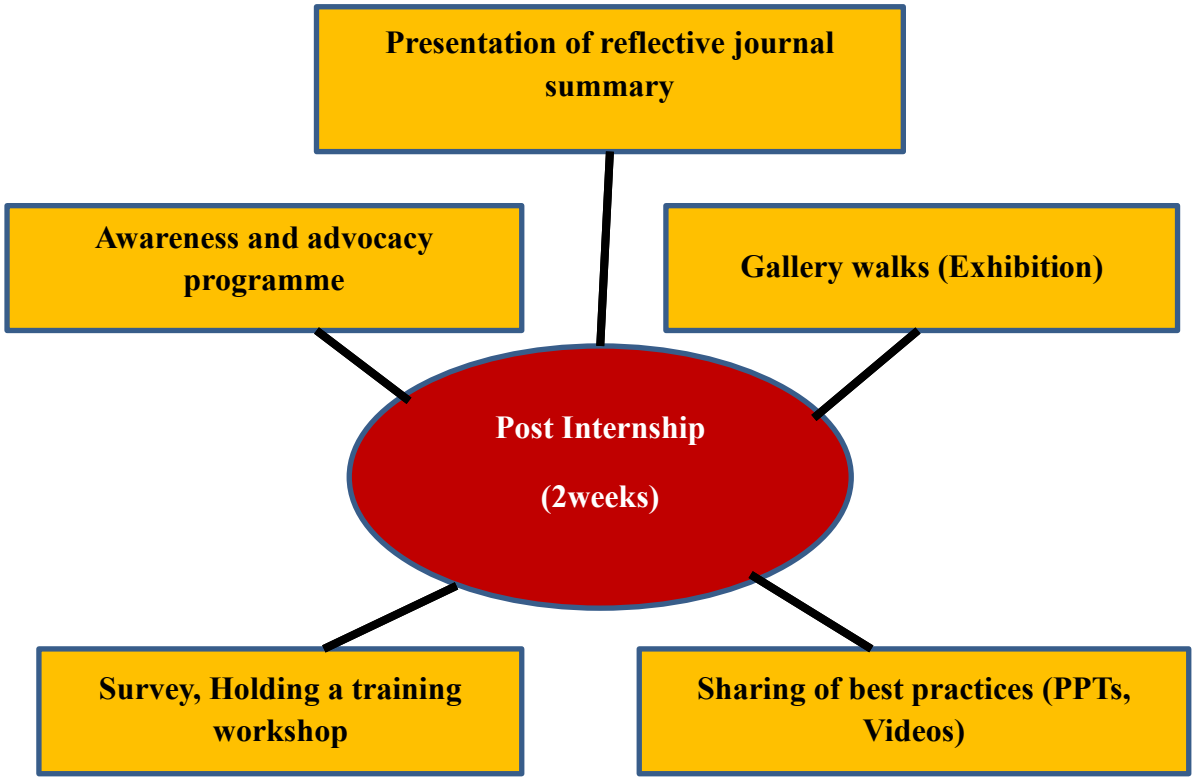
	CO1	CO2	CO3	CO4	CO5	CO6	Total
Internal	0	0	0	0	0	0	0
External	0	0	0	0	0	0	0
Practical	10	20	10	10	10	40	100
Total	10	20	10	10	10	40	**100**

e. Marks for practical assessment

S.No.	Activities	Marks
1	Identification of contextual problems and formulation of appropriate research design	10
2	Developing/Adapting and using tools and techniques for the collection of relevant data	20
3	Develop and implement need-based interventions for addressing the problems,	20
4	Preparation of Action Research – Report	30
5	Presentation of the Action Research Report -Teacher-Educators (panel of three experts)	10
6	Viva-Voce on School Internship Programme by a board comprising of faculty members of the Institute	10
Total		**100**

SEMESTER – VII					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10714	Post Internship (2weeks)	0	0	2	2
Internal	100	External	0	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Presentation of reflective journal through understanding of the school ecosystem.	Understand
CO 2	Reflect on school internship experiences through TLM in a report.	Apply
CO 3	Share their learning from school internship with peers and teacher educators.	Create
CO 4	Through survey encouraging them to act as volunteers in activities	Application
CO 5	Exhibit in the skills in the activities by experience	Skills

Course

After successful completion of internship programme in 7th semester, student teachers compile the learnings, discuss with peers about their experiences, reflect on the experiences, refine the artifacts developed during internship and prepare comprehensive internship report during post internship in 8th semester.

b. Syllabus

Discussion, Presentation, Gallery walks and Exhibition, Report Writing

Units	Content	Hours
I	Presentation of reflective journal summary	1
II	Gallery walks (Exhibition): TLMs, display of participation in school activities (photos/stories) and other artefacts created during the internship by student teachers.	2
III	Sharing of best practices (PPTs, Videos.)	1
IV	Survey and collect the local stories and rhymes from the parents and community (in the context of the middle stage). - Holding a training workshop for the parents and community and encouraging them to act as volunteers.	2
V	Awareness and advocacy programme in FLN for parents and community: Role play with parents and community on conducting specific FLN activities - Organizing a parents /community mela/fair on homemade TLM for FS children	2
	Post Internship: ✓ Each student is required to submit the following: ✓ Reflective Journal, Lesson Plans and TLMs ✓ Observation records (Teacher Educator, Mentor, school heads, Teachers, Parents) ✓ Assessment records and Student Portfolio ✓ Action research report/case study ✓ Comprehensive internship report.	

	Tasks and Assignments: ✓ Presentation of reflective journal summary ✓ My Learning Journey: by each student-teacher ✓ Gallery walks (Exhibition): TLMs, display of participation in school activities (photos/stories) and other artefacts created during the internship by student teachers. ✓ Sharing of best practices (PPTs, Videos.) ✓ Survey and collect the local stories and rhymes from the parents and community (in the context of the foundational stage) ✓ Holding a training workshop for the parents and community and encouraging them to act as volunteers. ✓ Awareness and advocacy programme in FLN for parents and community: Role play with parents and community on conducting specific FLN activities. ✓ Organizing a parents /community mela/fair on homemade TLM for FS children	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	2	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3

d. Evaluation Scheme Internal Marks

Sl. No	Description	CO1	CO2	CO3	CO4	CO5	Total
1	Reflective Journal & Comprehensive internship report.	20					20
2	Lesson Plans and TLMs				20		20
3	Observation records (Teacher Educator, Mentor, school heads, Teachers, Parents)		20				20
4	Assessment records and Student Portfolio			20			20
5	Action research report/case study					20	20
		20	20	20	20	20	100

e. Rubrics for TLM

Sl. No.	Criteria	100%	75%	50%	25%	0%
1	**Low cost**	Highly cheap and highly best	Moderately cheap and best	Cheap and best	Very low cheap and best	High cost and good
2	**Relevance to Objectives**	Highly related	Moderately Related	Low related	Very low related	No relevance
3	**Appropriateness**	Highly appropriate	Moderate appropriateness	Low appropriateness	Very low appropriateness	No appropriateness
4	**Promoting gender equality**	Promoting highly	Promoting moderately	Promoting low	Promoting very low	No gender quality

f. Rubric for (lesson plans)

Sl. No.	Criteria	100%	75%	50%	25%	0%
1	**Introduction**	Highly effective methods used	Effective methods are used	Low use of effective methods	The use of effective methods is very low	Methods used are ineffective
2	**Development**	The role of the teacher as a facilitator is high	The role of the teacher as a facilitator is moderate	The role of the teacher as a facilitator is low	The role of the teacher as a facilitator is very low	The teacher's role is not to facilitate learners
3	**Application**	Creation of situation is high for the application	The creation of situations is moderate for the application	Creation of situation is low for the application	Creation of situation for application is very low	Situations are not created for the application

4	**Review & Assessment**	Techniques used to review the major points is highly appreciated	Techniques used to review the major points is high	Techniques used to review the major points is low	Techniques used to review the major points is very low	Techniques are not used to review the major points

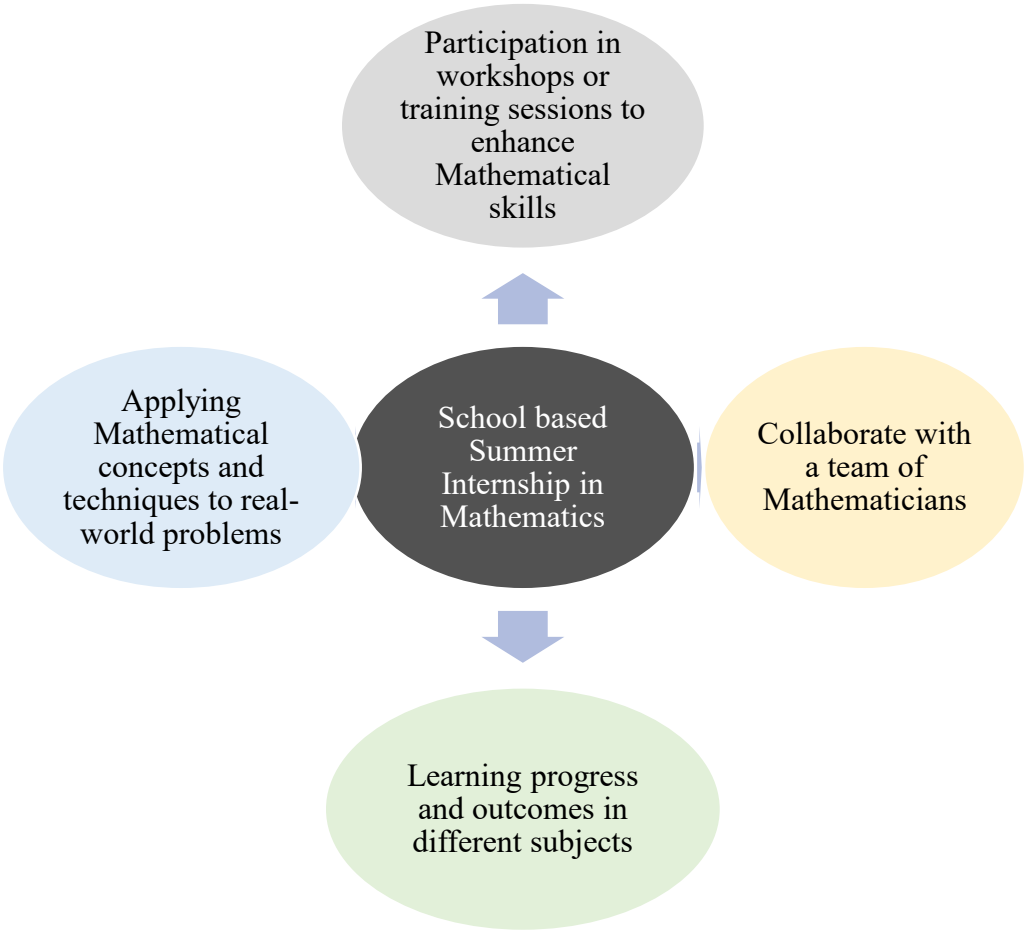
g. Rubric for record of observation of peer intern

Sl.No.	Criteria	100%	75%	50%	25%	0%
1	**Introduction**	Connection to prior knowledge is high	Connection to prior knowledge is moderate	Connection to prior knowledge is low	Connection to prior knowledge is very low	No linkage to prior knowledge
2	**Focus questions**	Leading to learning is high	Leading to learning is moderate	Leading to learning is low	Leading to Learning is very low	Question does not lead to learn
3	**Content competence**	High Integration between and among the concept	Moderate Integration between and among the concept	Low Integration between and among the concept	Very low Integration between and among the concept	No Integration between and among the concept
4	**Questions**	High variety of questions based on HOTS & LOTS	Moderate questions based on HOTS & LOTS	Low questions based on HOTS & LOTS	Very low questions based on HOT & LOTS	No questioning
5	**Explanation**	Effective Explanation	Moderate Explanation	Little Explanation	Very little Explanation	No Explanation
6	**Application**	Highly related and effective	Moderate related and effective	Low related and effective	Very low related and effective	No application
7	**Assessment**	Continuity of Assessment is high	Continuity of assessment is moderate	Continuity of assessment is low	Continuity of assessment is very low	No assessment

8	**Review and closure**	Attainment of learning objectives is high	Attainment of learning objectives is moderate	Attainment of learning objectives are low	Attainment of learning objectives is very low	No attainment of learning objectives is
9	**Classroom management**	Ways of creating an appropriate learning environment are high	Ways of creating an appropriate learning environment are moderate	Ways of creating an appropriate-learning environmen t are low	Ways of creating an appropriate learning environment are very low	No Way of creating an appropriate learning environment

SEMESTER – VII					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10715	Summer Internship in Mathematics	0	0	2	2
Internal	100	External	0	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO1	Acquire proficiency in using Mathematical tools and software for data analysis and visualization.	Understand
CO2	Collaborate with a team of Mathematicians and professionals to contribute to ongoing research projects.	Apply
CO3	Enhance critical thinking and analytical skills by tackling complex Mathematical problems and proofs.	Analysed
CO4	Develop a strong foundation in advanced Mathematical concepts that can be applied to future academic and professional pursuits.	Apply
CO5	Present the effectiveness of the intervention(s)	Understand
CO6	Gain hands-on experience in applying Mathematical concepts and techniques to real-world problems.	Understand

b. Syllabus:

The student teachers during the vacation which falls at the end of Sixth Semester have to undergo a two weeks training attachment at an institute of National importance in Mathematics. They have to gain concept based experiences through the mentor and submit a report at the Head of the Department. Department will adjudicate and award the marks.

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
CO6	3	3	3	3	3	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	CO6	Total
Internal	0	0	0	0	0	0	0
External	0	0	0	0	0	0	0
Practical	10	20	10	10	10	40	100
Total	10	20	10	10	10	40	**100**

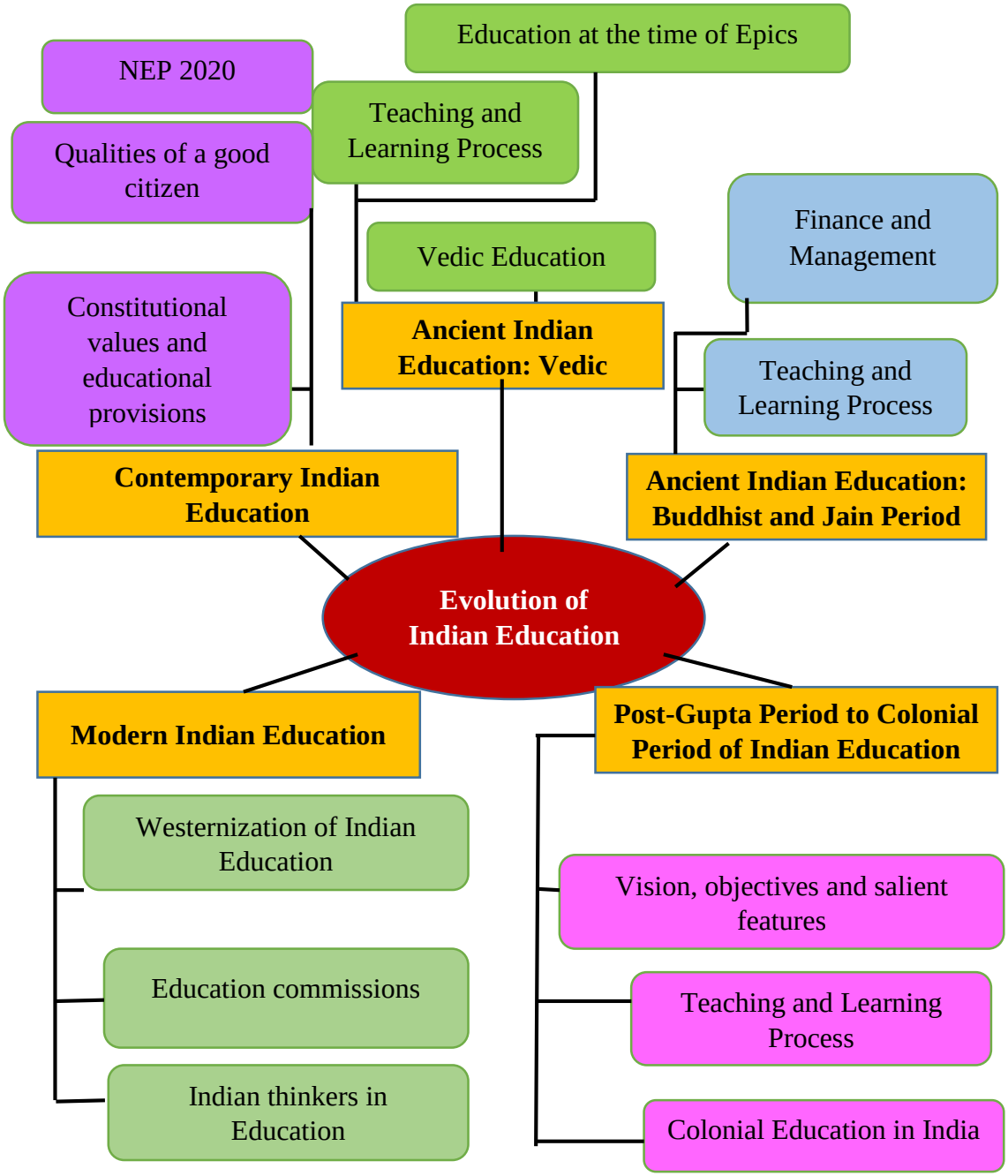
e. Marks for practical assessment

S.No.	Activities	Marks
1	Applying Mathematical concepts and techniques to real-world problems.	10
2	Developing/Adapting and using Mathematical tools and software for data analysis and visualization.	20
3	Develop and implement need-based interventions for addressing the problems,	20
4	Preparation of Internship – Report.	30
5	Presentation of the Report.	10
6	Viva-Voce on Internship Programme by the faculty members of the Department.	10
Total		**100**

SEMESTER - VIII

SEMESTER - VIII					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10811	Evolution of Indian Education	3	1	0	4
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO1	Understands the concept and vision of Vedic period Education	Understand
CO2	Applies Jain and Buddhist period education in present society	Apply
CO3	Analyze the features of colonial period of education	Analyze
CO4	Perceive the values of commissions and thinkers in modern education	Create
CO5	Enable themselves to shape their educational perspective to act as an effective teacher in contemporary education	Skill

b. Syllabus

Units	Content	Hrs.
I	**Ancient Indian Education: Vedic Period** Vision, objectives and salient features of Vedic Education System- Aims and character of Education, curriculum, Methods in Teaching and Learning Process- Development of educational institutions: Finances and Management- Famous Educational institutions- Education at the time of Epics: Ramayana and Mahabharata.	13
II	**Ancient Indian Education: Buddhist and Jain Period** Vision, objectives and salient features of Buddhist and Jain Education System- Teaching and Learning Process- Finance and Management of Educational Institutions- Educational Institutions: Nalanda, Taxila, Vikramshila, Vallabhi, Nadia- Famous Guru-Shishya.	13
III	**Post-Gupta Period to Colonial Period of Indian Education** Vision, objectives of Gupta and Colonial Period, brief historical development perspective as well as salient features of Education in Gupta and Colonial India- Teaching and Learning Process and Curriculum in Gupat period- Finance and Management of educational institutions. Colonial Education in India:	13
IV	**Modern Indian Education** Woods Despatch, Macaulay Minutes and Westernization of Indian Education - Shiksha ka Bhartiyakaran (Indigenous Interventions in Education) - The Aftermath of Lord Curzon's Education Policy, Calcutta University Commission (1917-19)- Secondary Education commission (1952-53)& Kothari Commission (1964-66)in relevance to secondary Education-vision silent features of National Policies on Education-1986- Contribution of Indian thinkers in Education – Savitribai and Jyotiba Phule, Rabindranath Tagore, Swami Vivekananda, Mahatma Gandhi, Sri Aurobindo, Periyar E.V. Ramasamy, Madanmohan Malaviya, Jiddu Krishnamurti and Dr. Bhima Rao Ambedkar others – to the education systems of India.	13
V	**Contemporary Indian Education** Overview of Constitutional values and educational provisions- Citizenship Education: Qualities of a good citizen- Education for fundamental rights and duties-Constitutional Provisions to SC/ST/OBC and Physical disabled students-Overview of 20th Century Committees, Commissions and Policies-UEE, RMSA, RTE Act 2009: Overview and impact-NEP 2020: vision and implementation for a vibrant India.NCF-2023.	12

Tasks and Assignments:

Each student is required to submit the following:

- ✓ A report highlighting educational reforms with special reference to school education in the light of NEP 2020.
- ✓ Critically analyze the concept of good citizen from the perspective of education for democratic citizenship.
- ✓ Compare vision, objectives, and salient features of education during different periods.
- ✓ Working out a plan to develop awareness, attitude and practices related to Fundamental Rights or fundamental duties or democratic citizenship qualities, execute it in the class and write the details in form of a report.
- ✓ Sharing of student experiences (in groups) related to Indian constitutional values, help them to reshape their concept and enable them to develop vision, mission and objectives for a school and their plan to accomplish the objectives in form of a group report.
- ✓ Analyses of current educational strengths and weaknesses of one's own locality and work out a critical report.
- ✓ Visit to places of educational significance and value centers and develop a project report.
- ✓ Observation of unity and diversity in a social locality and matching it with unity and diversity in the class and work out a plan for awareness for national-emotional integration for class to develop awareness, attitudes, skills, and participatory values, execute it in the class and report the details.

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Takur A S & Berwal B S (2008) Development Of Educational System In India

Aggrawal, J. C. (1996). Theory and principles of education (10th ed.). New Delhi: Vikas Publications.

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 5 x 4 = 20 marks)	10	10	10	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	-	10	10
Total	**12**	**12**	**12**	**12**	**12**

g. Model Question Paper

Sl. No.	Model Questions	Specifications	Level
	Part – A: Objective Type **Multiple choice 10 x 1 = 10**		
1	After how many years of practice Sambhavnath acquired Kewalya Gyan and formed DharamTirth? a.10 b. 12 c. 14 d. 16	Recognize	Remember
2	Two great Buddhist universities of Nalanda and Vikramshila were patronised by the a. Palas b. Paramaras c. Chandelas d. All the above	Recall	Remember
3	Ajeetnath Tirthankar was borni in a. Ayodhya b. Kiskindha c. Nasik d. Ujjain	Recognize	Remember
4	The following are beliefs of Buddhism (A)The world is full of sorrows., (B)People suffer on account of desires., (C)If desires are conquered, nirvana will be attained., (D)The existence of God and Soul must be recognised.	Recognize	Remember

	a. A B C and D b. B and C c. A B and C d. B C and D		
5	Ruler founded the famous Vikramshila University for the Buddhists a. Mahipala b. Devapala c. Gopala d. Dharampala	Recognize	Remember
6	National Education Policy 2020 replaced by a new pedagogical and curricular structure. What is the new curricular structure according to NEP 2020? a. "3+4+4+5" model b. "5+3+3+4" model c. "4+3+3+5" model d. "5+4+3+3" model	Recall	Remember
7	The chairman of the NEP2020 drafting committee was a. Kailasavadivoo Sivan b. Dr. K. Kasturirangan c. Prof. Yaspal Sharma d. Prod. G. RajaGopal	Recognize	Remember
8	The India adopt Goal 4 (SDG4) of the 2030 Agenda for Sustainable Development in the year a. 2020 b. 2015 c. 2030 d. 2025	Recognize	Remember
9	Education is ——————————for achieving full human potential, developing an equitable and just society, and promoting national development. a. Constitutional b. Legitimate c. Fundamental d. Authentic	Recall	Remember
10	"To achieve their aim not only did Brahmans develop a system of education which, survived even in the events of the crumbling of empires and the changes of society, but they, also through all those thousands of years, kept a glow of torch of higher learning'. Said by A) Dr. F. E. Key B) W C Banerjee C) Siman E A D) M N Srinivas	Recall	Remember
	PART – B Short Answer **The answer should not exceed 200 words 5 x 4 = 20**		
11	a) Explain the Objectives of Vedic Education? (or) b) Discuss the Famous Educational institutions in Vedic period ?	Explain	Understand
12	a) What are salient features of Vedic Education System (or)	Differentiate Define	Understand

	b) Discuss the different Methods in Teaching and Learning Process?		
13	a) Describe the education system in the time of Ramayana and Mahabharata? (or) b) Elaborate the Objectives of Jainism Education?	Illustrate	Apply
14	a) Describe the educational features of Woods Despatch, Macaulay Minutes ? (or) b) Discuss the features of Calcutta University Commission in relation to education	Differentiate Define	Understand
15	a) What are the Education for fundamental rights and duties? (or) b) Explain the concept and over view of UEE, RMSA, RTE Act 2009?	Define and Explain	Understand
PART – C Essay Answer **The answer should not exceed 400 words 3 x 10 = 30**			
16	Describe the Teaching and Learning Process in Buddist and Jainism Period?	Describe	Analyze
17	Explain the Contribution of Indian thinkers on Education?	Explain Discuss	Understand
18	Discuss objectives and features of Kothari Commission in relation to higher education?	Explain Discuss	Understand
19	Discuss the impact of NEP 2020 on Indian education system?	Assess	Skill
20	Explain the Constitutional Provisions to SC/ST/OBC and Physical disabled children?	Explain Discuss	Understand

SEMESTER - VIII					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10812	Philosophical and Sociological Foundations of Education – II	3	1	0	4
Internal	40	External	60	Total	100

Course Content Overview

a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Know about the sociological process	Remember
CO 2	Apply knowledge of sociology in education	Understand
CO 3	Analyze the sociological thoughts of different thinkers and social change	Apply
CO 4	Evaluate the important points in education, society, and socialization	Analyze
CO 5	Use the gained knowledge of sociology in teaching and day-to-day life and values	Skill

b. Syllabus

Units	Content	Hrs.
I	**Education and Society** Conceptual clarity, relationship, significance and aims of studying the relationship between these two, Educational sociology and social perspective of education: meaning and functions, Education as a Social System.	12
II	**Education and Social System** Conceptual clarity of the following terms: society, social behavior, status, institution, ideology, system, sub-system, socialization, social system, social values and norms, conflict, modernization, Understanding the relation between individual and group behavior with special reference to the purpose of education.	13
III	**Education and Social Change** Meaning, relation, and dimensions of Social Change, Factors affecting Education and Social Change: technology, social and educational movements, curricular innovations, value conflict, legal provisions, Constitution of India and Education, Education and Modernity, Role of education with reference to social change.	13
IV	**Education, Culture, and Socialization** Relationship between Education and Culture, Education as a process of Socialization, Impact of following on Culture and Educational Process: Social Welfare, Social Reform Movements, Legal interventions on Child Marriage and Child Labor Act, Educational Policies and Acts, Adult Literacy, New Technology of communication, Equality, Constitutional Provisions and Education with special reference to Social Equality and Equity.	13
V	**Education and Values** Conceptual Clarity, Relationship and Significance, Types of Values, Constitutional Values and their impact on our Education, Human Rights and Values, Environment and Education, and Pedagogical issues.	13
	Task and Assignment (any three) ✓ Individual/group assignments/tasks in various forms like writing small paragraphs/brief notes, conceptualizations on specific terms ✓ Discuss in small groups related to social change and preparation of a report followed by an individual/group presentation.	

	✓ Sharing of student experiences (in groups) related to readings on education, culture, and socialization helps them to reshape their concept and enable them to develop a vision, mission, and objectives for a school and their plan to accomplish the objectives in the form of a group report. ✓ Identification and reporting of Indian perspective related to educational aims, student-teacher characteristics, methods, evaluation procedure, and convocation based on critical study of education and values. **References**: Bilton, Tony, et a. (1987). Introductory Sociology. London, UK: Mac Millan. Ghurye (1986). Caste and Race in Modern India. Bombay, India: Popular Prakashan. Giddens, Anthony (1990). Sociology. Cambridge, UK: Polity Press. Gupta, Dipankar (1989). Social stratification. New Delhi, India: Oxford University Press. Horton, P.B. & Hunt, C.B. (1987). Sociology. Singapore: McGraw-Hill. Haralamboss, Michael (1989). Sociology, Themes and Perspectives. New Delhi, India: Oxford University Press. Kolenda, Pauline (1997). Caste in Contemporary India, Beyond Organic Solidarity. Jaipur, India: Rawat Publications. Kamat, A.R. (1985). Education and Social Change in India. Bombay, India: Somaiya Publication. Linton, Ralph (2006).The Study of Man. Delhi, India: Surjeet Publications. Majumdar, D.N. (1990). Races & Cultures of India. New Delhi, India: Kalyani Publishers. Mehta, Prayag (1995). Education, Participation, and Empowerment. Dew Delhi, India: Concept Publishing Company. Rai, S.V. (1985). Education and Rural Development. New Delhi, India: Sage Publications. Ratna and M. Zacharian (eds.). Education and the Process of Change. New Delhi, India: Sage Publications. Rawat, H.K. (2012). Sociology Basic Concepts. Jaipur, India: Rawat Publication. Rao, C.N.S. (eds.). Sociology Principles of Sociology with an Introduction to Social Though	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	0	3	3	3
CO2	3	3	0	3	3	2
CO3	3	3	2	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	1

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 4 x 5 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	**12**	**12**	**12**	**12**	**12**

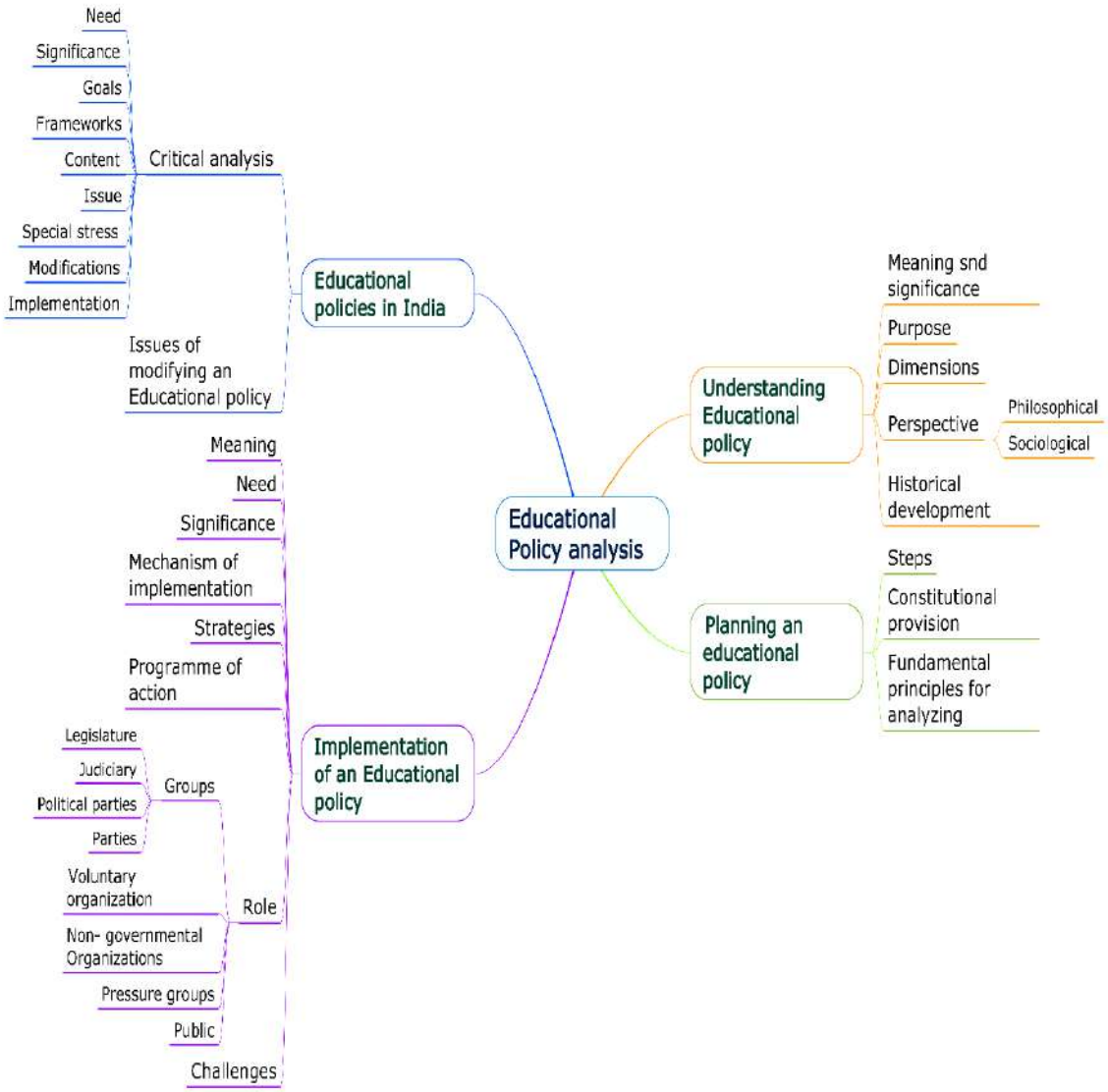
g. Model Question Paper

Sl. No.	Model Questions	Specifications	Level
	Part – A: Objective Type **Multiple Choice** **Marks: 10 x 1 = 10**		
1	Who is considered to be the father of Sociology? A. Emile Durkhein B. Kingsley Davis C. Auguste Comte D. George Payne	Recall	Remember
2	Sociology is the study of A. Human being B. Customs C. Values D. Society	Recall	Remember
3	One important example of a primary group is A. political party B. Church C. family D. YMA	Recall	Remember
4	The application of principles of sociology to education is known as A. Educational Sociology B. Sociology of Education C. Social Foundation of Education D. Social Science of Education	Recognize	Remember

5	Adopting oneself to the conditions and requirements of the community is called social- A. adaptation B. adjustment C. behavior D. dynamic	Identify	Remember
6	Which aim of education is most useful for the community? A. Cultural B. Technological C. Livelihood D. Socialization	Recognize	Remember
7	The individual and society are considered as A. supplementary B. interdependent C. complimentary D. contradictory	Recall	Remember
8	Education provided to the child by the schools is A. formal B. informal C. traditional D. highly standardized	Recognize	Remember
9	A society is a network of A. social attitudes B. socio-political relationships C. religions-cultural attitudes D. interpersonal relationships	Identify	Remember
10	Society preserves our A. civilization B. culture and transmits it to succeeding generations C. philosophical ideas D. interrelation	Identify	Remember
	PART – B Short Answer **Marks: 4 x 5 = 20**		
11	a) Explain the nature of sociology of education. (or) b) What do you mean by the sociological basis of education?	Explain Define	Understand
12	a) Describe educational sociology needs and their importance in education in detail. (or) b) Discuss the social perspective of education.	Explain Discuss	Understand
13	a) Write short notes on social behavior. (or) b) Write short notes on social values.	Explain Explain	Understand
14	a) Answer in detail: Is education a social system? (or) Discuss the role and responsibilities of education as a process of social progress and modernization.	Point out Investigate	Analyze
	PART – C **Essay Answer Marks: 3 x 10 = 30**		
15	a) Discuss the nature of the relationship between education and society. Mention some of the major factors in the process of social change. (or) b) Illustrate the factors affecting education and social change.	Describe Illustrate	Analyze
16	a) Explain the importance of education as the process of socialization (or) b) Discuss the relationship between education and modernity.	Explain Discuss	Understand
17	a) Discuss constitutional values and their impact on education. (or) b) Examine the use of human rights and values in education.	Discuss Examine	Apply

SEMESTER - VIII					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10813	Educational Policy Analysis	2	0	0	2
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcomes (CO)

On successful completion of the course, the student teachers will be able to

	Course Outcome	Level
CO1	Discuss knowledge and capacity to engage in education policy analysis and evaluate their effectiveness	Understand
CO2	Explain processes involved in policy analysis, including undertaking situation analysis and research	Understand
CO3	Identify possible policy options	Remember
CO4	Describe these possible options	Understand
CO5	Compare the potential policy options	Understand
CO6	Rank the possible policy options	Analyse
CO7	Choose the most effective option that could address issues and problems confronting school education.	Analyse

b. Syllabus

Units	Content	Hrs.
I	**Understanding Educational Policy** Meaning and significance of `Policy on Education'-Purpose and Dimensions of an Educational Policy at local and Global level - Philosophical and Sociological Perspective of planning an Educational Policy -Historical development of Educational Policies in India	6
II	**Planning an Educational Policy** Basic steps involved in planning - Constitutional provision for Policy on Education - Fundamental principles for analyzing an Educational Policy.	6
III	**Educational Policies in India** Critical analysis of Policies on Education since Independence: 1968, 1986 (Modified in 1992), 2020 in the context of: need and significance, goals and frameworks of educational policies, content of policies, issues raised in policies, constitutional provisions, special stress, modification of policies, implementation strategies - Issue of modifying an Educational Policy.	6
IV	**Implementation of an Educational Policy -I** Meaning, need, and significance - Mechanism of Policy Implementation - Strategies to Implement an Educational Policy - Programme of action and implementation: conceptual clarification and significance	6
V	**Implementation of an Educational Policy -II** E. Role of different Organization / Groups: Legislature/ Judiciary/ Political Will and Parties/ Voluntary Organizations/ Non-governmental organizations (NGOs)/ Pressure Groups/ Public - Challenges for Implementation.	8
	Tasks and Assignments: 1 Reviewing and presenting report on NEP, 2020 in reference to Policy Implementation. 2 To present a critical review of the Programme of Action (1986). 3 Preparing a list of challenges to implement the present new National Education Policy, 2020, in our States. 4 Preparing a list of Measures to be taken or taken to implement National Education Policy 2020 in our State.	

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c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	2	3	1	1	3
CO2	3	3	3	1	1	2
CO3	3	3	3	2	1	1
CO4	2	2	3	3	3	3
CO5	1	1	2	3	3	3
CO6	1	1	1	2	2	3
CO7	1	1	1	3	2	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	CO6	CO7	Total
Internal	7	7	3	3	7	6.5	6.5	40
External	7	7	6	11	11	6	12	60
Total	**14**	**14**	**9**	**14**	**18**	**12.5**	**18.5**	**100**

e. Mapping Course Outcomes with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5	CO6	CO7
Assignments	2	2	-	-	2	1.5	1.5
Seminar	-	-	2	2	-	-	-
Test	4	4	-	-	4	4	4
Attendance	1	1	1	1	1	1	1
Total	**7**	**7**	**3**	**3**	**7**	**6.5**	**6.5**

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5	CO6	CO7
Part – A (Objective - 10 x 1 = 10 marks)	2	2	1	1	1	1	2
Part – B (Short Answer - 4 x 5 = 20 marks)	5	5	5	-	-	5	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	-	10	10	-	10
Total	**7**	**7**	**6**	**11**	**11**	**6**	**12**

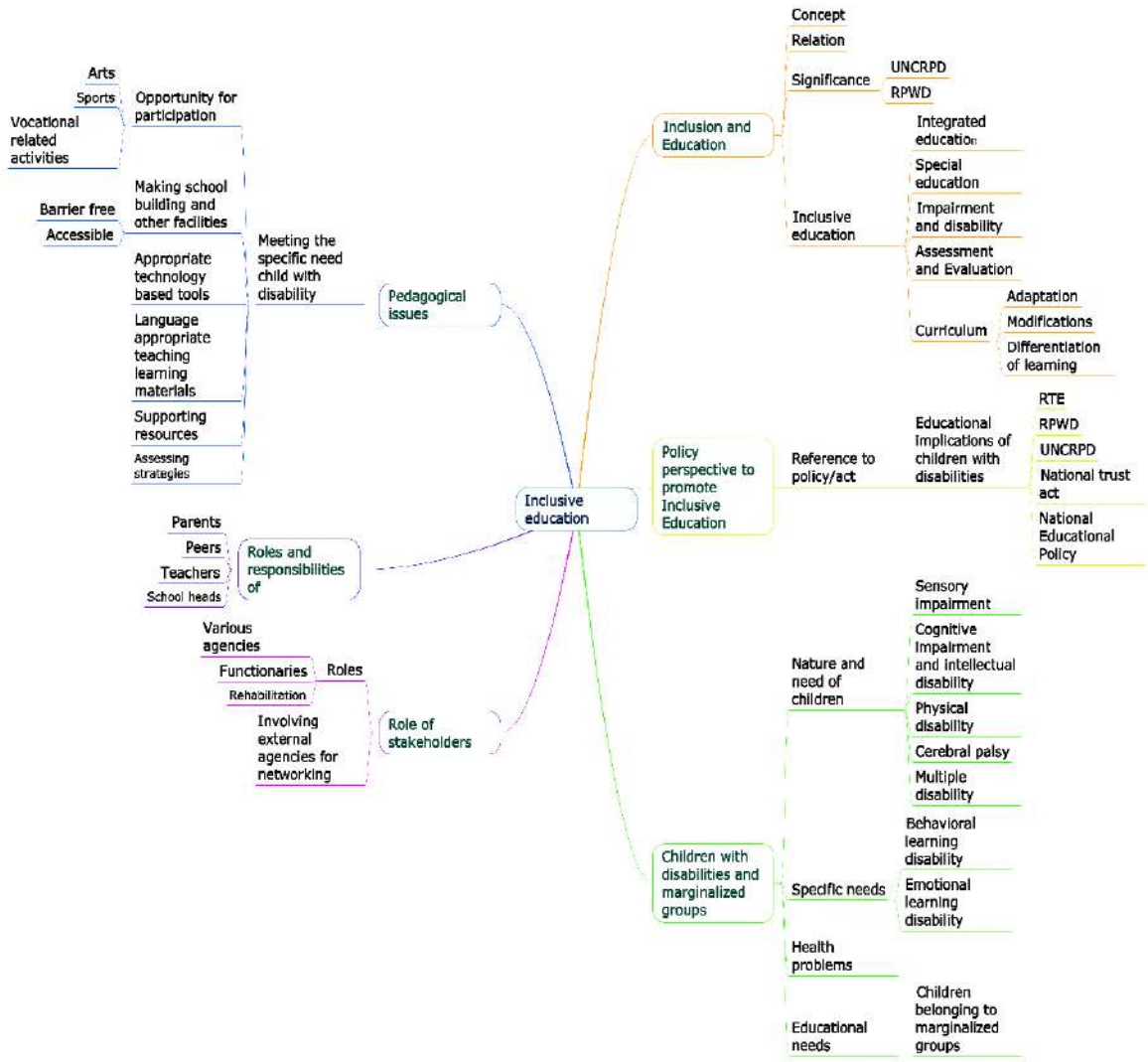
g. Model Question Paper

Sl. No.	Model Questions	Specification	Level
	Part – A: Objective Type **Multiple Choice Questions 10 x 1 = 10**		
1	The first step in policy model process is typically A. Policy evaluation B. Agenda setting C. Policy implementation D. Policy formulation	Recognize	Remember
2	The selection and enactment of policies through political actions by the executive, the legislature, and the courts refer to which stage? A. Policy Legitimation B. Policy Formulation C. Policy Implementation D. Policy Identification	Recall	Remember
3	Policy implementation is also known as A. Policy Action B. Policy Access C. Policy Availability D. Policy Ambition	Recall	Remember
4	Which of the following external agencies influences policy making process in India? A. WHO B. ICMR C. NIEPA D. RCI	Recognize	Remember
5	The main agency which implements government activities and public policies is _____ A. Bureaucracy B. NGOs C. Individuals D. Educational Institutions	Recognize	Remember
6	Who is the primary agent in policy making? A. Interest group B. Government C. Political parties D. NGOs	Recognize	Remember
7	_____ in India is/are the supreme public policy-making body(ies). A. Parliament B. Political Parties C. Public Institutions D. Prime Minister's Cabinet	Recognize	Remember

8	POA 1992 is the revised version of: A. NEP 1986 B. C. NEP 1968 D. ICDS 1975	Recall	Remember
9	The new curricular & pedagogical structure of NEP 2020 is A. 5+2+3+4 B. 5+4+3+4 C. 5+2+2+4 D. 5+3+3+4	Identify	Remember
10	Which of the following pillar in NEP 2020 emphasize free and compulsory education of all children of age 3 to 18 years? A. Accessibility B. Affordability C. Equity D. Equality	Identify	Remember
PART – B Short Answer The answer should not exceed 200 words 4 x 5 = 20			
11	a) Discuss the philosophical perspective of planning an educational policy. (or) b) Discuss the sociological perspective of planning an educational policy.	Explain	Understand
12	a) Comment on the fundamental principles for analyzing an educational policy. (or) b) Highlight the relationship between the Indian constitution and education.	Indicate	Understand
13	a) Discuss the approaches to teacher education in the context of NEP 2020. (or) b) Discuss the issues of modifying an educational policy.	Analyze	Analyze
14	a) Explain the challenges in the implementation of educational policies. (or) b) Outline the stages of a typical policy cycle for the education sector.	Intepret / Explain	Understand
PART – C Essay Answer The answer should not exceed 400 words 3 x 10 = 30			
15	a) Discuss the specific provisions for education included in the Indian Constitution. (or) b) Explain the steps involved in planning an educational policy.	Describe	Analyze
16	a) Critically analyze NPE 1986 and NEP 2020 in the context of need and significance. (or) b) Explain the purpose and dimensions of an educational policy at the local level.	Point out/ Explain	Analyze/ Understand
17	a) Discuss the strategies involved in the implementation of an educational policy. (or) b) Discuss the role of (i) public and (ii) non-governmental organizations in the implementation of educational policies.	Explain	Analyze

SEMESTER - VIII					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10814	Inclusive Education	2	0	0	2
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcomes (COs)

On successful completion of the course, the student teachers will be able to

	Course Outcomes	Level
CO 1	Ensure inclusion and equal participation in the education of children with disabilities (CWD) in the regular schooling process	Apply
CO 2	Point out the differences between special education and inclusive education with examples	understand
CO 3	Ensure retention of CWD in the school system	Apply
CO 4	Enable CWD to achieve the defined learning outcomes	Apply
CO 5	Adapt teaching and learning processes to meet the learning needs of different CWD	Apply

b. Syllabus

Units	Content	Hrs.
I	**Inclusion and Education** Conceptual Clarity, relation, and significance with special reference to UNCRPD, 2006, RPWD Act, 2016, with special reference to the Indian Context - Clarity of various terms and phrases associated with Inclusive Education: Integrated Education, Special Education, Impairment and Disability- Assessment and Evaluation-Curriculum, adaptation, modification, and differentiation of learning-Shifting from Disability to the Inclusive view - Shifting Paradigms from Bio-centric to Human Rights.	6
II	**Policy Perspective to Promote Inclusive Education** Introductory reference of Policies/Acts with reference to educational implications for Children with Disabilities: Right to Education Act, 2009/ 2012. RPWD Act, 2016, UNCRPD, National Trust Act, 1999, National Educational Policy, 2020.	6
III	**Children with Disabilities and Marginalized Groups** Nature and needs of children with sensory impairments: cognitive impairments and intellectual disability, physical disabilities, cerebral palsy, multiple disabilities - Specific needs of children with behavioral and emotional learning disabilities - Health Problems - Educational needs of children belonging to Marginalized Groups.	6
IV	**Pedagogical Issues** Meeting the specific needs of Children with Disabilities with special reference to: education and opportunities for participating in arts, sports, and vocation-related activities, making school buildings and compounds as well as other facilities barrier-free and accessible, supporting the learning activities and resources for the individualized learning environment, making available assistive devices and appropriate technology-based tools, language-appropriate teaching-learning materials (e.g., textbooks in accessible formats such as large print and Braille), assessing strategies - Designing assessment techniques for inclusive classrooms.	8

V	**Roles of Stakeholders** Roles and responsibilities of: parents, peers, teachers, school heads - Roles of various agencies, functionaries and rehabilitation professionals- Involving external agencies for networking including NGOs.	6
	Task and Assignment: ✓ Developing a checklist for identifying the various needs of CWD. ✓ Visiting schools of different categories and talking to parents, teachers, and Children with and without disabilities and listing the problems faced by these children and the families at the local level in gaining access to education. ✓ Analyzing RPWD Act 2016 and list its implications for CWD in inclusive settings. ✓ Outlining the problems faced by children with Visual impairments while learning mathematics and EVS. ✓ Giving a few exemplary adaptations based on the Preparatory Level textbooks. ✓ Outlining the problems faced by children with hearing impairments while learning language. Give a few exemplar adaptations based on the primary-level textbooks. ✓ Students work in small groups of 10 or so to prepare a street play highlighting the meaning and provisions of inclusive education. ✓ Analyzing the Context of NEP 2020 in the light of Inclusive Education.	
	References: Ainscow, M. and Booth, T (2002). Index for Inclusion: Developing Learning and Participation in Schools. Bristol: CSIE. Ainscow, M., Dyson, A. and Booth, T. (2006). Improving Schools, Developing Inclusion, London: Routledge. Alur, M., & Bach, M. (2009). The journey for inclusive education in the Indian sub-continent (Vol. 23). Routledge. Armstrong, A. C., Armstrong, D., & Spandagou, I. (2009). Inclusive education: International policy & practice. Sage. Julka. A, Index of Inclusion (2012). NCERT, New Delhi. Mitchell, D., & Sutherland, D. (2020). What really works in special and inclusive education: Using evidence-based teaching strategies. Routledge. Mohan, J. M. (2010). From special to inclusive education in India: Case studies of three schools in Delhi. Pearson Education India. Pijl, S. J., Meijer, C. J., & Hegarty, S. (Eds.). (1997). Inclusive education: A global agenda. Psychology Press. Puri, M., & Abraham, G. (Eds.). (2004). Handbook of inclusive education for educators, administrators and planners: Within walls, without boundaries. Sage.	

c. Mapping Course outcome with Programme Outcome

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	3	3
CO2	2	2	1	3	2	0
CO3	0	2	3	3	1	2
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	17	7	7	12	17	60
Total	**25**	**15**	**15**	**20**	**25**	**100**

e. Mapping Course Outcomes with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignment	2	-	-	2	2
Seminar	-	2	2	-	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	**8**	**8**	**8**	**8**	**8**

f. Mapping Course Outcomes with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 4 x 5 = 20 marks)	5	5	5	-	5
Part – C (Essay- 3 x 10 = 30 marks)	10	-	-	10	10
Total	**17**	**7**	**7**	**12**	**17**

g. Model Question Paper

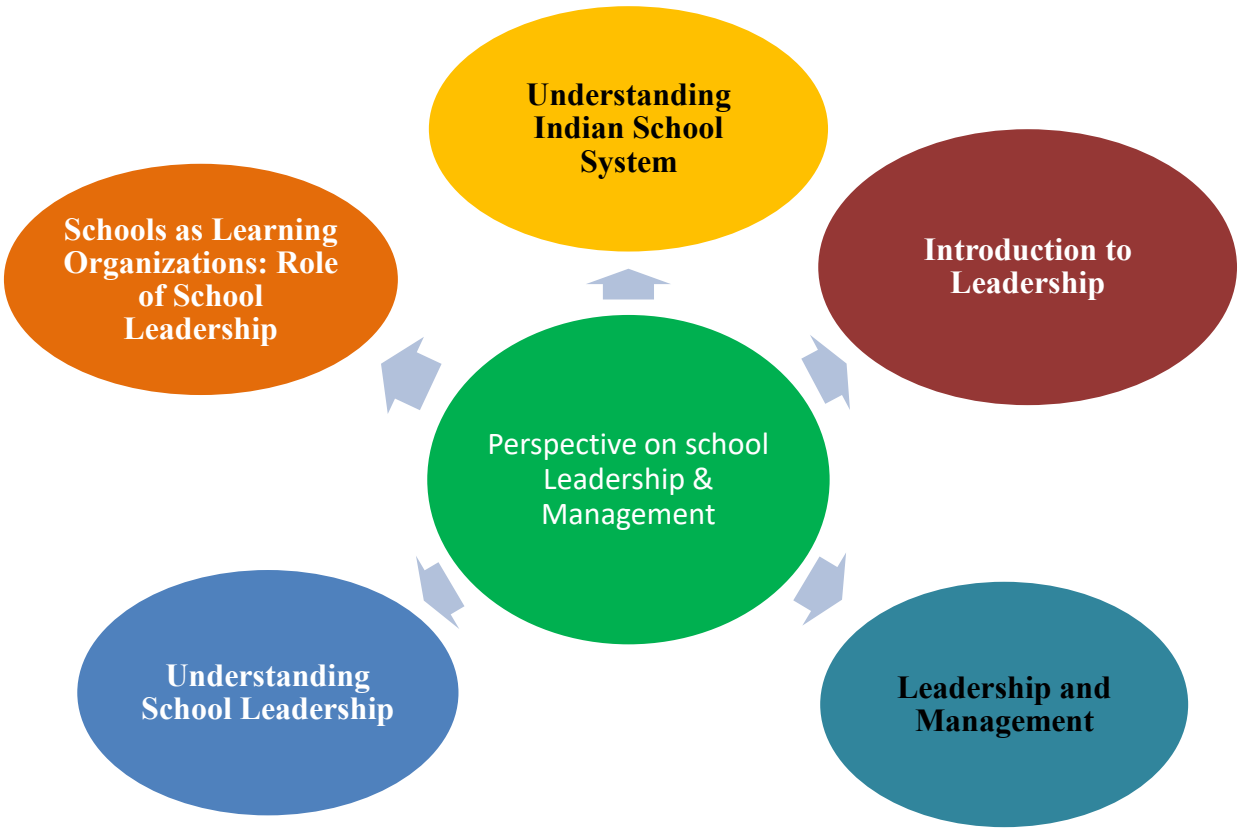
Sl. No	Model Questions	Specification	Level
	Part – A: Objective Type Multiple choice 10 x 1 = 10		
1	A disability may be present in which of the following? A.Speech or hearing B. Perception or memory C. Physical coordination D. All of these	Identify	Remember

2	The National Policy that recognizes that persons with disabilities are valuable human resources for the country and seeks to create an environment that provides them equal opportunities is A. National Policies for persons with disability, 2006 B.National Policies for persons with disability, 2008 C. National Policies for persons with disability, 2009 D. National Policies for persons with disability, 2010	Recall	Remember
3	Enrolment and retention of all children in 6 -14 years of age is the motive of A. RMSA B. Sarva Shiksha Abhiyan (SSA) C. EFA D. All of the above	Recognize	Remember
4	Which of the following is NOT an assistive technology for visually impaired students? A. Computer screen magnification B. Screen readers C. Personal frequency modulation D. None of these	Identify	Remember
5	Poor muscle control, weakness and fatigue, difficulty in walking, talking, speaking, doing complex or compound manipulations is related to A. Visual impairment B. Speech impairment C. Cognitive impairment D. Locomotor impairment	Recall	Remember
6	Success of inclusive education depends on A. Community report B. Good textbooks C.Good TLMs D. Attitudinal change among teachers	Recognize	Remember
7	When was RCI (Rehabilitation Council of India) set as a registered society? A.1986 B. 1985 C. 1988 D. 1989	Recall	Remember
8	What are the characteristics of an inclusive classroom? A. Positive classroom climate B.Using examples from diverse situations C. Use of proper ICT tools D. All of these	Recall	Remember
9	The landmark legislation that seeks to protect and promote the rights of persons who, within the disability sector, have been even more marginalized than others is A. The National Trust Act, 1999 B. The tenth Plan (2002 - 2007) C. National Curriculum Framework, 2005 D. All of the above	Identify	Remember
10	A child with a cognitive disability may have A. Memory problems	Identify	Remember

	B. Awareness problems C. Difficulty in problem Solving D. All of the above		
	PART – B **Short Answer** **4 x 5 = 20**		
11	a) Classify the characteristics of disabilities and explain any two of them. (or) b) Explain integrated education and give its merits and demerits.	Classify/ Explain	Understand
12	a) Explain the international Convention: UN Convention on the Rights of Persons with Disabilities (2006) and its significance. (or) b) Explain the constitutional provisions of the National Trust Act, 1999.	Explain	Understand
13	a) Explain the role of a teacher in creating a positive classroom climate with examples. (or) b) Give the importance of Adaptive and Assistive technologies to create an inclusive classroom.	Explain /Cite Examples	Understand
14	a) Discuss the scope and challenges of inclusive education. (or) b) Illustrate the support of pre-school programmes and pre-vocational training programmes in inclusive education.	Discuss/ Illustrate	Apply
	PART – C **Essay Answer** **3 x 10 = 30**		
15	a) Describe the main features of RCI Act in terms of inclusive education. (or) b) Examine in detail, as how India has prepared to provide inclusive education to the students.	Describe	Analyze
16	a) Point out the differences between special education and inclusive education with examples (or) b) Discuss the need and concept of inclusive education. Also, discuss the transition from segregation to inclusion.	Point out/ Discuss	Analyze
17	a) Interpret the different ways to encourage inclusive classroom in a school. (or) b) Interpret how assistive and adaptive technology is used in teaching – learning process of the students with disabilities.	Interpret	Skill

SEMESTER - VIII					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10815	Perspective on school Leadership & Management	2	0	0	2
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO1	Understands the Indian school system.	Understand
CO2	Apply the various styles and types of leadership	Apply
CO3	Explore the management skills in educational leadership.	Analyze
CO4	Formulate how to develop school leadership skills in schools	Create
CO5	Assess the role of organizations through leadership qualities.in the 21st century.	Skill

b. Syllabus

Units	Content	Hrs.
I	**Understanding Indian School System** School as a normative organization vis-a-vis school as a socio-emotional-cultural space for learning- Concept and Types with Studying the diversity of schools in India; their structure, governance, socio-political and cultural context, funding, management, autonomy and accountability mechanisms, support systems.- Relationship between school leadership and school diversity issues, challenges, and needs.- Engagement with diversity discourses, educational policies, reforms and practices and role in developing inclusive schools.	6
II	**Introduction to Leadership** Roles, functions and characteristics of a leader; evolution and growth of leadership; Leadership traits and ethics; Attitude, Behaviour, Personality traits and leadership; Types and Styles of leadership	6
III	**Leadership and Management** Nature, Scope and Significance of Management; Levels of Management; Functions: Planning, Organizing, Staffing, Directing and Controlling; Skills: Conceptual, Human and Technical; Roles: Interpersonal, Informational and Decisional; difference between a leader and a manager	6
IV	**Understanding School Leadership** School Leadership: concept as defined, and concept as practiced.- theories of Leaderships- Being a School Leader: exploring the multiple roles and responsibilities, issues and challenges of school leadership in the Indian context.- What works in schools: sharing National and International best practices on School leadership.	7
V	**Schools as Learning Organizations: Role of School Leadership** Schools as motivating learning spaces: Developing inspiring school ethos.- Schools as learning organization: promoting personal mastery, examining mental models, and developing a shared vision, team learning and a system's thinking perspective.- Nurturing school belongingness: engaging students, teachers, staff, parents, SMC, and community in the formulation of a whole school development plan. - Designing professional and collaborative learning opportunities for self and others (teachers, parents, and SMC members) and improving teaching and learning.	7

Tasks and Assignments:

Each student is required to submit the following:

Being a practitioner centric course, the assessment would largely include application-based tasks. This includes exploring the work and life of a school principal and writing a detailed report on the observations and the learning. The following are some exemplars.

- ✓ Preparing school vision, mission, goals, and school development plan.
- ✓ Shadowing school principals: a critical observation of the principal's daily work life.
- ✓ A critical examination of the diversity of schools; their governance structure, leadership, autonomy and accountability mechanisms, issues and challenges and work life of the school principal

References:

Razik, T.A. & Swanson, A.D. (2010). Fundamental Concepts of Educational Leadership and Management (3rd ed.)

Lewis, D. & Kanji, N. (2009). Non-governmental organizations and development: London and New York: Routledge, Taylor and Francis Group.

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DeMatthews, David (March 2014). "Deconstructing Systems of Segregation: Leadership Challenges in an Urban School" (PDF). Journal of Cases in Educational Leadership. 17 (1): 16–26.

Modules on Middle Leadership Development Programme: National College for Leadership of Schools and Children's Services, Nottingham, Central England (U.K.)

Modules on Quality Dimensions of Elelementary Education under SSA: NCERT

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http://pslm.niepa.ac.in/

https://itpd.ncert.gov.in/pluginfile.php/10223/mod_label/intro/Module13.pdf

DevidR Schumaker & Willium A Sammers Being A Successful Principal.

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Palgrave Macmillan (2020) The Palgrave Handbook of Educational Leadership and Management Discourse

Camburn E, Spillane JP, Sebastian J (2010) Assessing the utility of a daily log for measuring principal leadership practice. *Educational Administration Quarterly* 46(5):707–737.

Gronn P (2000) Distributed properties: A new architecture for leadership. *Educational Management and Administration* 28(3):317–338.

Lumby J (2013) Distributed leadership: The uses and abuses of power. *Educational Management Administration & Leadership* 41(5) 581–597.

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	0	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	2
CO4	3	3	3	3	3	3
CO5	3	3	0	3	2	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	-	-	2	2
Seminar	-	2	2	0	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 5 x 4 = 20 marks)		10	10	-	-
Part – C (Essay- 3 x 10 = 30 marks)	10	-		10	10
Total	**12**	**12**	**12**	**12**	**12**

g. Model Question Paper

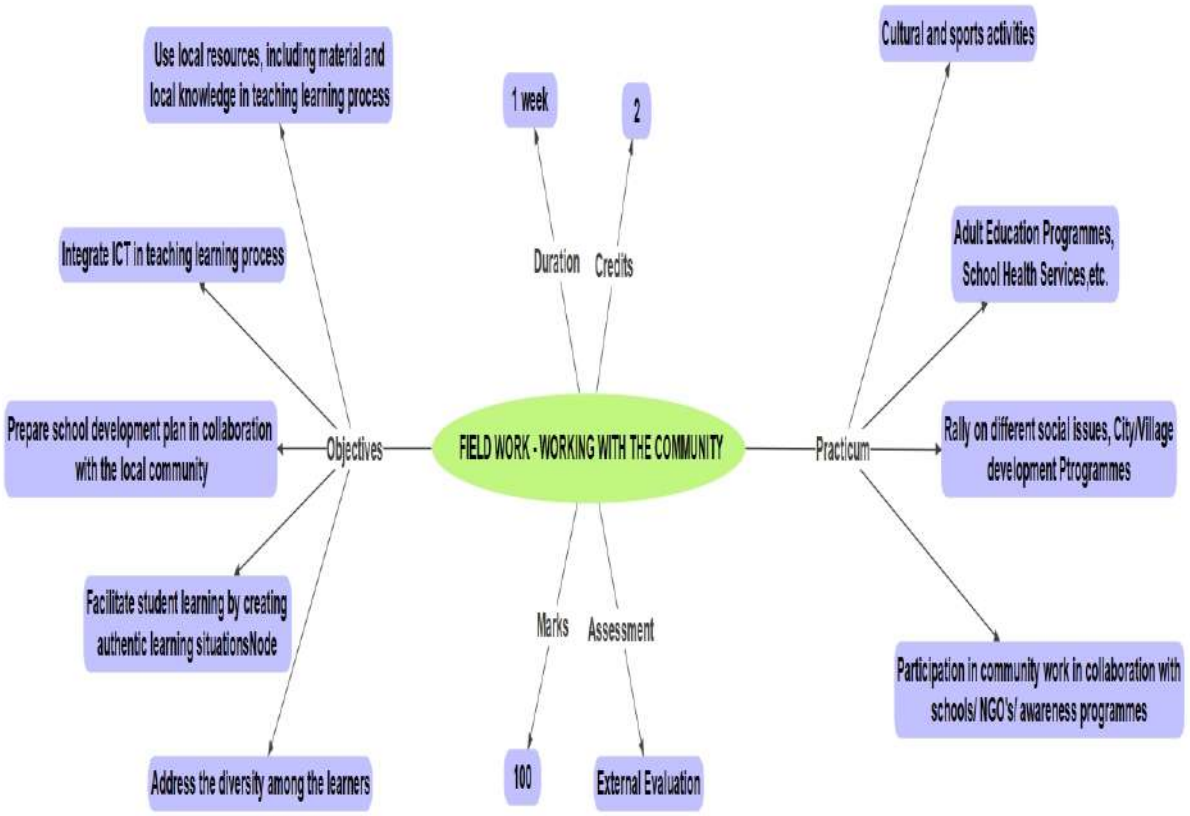
Sl. No.	Model Questions	Specifications	Level
	Part – A: Objective Type Multiple choice 10 x 1 = 10		
1	What is NOT one characteristic of the Democratic leadership style? a) Leader asks before doing anything. b) Leader enforces and relies on discipline. c) Leader works together with the members as a group. d) There is a mutual synergy between the leader and the team.	Recognize	Remember

2	What are the two important attributes of self-required for becoming an effective leader? a) Distributor and a complaining attitude. b) An initiator and positive outlook. c) Organizer and planner. d) Administrator and manager	Recall	Remember
3	Who is a visionary leader? a) One who has a medium-term perspective b) One who has a long-term perspective. c) One who has a short-term perspective. d) One who takes initiative for need satisfaction.	Recognize	Remember
4	Development of leadership qualities among students should be done in the direction of the teacher: a) Not agree on b) Perhaps c)Agree on d) Partially Agree	Recognize	Remember
5	Leadership is most associated with a) Consistency. b) Vision c) Control. d) Planning.	Recognize	Remember
6	The direct effect of school leadership on student learning implies a) Engaging in the teaching-learning process. b) Taking school rounds. c) Facilitating teachers to experiment with new teaching methods. d) Randomly checking the notebooks of the students.	Recall	Remember
7	Which role focuses on bringing about order and consistency by drawing up formal plans? a) Leadership b) Management c) Task structure d) Initiating structure.	Recognize	Remember
8	Which one of the following statements concerning the rational and emotional aspects of leadership is false? a) Leaders use rational techniques and/or emotional appeals to influence followers. b) Effective leadership involves actions based exclusively on reason and logic. c) Aroused feelings can be used by leaders either positively or negatively. d) Good leadership involves touching others' feelings.	Recognize	Remember
9	Which of the following set of traits is most appropriate for effective leadership? a) Knowledge, vision, and Relationship. b) Achievement drive, self-confidence, and charisma. c) Cognitive ability, emotional maturity, and flexibility. d) Creativity, honesty, and knowledge of the task.	Recall	Remember
10	A leadership style that follows the" Command and Control Approach" is a) Transactional leadership b) Democratic leadership. c) Autocratic leadership. d) Democratic leadership.	Recall	Remember

PART – B **Short Answer**			**5 x 4 = 20**
11	a) What is Educational leadership and Explain the nature of leadership. (or) b) Differentiate between Educational Leadership and Educational Management.	Explain	Understand
12	a) Discuss how educational leadership is important in school. (or) b) List the qualities of an effective leader. Discuss the factor affecting it.	Describe Define	Understand
13	a) Explain the main assumption of the trait leadership theory. (or) b) State the four major qualities exhibited by transformational leaders.	Illustrate	Apply
14	a) Examine how to develop the leadership skill in the classroom (or) b) Determine the moral and ethical responsibilities of a good leader?	Differentiate Define	Understand
PART – C **Essay Answer 3 x 10 = 30**			
15	Analyze how leadership influences students learning.	Describe	Analyze
16	What do you understand by the term 'Leadership style'? Classify different types of leadership styles.	Explain/ Discuss	Understand
17	Compare and contrast transactional leadership differs from transformational leadership?	Explain/ Discuss	Understand
18	Discuss situational leadership and its application	Assess	Skill
19	Assess the challenges of educational leadership in the 21century.	Explain/ Discuss	Understand
20	b) Elaborate on how do you lead and manage educational challenges as an educational leader	Assess	Skill

SEMESTER - VIII					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDU10816	Community Engagement and Service	0	0	2	2
Internal	100	External	0	Total	100

Course Content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO1	Develop social sensitivity among the student teachers and facilitate student learning by creating authentic learning situations.	Understand
CO2	Apply the use of local resources, including the materials of local knowledge in the teaching-learning process.	Apply
CO3	Integrate ICT in the teaching-learning process.	Analyze
CO4	Prepare school development plan in collaboration with the local community.	Create
CO5	Address the diversity among the learners, including cultural and learning needs.	Skill

b. Syllabus

S.No.	Content	Time
I	**Working with community:** Student teachers shall be provided exposure to the community life, during which they shall live with the community members and act in terms of preparing school development plan, sharing the cultural practices, holding cultural programs, and gaining the community's perception about and aspiration from the formal education system.	Maximum 2 Weeks
	Tasks and Assignments: Student-teacher will select and participate in any one activity ✓ Adult educate programme, school health services, cultural activities, sports activities, city/ village development program family planning programvil defedefenselly on different social issues. ✓ Participation in community work in collaboration with schools/ NGO's literacy, awareness programs (related to Environment population, Health, and hygiene, Sociological issues, Financial-literacy,well-being).	

c. Mapping of program outcomes with course outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	2	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	2	3
CO4	3	3	3	1	3	3
CO5	3	3	3	3	3	2

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	20	20	20	20	20	**100**
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping course outcome with External Assessment (100 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Performance and participation in any one of the activities. (Adult education program School Health Services Cultural and Sports activities, City /Village development program, Civil Defence, Rally on different social issues, Participation in community work in collaboration with schools/ NGO's).	20	20	20	20	20
Total	**20**	**20**	**20**	**20**	**20**

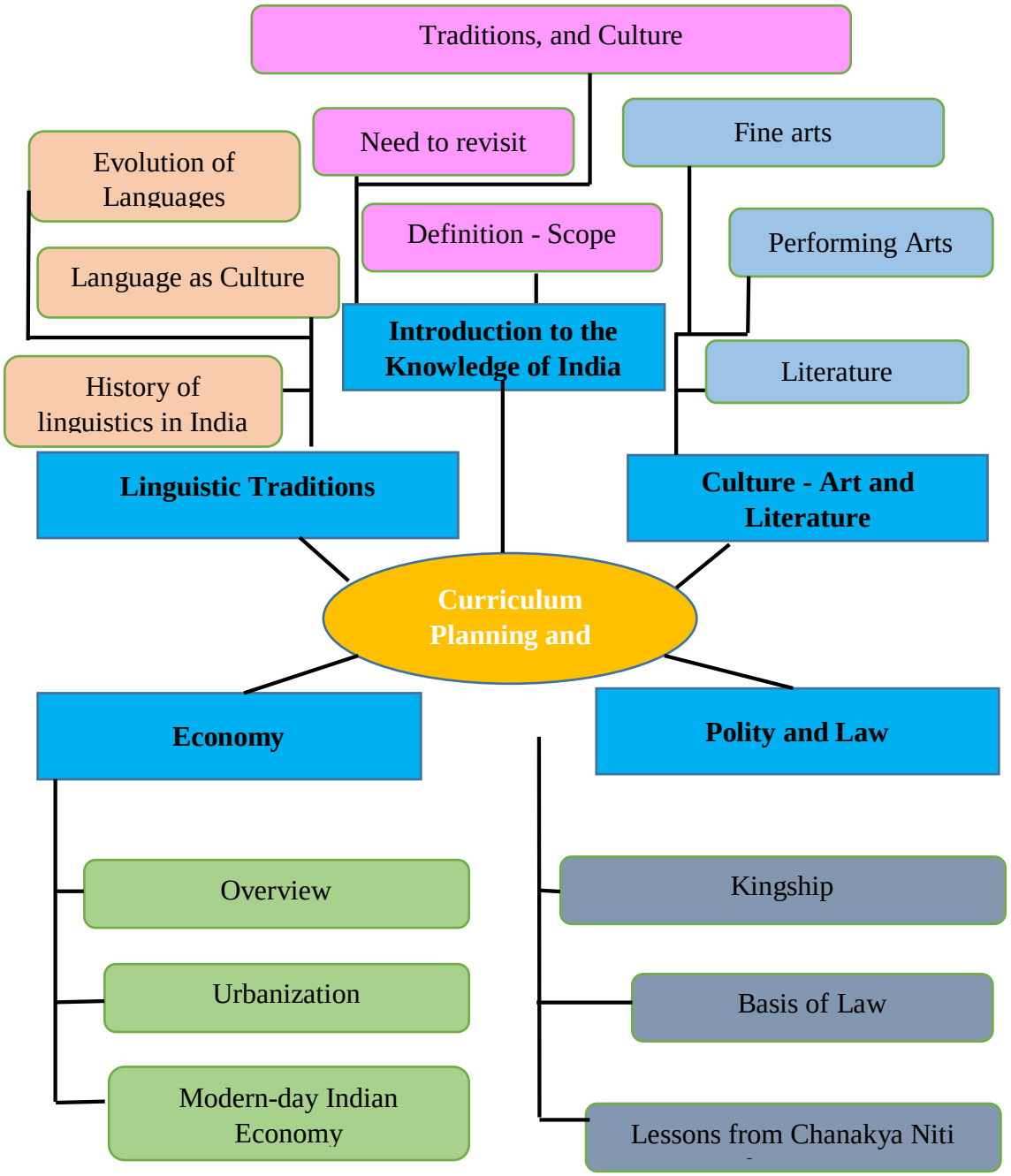
f. Rubrics for tasks

Sl.No	Criteria	100%	75%	50%	25%	0%	Relation to COs
1.	**Preparation and focus on the work**	Consistently stayed focused on the task and what needed to be done and prepared all those needed.	Focused on the task and what needed to be done most of the time and prepared most of what needed.	Focused on the task and what needed to be done some of the time and prepared most of the needed materials but took a while to settle down and get to work	Rarely focused and was not prepared.	Not attended	**CO2**

2.	**Performance and working with others**	Performed well and was always co-operative with the others.	Usually listened to, shared with, and supported the efforts of others. Did not cause "waves" in the group.	Sometimes listened to, shared with, and supported the efforts of others, but at times, was un-collaborative	Performed very badly and was not a good team member.	Not attended	**CO2, CO3, CO4**
3.	**fieldwork**	Reported all of the details about the fieldwork without missing any details.	Reported most of the details about fieldwork.	Reported the details about the fieldwork, but some details were missing.	Not enough details about the fieldwork.	Not attended	**CO1, CO5**

SEMESTER - VIII					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDUVA05	Understanding India (Indian Ethos and Knowledge Systems)	2	0	0	2
Internal	40	External	60	Total	100

Course content Overview



a. Course Outcome (CO)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Identify key historical events and developments in India	Understand
CO 2	Examine how art and literature contribute to the construction and representation of cultural identity.	Evaluate
CO 3	Analyse the role of culture in shaping legal systems and jurisprudence	Analyze
CO 4	Apply economic principles and concepts to real-world scenarios.	Apply
CO 5	Cultivate cultural sensitivity and respect for linguistic diversity.	Create

b. Syllabus

Units	Content	Hrs.
I	**Introduction to the Knowledge of India** Definition - Scope- Relevance of this knowledge-Need to revisit our ancient knowledge, traditions, and culture.	6
II	**Culture - Art and Literature** Fine arts (traditional art forms, contemporary arts, arts & spirituality, arts and Identity, and art & globalization) -Performing Arts (Indian dance systems, traditional Indian pieces of music, visual arts, folk arts, etc.,) -Literature (Sanskrit literature, religious literature, Indian poetry, folk literature, Indian fiction, Sangam literature, Kannada, Malayalam literature, Bengali literature, etc.)	6
III	**Polity and Law** Kingship - Types of government (oligarchies, republics)-Local administration (village administration) -Basis of Law: Dharma & its sources -Criminal Justice: police, jails, and punishments- Lessons from Chanakya Niti; Lessons for modern-day India: Towards a tradition driven equitable and just polity and law system.	6
IV	**Economy** Overview of the Indian Economy (from the Stone Age to the Guptas)- The new culture of Urbanization (including castes, guilds, and other economic institutions)- Harappan civilization economy- growth of agriculture and proliferation of new occupations - growth of writing- Internal & external trade and commerce (including trade routes, Indo-roman contacts, and maritime trade of South India)-Temple economy- Land ownership - land grants & property rights- land revenue systems - Understanding Arthashastra: Ideas & Criticism- Locating relevance of ancient Indian economic thought in modern-day Indian Economy.	7
V	**Linguistic Traditions** History of linguistics in India (conceptualizing ancient Indian linguistics, oral traditions, etc.)-Language as Culture: Evolution of Languages over the years & language as building blocks to different cultures and society-Language: Identity, culture, and History	7

	Tasks and Assignments: ✓ The modes of curriculum transaction will include lectures, Tutorials, and Practicum. ✓ Practicum will include organization of day trips to watch events relating to visual and performing art; ✓ Activities that enable to identify and record through photos, videos, etc. the elements of ancient architecture still existing in the city around ✓ Organization of Individual and group presentations based on themes such as Polity, Law and Economy etc., ✓ Organization of a 'Knowledge of India' day in the institution to celebrate the culture (food, clothes, etc.) **References:** Collins, L., & Lapierre, D. (1975). Freedom at midnight . Simon and Schuster. Douglas Allen., & Lynn (2006). The Philosophies of India . Blackstone Publishing. Matthew McCartney (2019). The Indian Economy Agenda Publishing. Mountstuart Elphinstone (2014). History Of India, Volume I . Normanby Press. Awadh Narayan Verma (2021) Cultural Heritage of India, Kala Prakashan	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	3	2
CO2	3	3	2	3	2	2
CO3	2	3	3	3	3	2
CO4	3	3	3	3	2	3
CO5	3	3	3	3	3	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 4 x 5 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	**12**	**12**	**12**	**12**	**12**

g. Model Question Paper

Sl. No.	Model Questions	Specification	Level
	Part – A: Objective Type Multiple choice 10 x 1 = 10		
1	Which classical dance form originates from the southern Indian state of Kerala? a) Kathak b) Bharatanatyam c) Odissi d) Kathakali	Recognize	Remember
2	Which ancient Indian text is often considered the world's oldest system of medicine and holistic wellness? a) Ramayana b) Mahabharata c) Rigveda d) Ayurveda	Recall	Remember
3	The famous Indian epic, "Mahabharata," is traditionally attributed to which sage? a) Valmiki b) Veda Vyasa c) Tulsidas d) Kalidasa	Recognize	Remember
4	Which ancient Indian script is often associated with the carving of inscriptions on monumental pillars and rocks? a) Brahmi b) Kharosthi c) Devanagari d) Tamil	Recognize	Remember

5	Who is the guardian of the Fundamental Rights in India? a) Supreme Court b) President c) Prime Minister d) Parliament	Identify	Remember
6	Which constitutional amendment introduced the Goods and Services Tax (GST) in India? a) 100th Amendment b) 101st Amendment c) 122nd Amendment d) 123rd Amendment	Recognize	Remember
7	Which of the following is not a stock exchange in India? a) NSE (National Stock Exchange) b) BSE (Bombay Stock Exchange) c) MSE (Madras Stock Exchange) d) ASE (Ahmedabad Stock Exchange)	Recognize	Remember
8	Who is responsible for formulating India's monetary policy? a) Ministry of Finance b) Reserve Bank of India (RBI) c) Planning Commission d) Securities and Exchange Board of India (SEBI)	Recall	Remember
9	Which script is used for writing the Sanskrit language? a) Devanagari b) Tamil script c) Kannada script d) Bengali script	Identify	Remember
10	Who is considered the father of Indian linguistics? a) Panini b) Kalidasa c) Adi Shankaracharya d) Valmiki	Recall	Remember
PART – B Short Answer **The answer should not exceed 200 words 4 x 5 = 20**			
11	a) Discuss the importance of yoga and meditation in Indian traditions and their global influence. (or) b) What are the different types of classical dance forms in India, and briefly describe one of them in detail.	Differentiate Define	Understand

12	a) Explore the importance of festivals in Indian culture and their role in preserving traditions. (or) b) Explain the role of family and community in upholding Indian traditions.	Explain	Understand
13	a) Discuss the evolution of Indian literature from ancient times to the modern era. (or) b) Analyze the contribution of Rabindranath Tagore to Indian literature and art.	Differentiate Define	Understand
14	a) How does art reflect and shape cultural values and beliefs? Provide specific examples. (or) b) Discuss the role of art and literature in challenging societal norms and promoting social change.	Explain	Understand
PART – C Essay Answer **The answer should not exceed 400 words 3 x 10 = 30**			
15	a) Analyze the role of the judiciary in safeguarding human rights in India, (or) b) Examine the issues and challenges related to women's rights and gender equality in India's legal system.	Define Describe	Analyse
16	a) Discuss the impact of the Goods and Services Tax (GST) on the Indian economy, including its benefits and challenges. (or) b) Discuss the major drivers of economic growth in India over the past decade and their impact on the overall economy.	Define Discuss	Understand
17	a) Describe the linguistic diversity of India and its impact on the country's linguistic traditions. (or) b) Examine the linguistic policies and language planning initiatives in modern India.	Describe Assess	Skill

SEMESTER - VIII					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDUVA06	Mathematical and Quantitative Reasoning	2	0	0	2
Internal	40	External	60	Total	100

Course content overview

a. Course Outcome (COs)

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Know about mathematical and quantitative reasoning	Remember
CO 2	Apply knowledge of quantitative reasoning and mathematization in education	Understand
CO 3	Analyze the data in education	Apply
CO 4	Evaluate the data of the Census of India	Analyze
CO 5	Use the gained knowledge of Data Analysis and interpretation in education	Skill

b. Syllabus

Units	Content	Hrs.
I	**Introduction to mathematical and quantitative reasoning** Meaning, nature, and scope of mathematical and quantitative reasoning, Importance of mathematical and quantitative reasoning in various fields	6
II	**Quantitative Reasoning and mathematization** Types of quantitative reasoning, Usage of mathematical and quantitative reasoning, Concept of mathematization	6
III	**Introduction to Data in Education** Data requirement, different sources of data, School enrolment: gross enrolment ratios, net enrolment ratios, educational progression: dropout rate, literacy: measures of literacy	6
IV	**Introduction to Census of India** Indian censuses, details of different items on which Indian censuses collect data, Nationwide sample surveys, National family health surveys, District level household surveys, UDISE	6
V	**Data Analysis & Interpretation** Concept of data interpretation (equation, diagram, graph, and tables), Statistical analysis of data in educational context and its applications (measures of central tendency, measures of variability, percentile), Visual and numerical representation of data and its application (bar diagram, histogram, pie charts), Learning analytics: concept, significance, types, levels, and its applications in educational context	8
	Task and Assignment ✓ Individual/group assignments/tasks in various forms like writing small paragraphs/brief notes, conceptualizations on specific terms. ✓ Discuss in small groups related to quantitative reasoning and mathematization and preparation of a report followed by an individual/group presentation. ✓ Sharing of student experiences (in groups) related to readings on data in education helps them to reshape their concept and enable them to develop a vision, mission, and objectives for a school and their plan to accomplish the objectives in the form of a group report.	

	✓ Identification and reporting of Indian census data and analysis of data. **References**: Bhatia, H. S (1983).Ageing and Society, The Arya's Book Centre Publishers, Udaipur. Bhende, A. and T. Kanitkar (2019). Principles of Population Studies, Himalaya Publishing House, Mumbai. Bogue, D (1969) Principles of Demography, John Wiley and Sons, New York. Heer, David (1975). Society and Population, Prentice-Hall, New Delhi. Krishnan, P. and Mahadevan, K (2008) Elderly Population Today: Policies Problems and Prospects, B. R. Publishing House, New Delhi.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	0	3	3	3
CO2	3	3	0	3	3	2
CO3	3	3	2	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	1

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (40 Marks)

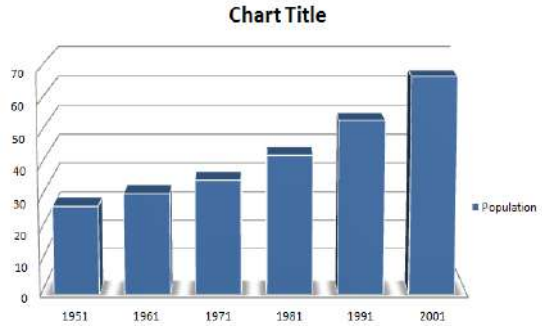
	CO1	CO2	CO3	CO4	CO5
Assignments	2	2	-	-	2
Seminar	-	-	2	2	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 4 x 5 = 20 marks)	10	10	-	-	-
Part – C (Essay- 3 x 10 = 30 marks)	-	-	10	10	10
Total	**12**	**12**	**12**	**12**	**12**

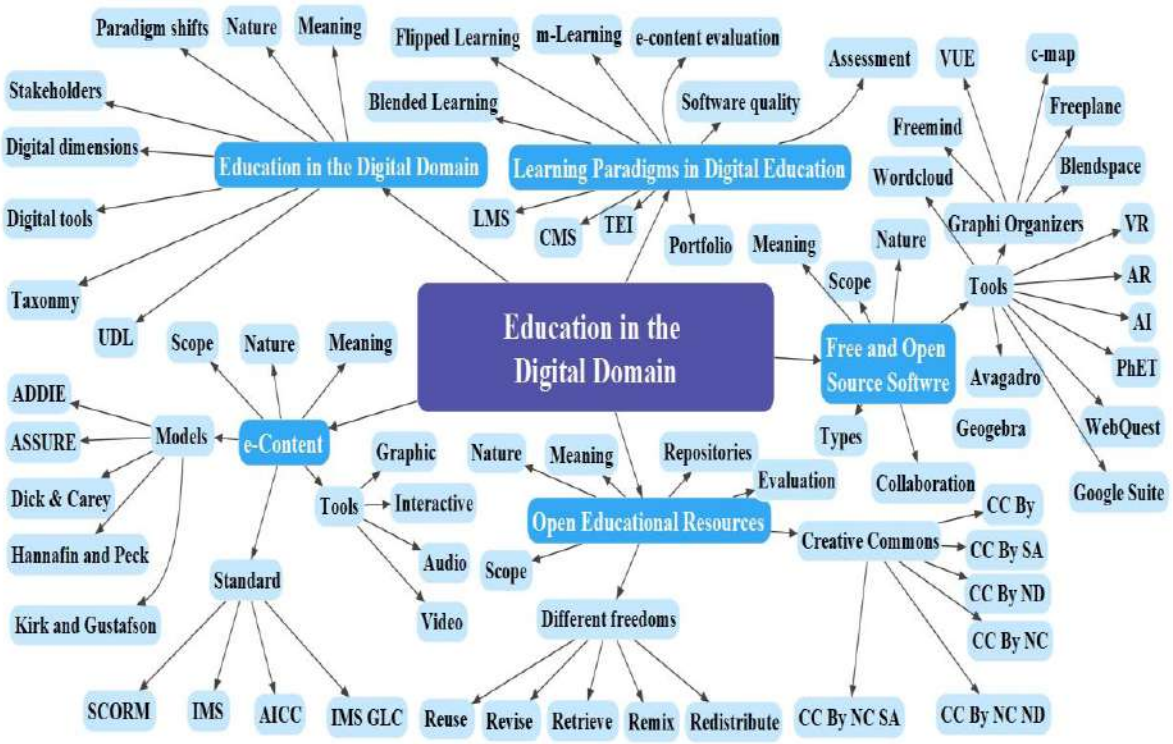
g. Model Question Paper

Sl. No.	Model Questions	Specification	Level
	Part – A: Objective Type **Multiple Choice Marks: 10 x 1 = 10**		
1	Concepts like more-less, long-short, far-near, big-small, etc. are: A. Vague terms for comparison B. Antonyms, not necessary for learning mathematics C. Simple English language adjectives D. Important pre-number concepts	Recall	Remember
2	Which of the following is NOT true of the Hindu-Arabic system of numeration? A. The position of a digit in a number dictates its value. B. It is additive in nature. C. It follows the base 2 system, D. It is multiplicative in nature.	Recall	Remember
3	Mathematics is accepted as a branch of A. Logic B. Arithmetic C. Analysis D. Algebra	Recall	Remember
4	A close relationship between the growth of thinking and the development of mathematical concepts is established in A. Theory B. Intervention C. Research D. Demonstration	Recognize	Remember
5	The gross enrolment ratio (GER) is associated with which sector? A. Agriculture B. Transport C. Education D. Industry	Identify	Remember
6	The proportion of the literate population in the 7 years and above age group is termed as A. Education index B. Mortality ratio C. Literacy rate D. Gross enrolment ratio	Recognize	Remember
7	In which census year, the percent increase in population is highest as compared to that in the previous census year? A. 1971 B. 1981 C. 1991 D. 2001	Identify	Remember
8	Assertion (A): A demographic dividend is the potential for economic growth that can result from shifts in a population age structure. Reason (R): A demographic dividend is linked to a demographic transition, which begins when child and infant death rates decrease in response to increased access to vaccines, antibiotics, safe water, sanitation, and better nutrition. A. Both (A) and (R) are true and (R) is the correct explanation of (A) B. Both (A) and (R) are true, but (R) is not the correct explanation of (A) C. (A) is true, but (R) is false D. (A) is false, but (R) is true	Recall	Remember

9	Which one of the following combination of errors of coverage in age data have been obtained in census return? (a) Under-enumeration of young children (b) Net-count at the older ages (c) Under-enumeration at the early adult ages Code : A. (a) B. (a) and (c) C. (b) and (c) D. (a), (b) and (c)	Recognize	Remember
10	Study the graph and answer the questions: (9 and 10)  The percent increase in population from 1991 to 2001 is: A. 24.8 crores B. 20 crores C. 13.6 crores D. 22.9 crores	Identify	Remember
PART – B Short Answer **The answer should not exceed 200 words Marks: 4 x 5 = 20**			
11	a) Explain the nature of quantitative reasoning. (or) b) What are the scopes of quantitative reasoning?	Explain	Understand
12	a) Describe the importance of mathematical reasoning. (or) b) Discuss the application of quantitative reasoning in various fields.	Explain	Understand
13	a) What are the types of quantitative reasoning? (or) b) Write short notes on the concept of mathematization.	Explain	Understand
14	a) Answer in detail: Concept of mathematization in education? (or) b) Discuss the role of quantitative reasoning in the field of education.	Investigate	Analyze
PART – C Essay Answer **The answer should not exceed 400 words. Marks: 3 x 10 = 30**			
15	a) Discuss the different sources of data. (or) b) Explain with suitable illustration the dropout rate, literacy: measures of literacy.	Describe	Analyze
16	a) Explain the importance of the Indian census and different items on which Indian census data is collected (or) b) Discuss the Nationwide sample surveys and National family health survey.	Explain	Understand
17	a) Discuss the application of Statistical analysis of data in an educational context with suitable examples. (or) b) Examine the visual and numerical representation of data with suitable examples and its application in education.	Examine	Apply

Semester VIII					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDUEC04	Education in the Digital Domain	3	0	0	3
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcomes (Cos)

On successful completion of the course, the student teachers will be able to

S No	Course Outcome	Level
CO1	Understand the meaning and nature of education in the digital domain.	Understand
CO2	Understand the meaning, development and standards of e-content	Understand
CO3	Understand the meaning, nature, scope and educational uses of OER	Understand
CO4	Analyse the scope and uses of FOSS	Analyse
CO5	Understand Learning Paradigms in Digital Education	Understand

b. Syllabus

Units	Content	Hours
I	**Education in the Digital Domain** Meaning and nature of education in the digital domain- a paradigm shift in the role of education stakeholders in the digital era- Digital dimensions of education- Taxonomy of educational objectives in the digital domain- digital tools in education- scope and application selection procedures- Universal Design of Learning.	8
II	**E-contents** E-content- meaning, nature, scope- designing and development of e-content- steps involved in developing learning objects-e-content design models- ADDIE Model- Dick & Carey Model, Hannafin and Peck model, Kirk and Gustafson Design Model- - standards of e-content- SCORM, AICC, IMS, IMS GLC – e-content tools- Graphics, Audio, Video-creating and editing Software- Authoring tools.	10
III	**Open Educational Resources** Open Educational Resources- Meaning, Nature, Scope- Different freedoms- Various OER initiatives- OER Impact Map- OER universities- Creative Common Licensing OER repositories- application- Creating OERs steps and procedures- Evaluating OERs.	10
IV	**Free and Open-Source Software** Free and Open-Source Software- FOSS tools in education- meaning, nature, scope, and importance- applications of FOSS tools- Types of FOSS Tools- Avogadro, Geogebra, PhET, Graphic Organizers- Online Tools- Google Suites, Blend space, WebQuest- Education Applications- Augmented Reality, Virtual Reality, Artificial Intelligence-Collaboration tools, word cloud tools.	10

V	**Learning Paradigms in Digital Education** Learning Paradigms in Digital Education- Flipped Learning, Blended Learning, m-Learning- Concept of Technology Enriched Instruction- Assessment Paradigms in Digital Education- Digital Portfolio, Assessment through LMS, CMS- e-content evaluation- educational software quality assessment.	10
	Activities/ Internal Assessment Tasks: Locating and exploring e-content from any specific subject. Design and Develop e-content for one unit from the secondary school level. Locate and explore OER Explore FOSS tools in Education and make a comparison of the same. Evaluate any selected e-content for the secondary school level. **References:** COL (2005). Creating Learning Materials for Open and Distance Learning: A Handbook for Authors and Instructional Designers. Commonwealth of Learning is available at http://oasis.col.org/bitstream/handle/11599/43/odlinstdesignHB.pdf?sequence=1&i sAllowed=y www.nchsoftware.com/software/editing.html e-Learning Standards – Course Avenue available at www.courseavenue.com/e-learning standards accessed on 19th Jan 2016 'Frequently asked questions- Creative Commons' Available at https://wiki.creativecommons.org/index.php/Frequently_Asked_Questions accessed on 12th Jan 2016 National Repository of Open Educational Resources (NROER) Available at http://edtechreview.in/news/561-national-repository-of-openeducational-resourcesby-mhrd accessed on 13-1-2016	

c. Mapping of Programme Outcome with Course Outcomes

	CO1	CO2	CO3	CO4	CO5
PO1	3	3	3	3	3
PO2	3	0	3	3	3
PO3	2	3	3	3	2
PO4	2	1	3	3	3
PO5	3	3	3	3	0
PO6	1	3	3	3	2

d. Evaluation Scheme

Components	CO1	CO2	CO3	CO4	CO5	Total
Internal	5	10	10	10	5	40
External	6	16	16	16	6	60
Total	11	26	26	26	11	100

e. Mapping Course Outcomes with Internal Assessment

Components	CO1	CO2	CO3	CO4	CO5	Total
Assignments	-	5	5	-	-	10
Seminar	-	-	-	5	-	5
Test	5	5	5	5	5	25
Total	5	10	10	10	5	40

f. Mapping course outcomes with External Assessment

Type	CO1	CO2	CO3	CO4	CO5	Total
Objective Type	2	2	2	2	2	10
Short Answer	4	4	4	4	4	20
Long Answer	-	10	10	10	-	30
Total	6	16	16	16	6	60

g. Model Question Paper

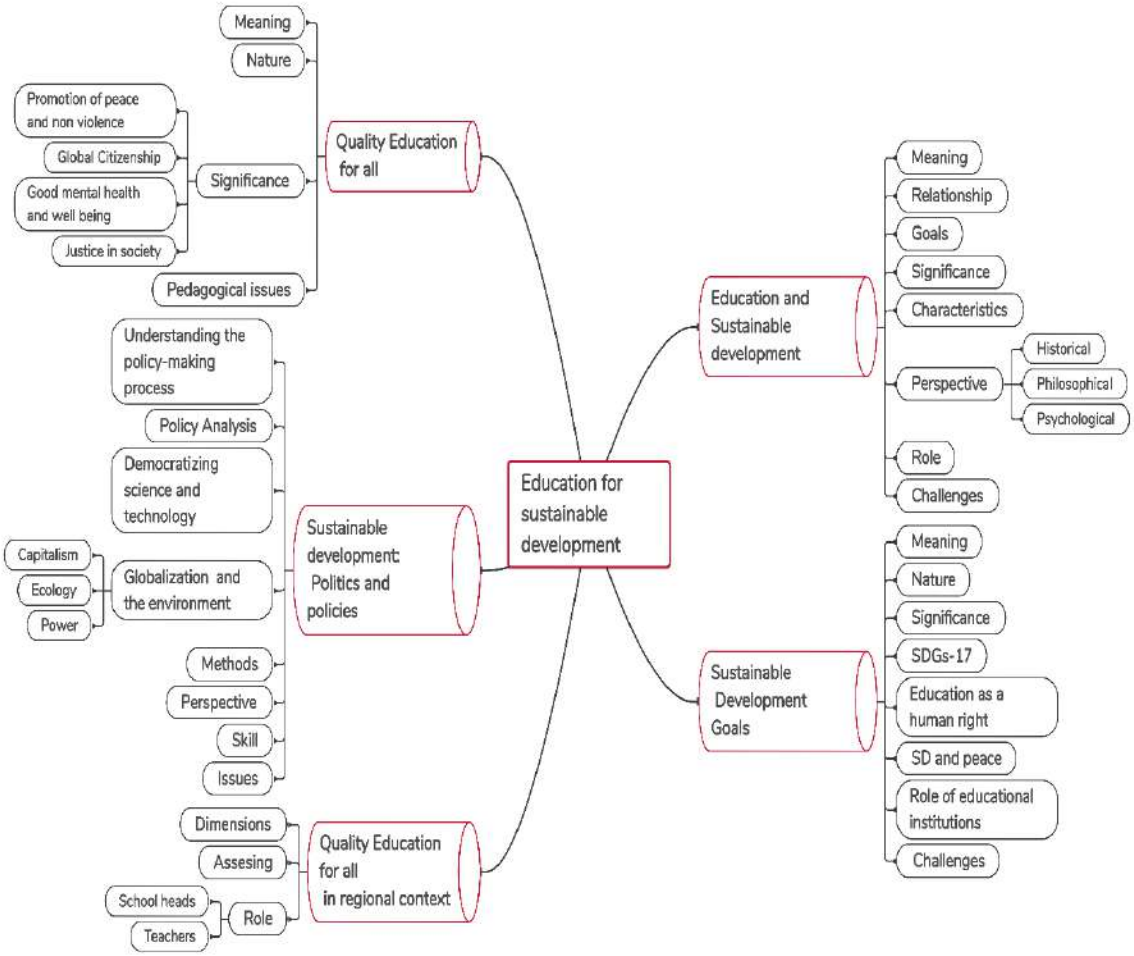
Q No	Question	Specification	Level
	Part A **Answer all questions. Each question carries 1 mark.**		
1	Which of the following is NOT an example for creating in digital domain taxonomy? a. Crating a blog post b. Designing a mind map c. Editing an e-content d. Sharing a website link	List	Understand
2	Which of the following is correct for UDL? a. Universal Department for Learning b. University Department for Learning c. Universal Design for Learning d. Unicode Design for Learning	List	Understand
3	Which of the following is NOT an example of an e-content standard? a. SCORM b. IMS c. AICC d. LAMS	List	Understand
4	Which of the following is NOT an example of a form of e-content a. Video b. Applet c. Newspaper d. Simulation	List	Understand
5	Which of the following describes an OER? a. OER comes with open licensing b. OER comes with open licencing with restrictions c. OER comes with open licensing with no restrictions or with restrictions d. OER comes with a partial copyright	Explain	Understand

6	Which of the Creative Commons licenses best describes restricted adaptations and commercial use? a. CC By NC b. CC By ND c. CC By NC SA d. CC By NC ND	Describe	Understand
7	You would like to present content on variation of volume with respect to pressure; which of the following would be the best resource to use? a. PhET b. GeoGebra c. Avogadro d. Marble	Analyse	Analyse
8	While analysing FOSS tools, which of the following helps you to select a. Freedom to use b. Freedom to attribute c. Freedom to redistribute d. Freedom to use, attribute, redistribute	Analyse	Analyse
9	Describing blended learning can be as a. Taking a class physically and conducting an exam online b. Sharing videos and conducting an exam online c. Mixing online and offline logically d. Provide video lectures and conduct exams physically	Describe	Understand
10	Which of the following is the best example of contextualised blended learning? a. m-learning b. Flipped Learning c. Web-based Learning d. Online Learning	Example	Understand
Part B **Answer any one question from each question number. Each question carries 4 marks.**			
11			
A	Discuss the changing roles of stakeholders in Online Education	Discuss	Understand
B	Explain the meaning and scope of UDL	Explain	Understand
12			
A	Describe the different steps involved in developing learning objects.	Discuss	Understand
B	Explain salient features of any two e-content standards	Explain	Understand
13			
A	Explain the different freedoms offered by OER	Explain	Understand
B	Discuss the criteria for evaluating an OER.	Discuss	Understand

14			
A	Critically analyse educational advantages of using FOSS with examples	Analyse	Analyse
B	Explain the pedagogical uses of a FOSS mind-mapping tool	Explain	Understand
15			
A	Elucidate the salient features of blended learning and m-learning	Elucidate	Understand
B	Explain the advantages and limitations of an LMS	Explain	Understand
Part C **Answer any three questions. Each question carries 10 marks.**			
16	Explain the scope of the taxonomy of educational objectives in the digital domain with suitable examples.	Explain	Understand
17	Discuss the different phases of e-content development following the ADDIE model.	Discuss	Understand
18	Explain the importance and different types of Creative Commons Licenses	Explain	Understand
19	Analyse the different features of any two FOSS tools and plan two learning experiences related to secondary school subject	Analyse	Analyse
20	Explain the different parameters of evaluation of e-content	Explain	Understand

SEMESTER - VIII					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDUEC05	Education for Sustainable Development (ESD)	**3**	**0**	**0**	**3**
Internal	40	External	60	Total	100

Course Content Overview



a. Course Outcomes (COs)

On successful completion of the course, the student teachers will be able to

	Course Outcomes	Level
CO 1	Clarify the meaning and significance of sustainable development	Understand
CO 2	Explore the relationship among education, development, and environment	Analyse
CO 3	Appreciate the relation between education and sustainable development	Evaluate
CO 4	Describe the characteristics of ESD	Understand
CO 5	Explain the role of education in sustainable development	Understand
CO 6	Critically analyze the meaning and importance of education in the context of sustainable development	Analyse
CO 7	Analyse the pedagogical issues related to ESD	Analyse

b. Syllabus

Units	Content	Hrs.
I	**Education and Sustainable Development** Meaning, relationship, goals, and significance - Characteristics of ESD - Education for Sustainable Development: Historical Perspective, Philosophical, Sociological and Psychological Perspective - Role of Education for Sustainable Development - Decolonizing Knowledge for Sustainable Development - Challenges of Education for Sustainable Development.	10
II	**Sustainable Development Goals (SDGs)** Meaning, nature and significance of SDGs -17 Sustainable Development Goals (SDGs): UNESCO agenda - SDGs and Social Transformation as Universal Commitment - Education as a Human Right to achieve Sustainable Development- Sustainable Development and Peace - Role of Educational Institutions and Challenges to achieve SDGs.	10
III	**SD Goal-4: Quality Education for All** Meaning, Nature, and Significance of NEP 2020 on SDG-4: Sustainable lifestyle, Gender equality, Promotion of peace & non-violence, Global Citizenship, Good mental health and well-being, Justice in society-Pedagogical issues for SDG-4.	8
IV	**Sustainable Development: Politics and Policies** Understanding the Policy-Making Process- Policy Analysis-Democratizing Science and Technology-Globalization and the Environment: Capitalism, Ecology and Power-Perspectives, Methods, and Skills-Innovation for Sustainability-Key Issues from an International Perspective-Critical issues involved in sustainability.	10

V	**SDG 4 in Regional Context** Dimensions of quality education for all-Assessing quality education for all in local schools-School heads and teachers' role in achieving SDG 4.	10
	Task and Assignments: ✓ To present critical review of NEP 2020 in the context of SDGs. ✓ Critical study of Delors Commission Report, 1996: **Learning: The Treasure within** with reference to SDGs. ✓ To review and present a critical report on the legal perspective on SDGs. ✓ To prepare Toolkit for Education for Sustainable Development. ✓ To organize discussions/ seminars of Teachers of all streams to present their views on SDGs and to present an Action Plan for this. ✓ To prepare and present a short Video/film to promote SDGs.	
	References: Dodds, F., Donoghue, A. D., & Roesch, J. L. (2016). Negotiating the sustainable development goals: a transformational agenda for an insecure world. Taylor & Francis. Ferguson, T., Iliško, D., Roofe, C., & Hill, S. (2018). SDG4–quality education: inclusivity, equity and lifelong learning for all. Emerald Publishing Limited. French, D., & Kotzé, L. J. (Eds.). (2018). Sustainable development goals: Law, theory and implementation. Edward Elgar Publishing. Hopkins, D. (2015). Improving the quality of education for all: A handbook of staff development activities. Routledge. Khalid, A. M., Sharma, S., & Dubey, A. K. (2021). Concerns of developing countries and the sustainable development goals: Case for India. International Journal of Sustainable Development & World Ecology, 28(4), 303-315. Pandey, B. (2018). Achieving SDG 4 in India: moving from quantity to quality education for all. Research and Information System for Developing Countries. UNESCO Institute for Statistics. (2019). SDG 4 data book. Global education indicators 2019.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	2	3	3
CO2	3	3	2	3	2	2
CO3	3	3	3	3	2	3
CO4	3	2	3	3	3	3
CO5	3	3	3	3	2	3
CO6	3	2	2	3	3	3
CO7	3	3	3	2	3	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	CO6	CO7	Total
Internal	7	5	3	3	7	8	7	40
External	12	7	6	6	11	6	12	60
Total	**19**	**12**	**9**	**9**	**18**	**14**	**19**	**100**

e. Mapping Course Outcomes with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5	CO6	CO7
Assignments	2	-	-	2	2	3	-
Seminar	-	-	2	-	-	-	2
Test	4	4	-	-	4	4	4
Attendance	1	1	1	1	1	1	1
Total	**7**	**5**	**3**	**3**	**7**	**8**	**7**

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5	CO6	CO7
Part – A (Objective - 10 x 1 = 10 marks)	2	2	1	1	1	1	2
Part – B (Short Answer - 4 x 5 = 20 marks)	-	5	5	5	-	5	-
Part – C (Essay- 3 x 10 = 30 marks)	10	-	-	-	10	-	10
Total	**12**	**7**	**6**	**6**	**11**	**6**	**12**

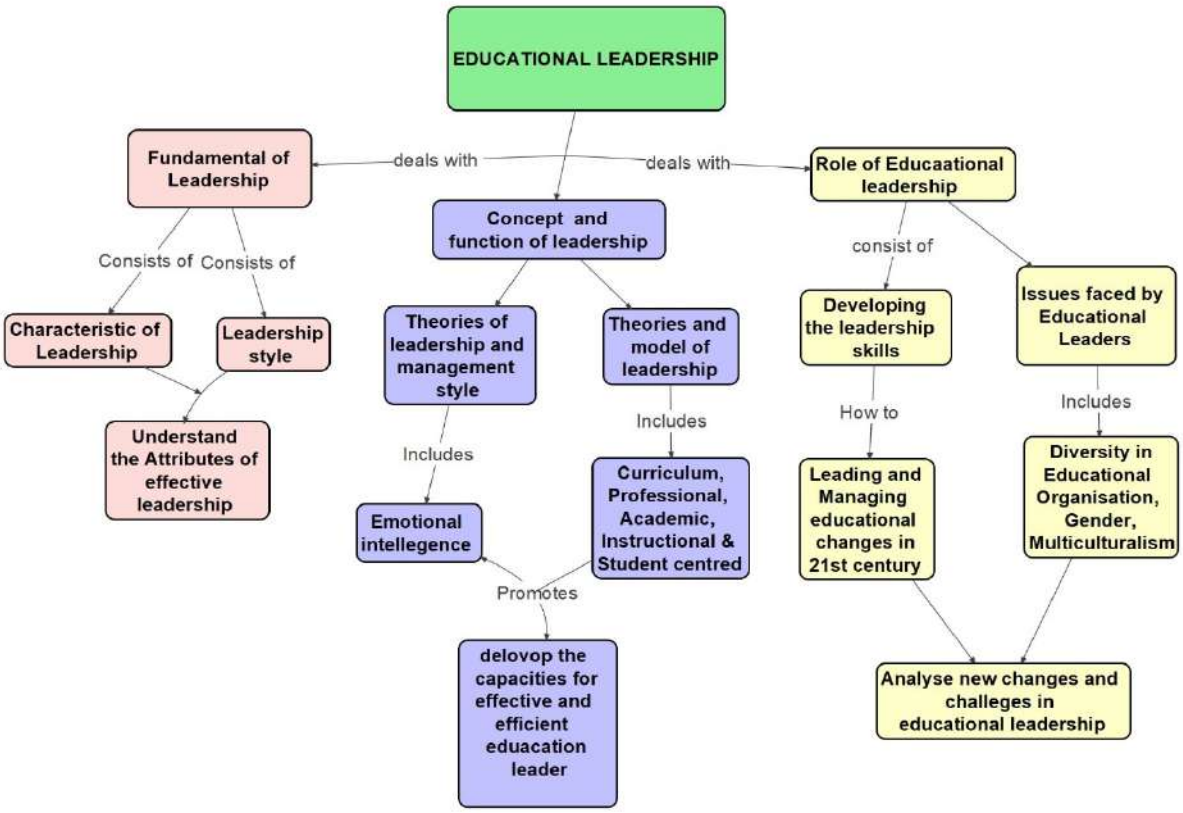
i. Model Question Paper

Sl. No.	Model Questions	Specification	Level
	Part – A: Objective Type **Multiple Choice Questions 10 x 1 = 10**		
1	The target year of achieving SDG is **A. 2030** B. 2040 C. 2050 D. 2025	Recognize	Remember
2	The SDG's India index (SDG Index 2.0) which documents the progress made by India's States and UT's toward achieving the SDG target was released by A. **NITI Ayog** B. Knowledge Commission C. MHRD D. ICMR	Recall	Remember
3	What are all the main sustainability objectives? I Poverty and hunger eradication II Higher education and healthcare standards, notably in terms of water quality and sanitation. III Gender equality IV Long-term economic growth that promotes employment and strengthens communities A. I, II & III B. I, III & IV C. I & III **D. I, II, III & IV**	Recognize	Remember
4	Education for Sustainable Development means I. Understanding about sustainable development II. Enhancing individuals' skills for sustainable development III. Clarification of sustainable development values IV. Deployment of environment for sustainable education A. I, II & IV B. I and III C. I, III & IV **D. I, II & III**	Recognize	Remember
5	Which one of the following is the GAP on ESD? A. Mobilization of elders for lifelong learning **B. Acceleration of ESD at local levels** C. Providing pollution free environment for learning D. Building the capacity of students	Recognize	Remember
6	Which one of the following are ESD knowledges? **A. Knowledge drawn from different disciplines** B. Knowledge of educational policies C. Knowledge of educational policies for sustainability D. Knowledge of ecosystem	Recognize	Remember

7	ESD pedagogies thrive for A. Environment Centered learning B. Teacher Centered learning C. **Students as decision makers** D. Convergent thinking	Recognize	Remember
8	Indigenous knowledge refers to : A. Western knowledge B. Scientific knowledge C. **Local knowledge** D. Environmental knowledge	Recognize	Remember
9	Quality Education is one that focuses on **A. Whole Child** B. Teaching-learning process C. I.Q. of the Child D. Infrastructure	Recognize	Remember
10	Quality education for all can be achieved through by providing **A. Indigenous Education** B. Inclusive Education C. Idealistic Education D. Innovative Education	Recognize	Remember
	PART – B Short Answer **The answer should not exceed 200 words 4 x 5 = 20**		
21	a) Comment on the characteristics of ESD. (or) b) Discuss the key challenges of ESD.	Explain	Understand
22	a) Comment on the historical perspective of ESD. (or) b) SDGs stimulate actions to achieve peace and prosperity. Substantiate this statement.	Explain / Analyse	Analyse
23	a) SDGs call for a transformation of the education system. Justify this statement (or) b) Highlight the roles of educational institutions in achieving SGDs.	Analyse / Explain	Analyse
24	a) Discuss the impact of globalization on the environment. (or) b) Discuss the impact of globalization on sustainable development.	Discuss	Evaluate
	PART – C Essay Answer **The answer should not exceed 400 words 3 x 10 = 30**		
25	a) Discuss the role of education in sustainable development. (or) b) The NEP 2020 goals align with SDGs. Mention policy initiatives to substantiate this statement.	Explain/ Analyse	Analyse
26	a) Discuss the targets set by UNESCO to achieve SDG4. (or) b) Describe the dimensions of quality education for all.	Explain	Understand
27	a) Describe the roles of school heads and teachers in achieving SDG4. (or) b) Sustainability requires innovation. Substantiate with examples.	Describe/ Analyse	Analyse

SEMESTER – VIII					
Course Code	**Course Name**	**L**	**T**	**P**	**Credits**
EDUEC06	Educational Leadership	3	0	0	3
Internal	40	External	60	Total	100

Course Content Overview



a. **Course Outcome (CO)**

On the successful completion of the course, the student will be able to

	Course Outcome	Level
CO 1	Explain the concept of leadership.	Understand
CO 2	Apply the various styles and types of leadership	Apply
CO 3	Explore the Theories and models of educational leadership.	Analyze
CO 4	Formulate how to develop leadership skills in the classroom.	Create
CO 5	Assess the role of leadership in the 21st century.	Skill

b. Syllabus

Units	Content	Hrs.
I	**Fundamentals of Leadership Sciences** Unlearning and Learning, Introduction to Leadership, Character of a Leader, Leadership Styles, and Application, Attitude, Etiquette, Time Management, Delegation, Networking for Success.	9
II	**Leadership: Concept and Dynamics** Concept and functions of Leadership-Theories of leadership and management in educational organizations-Theories of leadership and management styles including emotional intelligence-Theories and models of educational leadership (including curriculum, professional, academic, instructional, and student-centered leadership)	10
III	**Leadership Roles: Challenges and Perspectives** Leadership for the learning community -Developing leadership and management skills and insights.	10
IV	**Leadership and Values** Values, vision, and moral purpose in educational leadership -Leading and managing educational change and improvement	10
V	**Leadership- Issues andSolutions** Issues of diversity in educational organizations, including issues related to gender and multiculturalism-Solutions	9
	Tasks and Assignments: ✓ Reflection on Leadership styles and self-assessment ✓ Readings on Leadership case studies ✓ Workshop on school leadership/ instructional leadership/ leadership skills **References:** Razik, T.A. & Swanson, A.D. (2010). Fundamental Concepts of Educational Leadership and Management (3rd ed.). New York: Allyn & Bacon. Lewis, D. & Kanji, N. (2009). Non-governmental organizations and development: London and New York: Routledge, Taylor and Francis Group.	

	Osterman, Karen (August 12, 2013). "Action research in EdD programs in educational leadership" (PDF). Journal of Research on Leadership Education. 9 (1): 85–105. DeMatthews, David (March 2014). "Deconstructing Systems of Segregation: Leadership Challenges in an Urban School" (PDF). Journal of Cases in Educational Leadership. 17 (1): 16–26.	

c. Mapping of Program Outcomes with Course Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	2	3	3
CO3	3	3	3	3	3	2
CO4	3	3	3	3	3	3
CO5	3	3	0	3	2	3

d. Evaluation Scheme

	CO1	CO2	CO3	CO4	CO5	Total
Internal	8	8	8	8	8	40
External	12	12	12	12	12	60
Total	**20**	**20**	**20**	**20**	**20**	**100**

e. Mapping Course Outcome with Internal Assessment (40 Marks)

	CO1	CO2	CO3	CO4	CO5
Assignments	2	-	-	2	2
Seminar	-	2	2	-	-
Test	5	5	5	5	5
Attendance	1	1	1	1	1
Total	8	8	8	8	8

f. Mapping Course Outcome with External Assessment (60 Marks)

Category	CO1	CO2	CO3	CO4	CO5
Part – A (Objective - 10 x 1 = 10 marks)	2	2	2	2	2
Part – B (Short Answer - 5 x 4 = 20 marks)	10	-	-	10	-
Part – C (Essay- 3 x 10 = 30 marks)	-	10	10	-	10
Total	**12**	**12**	**12**	**12**	**12**

g. Model Question Paper

Sl. No.	Model Questions	Specification	Level
	Part – A: Objective Type **Multiple choice 10 x 1 = 10**		
1	What is NOT one characteristic of the Democratic leadership style? a) Leader asks before doing anything. b) Leader enforces and relies on discipline. c) Leader works together with the members as a group. d) There is a mutual synergy between the leader and the team.	Recognize	Remember
2	What are the two important attributes of self-required for becoming an effective leader? a) Distributor and a complaining attitude. b) An initiator and positive outlook. c) Organizer and planner. d) Administrator and manager.	Recall	Remember
3	Who is a visionary leader? a) One who has a medium-term perspective b) One who has a long-term perspective. c) One who has a short-term perspective. d) One who takes initiative for need satisfaction.	Recognize	Remember
4	Development of leadership qualities among students should be done in the direction of the teacher: a) Not agree on b) Perhaps c)Agree on d) Partially Agree	Recognize	Remember
5	Leadership is most associated with a) Consistency. b) Vision c) Control. d) Planning.	Recognize	Remember
6	The direct effect of school leadership on student learning implies a) Engaging in the teaching-learning process. b) Taking school rounds. c) Facilitating teachers to experiment with new teaching methods. d) Randomly checking the notebooks of the students.	Recognize	Remember
7	Which role focuses on bringing about order and consistency by drawing up formal plans? a) Leadershipb) Management c) Task structure d) Initiating structure.	Recall	Remember

8	Which one of the following statements concerning the rational and emotional aspects of leadership is false? a) Leaders use rational techniques and/or emotional appeals to influence followers. b) Effective leadership involves actions based exclusively on reason and logic. c) Aroused feelings can be used by leaders either positively or negatively. d) Good leadership involves touching others' feelings.	Recall	Remember
9	Which of the following set of traits is most appropriate for effective leadership? a) Knowledge, vision, and Relationship. b) Achievement drive, self-confidence, and charisma. c) Cognitive ability, emotional maturity, and flexibility. d) Creativity, honesty, and knowledge of the task.	Identify	Remember
10	A leadership style that follows the" Command and Control Approach" is a) Transactional leadership b) Democratic leadership. c) Autocratic leadership. d) Democratic leadership.	Identify	Remember
PART – B Short Answer **The answer should not exceed 200 words 5 x 4 = 20**			
11	a) What is Educational leadership and Explain the nature of leadership. (or) b) Differentiate between Educational Leadership and Educational Management.	Explain Differentiate	Understand
12	a) Discuss how educational leadership is important in school. (or) b) List the qualities of an effective leader. Discuss the factor affecting it.	Discuss List	Understand
13	a) Explain the main assumption of the trait leadership theory. (or) b) State the four major qualities exhibited by transformational leaders.	Explain State	Understand
14	a) Examine how to develop the leadership skill in the classroom (or) b) Determine the moral and ethical responsibilities of a good leader?	Examine Determine	Apply
PART – C Essay Answer **The answer should not exceed 400 words 3 x 10 = 30**			

15	a) Analyze how leadership influences students learning. (or) b) What do you understand by the term 'Leadership style'? Classify different types of leadership styles.	Analyze Classify	Analyze
16	a) Compare and contrast transactional leadership differs from transformational leadership? (or) b) Discuss situational leadership and its application.	Differentiate Discuss	Understand
17	a) Assess the challenges of educational leadership in the 21st century. (or) b) Elaborate on how do you lead and manage educational challenges as an educational leader.	Assess Elaborate	Skill