B.Sc., ELECTRONICS & COMMUNICATION

Syllabus

Program Code: UEL

2023-2024 onwards

MANNAR THIRUMALAI NAICKER COLLEGE

(AUTONOMOUS)

Re-accredited with "A" Grade by NAAC

PASUMALAI, MADURAI – 625 004

GUIDLINESS FOR OUTCOME BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM

(FOR UG PROGRAM FROM 2023 -2024 ONWARDS)

ELIGIBILITY FOR ADMISSION

Candidates seeking admission to the UG Degree program must have passed the Higher Secondary Education (respective groups – Arts / Science) of the Government of Tamil Nadu or any other state or its equivalent qualification.

DURATION OF THE COURSE

The duration of the course shall be three academic years comprising six semesters with two semesters in each academic year.

Subjects of Study

Part I   : Tamil / Hindi /
Part II : English
Part III :
       1.Core Subjects
       2.Allied Subjects
       3.Electives
 Part IV:
       1.Non Major Electives (I Year)
       2.Skill Based Subjects
       3.Environmental Studies - Mandatory Subject
       4.Value Education - Mandatory Subject
Part V :
       Extension Activities

ARTS & SCIENCE

CBCS COURSE STRUCTURE FOR UG PROGRAMS

Sem I	Credit	Sem II	Credit	Sem III	Credit	Sem IV	Credit	Sem V	Credit	Sem VI	Credit
1.1. Language - Tamil	3	2.1. Language - Tamil	3	3.1. Language - Tamil	3	4.1. Language - Tamil	3	5.1 Core Course – \CC IX	4	6.1 Core Course – CC XIII	4
1.2 English	3	2.2 English	3	3.2 English	3	4.2 English	3	5.2 Core Course – CC X	4	6.2 Core Course – CC XIV	4
1.3 Core Course – CC I	4	2.3 Core Course – CC III	4	3.3 Core Course – CC V	4	4.3 Core Course – CC VII Core Industry Module	4	5.3.Core Course CC -XI	4	6.3 Core Course – CC XV	4
1.4 Core Course – CC II	4	2.4 Core Course – CC IV	4	3.4 Core Course – CC VI	4	4.4 Core Course – CC VIII	4	5.3.Core Course –/ Project with viva-voce CC - XII	4	6.4 Elective -VII Generic/ Discipline Specific	3
1.5 Elective I Generic/ Discipline Specific	3	2.5 Elective II Generic/ Discipline Specific	3	3.5 Elective III Generic/ Discipline Specific	3	4.5 Elective IV Generic/ Discipline Specific	3	5.4 Elective V Generic/ Discipline Specific	3	6.5 Elective VIII Generic/ Discipline Specific	3
1.6 Skill Enhancement Course SEC-1 (NME)	2	2.6 Skill Enhancement Course SEC-2 (NME)	2	3.6 Skill Enhancement Course SEC-4, (Entrepreneurial Skill)	1	4.6 Skill Enhancement Course SEC-6	2	5.5 Elective VI Generic/ Discipline Specific	3	6.6 Extension Activity	1
1.7Ability Enhancement Compulsory Course (AECC) Soft Skill-1	2	2.7 Skill Enhancement Course – SEC-3(NME)	2	3.7 Skill Enhancement Course SEC-5	2	4.7 Skill Enhancement Course SEC-7	2	5.6 Value Education	2	6.7 Professional Competency Skill	2
1.8 Skill Enhancement - (Foundation Course)	2	2.8 Ability Enhancement Compulsory Course (AECC) Soft Skill-2	2	3.7 Ability Enhancement Compulsory Course (AECC) Soft Skill-3	2	4.7 7Ability Enhancement Compulsory Course (AECC) Soft Skill-4	2	5.5 Summer Internship /Industrial Training	2		
				3.8 E.V.S	-	4.8 E.V.S	2				
	23		23		22		25		26		21
Total Credit Points											140

QUESTION PAPER PATTERN FOR THE CONTINUOUS INTERNAL ASSESSMENT

Note: Duration – 1 hour

(FOR PART I, PART II & PART III)

The components for continuous internal assessment are:

Part –A

Four multiple choice questions (answer all)   4 x01= 04 Marks

Part –B

Two questions ('either …. or 'type)   2 x05= 10 Marks

Part –C

Two questions ('either …. or 'type)   2 x 08=16 Marks

                              Total   30 Marks

THE COMPONENTS FOR CONTINUOUS INTERNAL ASSESSMENT ARE:

(60 Marks of two continuous internal assessments will be converted to 15 marks)

Two   tests and their average   --15 marks

Seminar /Group discussion / Quiz Test   --5 marks

Assignment   --5 marks

              Total   25 Marks

QUESTION PAPER PATTERN FOR THE SUMMATIVE EXAMINATIONS:

Note: Duration- 3 hours

Part –A

Ten multiple choice questions   10 x01   = 10 Marks

No Unit shall be omitted: not more than two questions from each unit.)

Part –B

Five Paragraph questions ('either …. or 'type)   5 x 05   = 25 Marks

(One question from each Unit)

Part –C

Five Paragraph questions ('either …. or 'type)   5 x 08   = 40 Marks

(One question from each Unit)

Total   75 Marks

PART-IV- SKILL BASED PAPERS / NME:

The Scheme of Examination for Skill Based Papers: (Except Practical Lab Subjects)

QUESTION PAPER PATTERN FOR THE CONTINUOUS INTERNAL ASSESSMENT (SKILL BASED AND NME COURSES) DURATION – 1 HOUR

❖ 50 MCQs will be asked for each internal assessment tests (50 x 1=50 Marks) and converted for 15 marks

THE COMPONENTS FOR CONTINUOUS INTERNAL ASSESSMENT ARE:

Two   tests and their average   --15 marks

Seminar /Group discussion / Quiz Test   -- 5 marks

Assignment   -- 5 marks

Total   25 Marks

SUMMATIVE EXAMINATION PATTERN (SKILL BASED AND NME COURSES) DURATION – 3 HOURS

Pattern of the Question Paper for Skill Based and Non-Major Elective courses (External)

75 Multiple choice questions will be asked from five units (75 x 1=75 Marks)

(15MCQ's from each unit)

PART-IV- ENVIRONMENTAL STUDIES AND VALUE EDUCATION

QUESTION PAPER PATTERN (INTERNAL ASSESSMENT)

Pattern of the Question Paper for Environmental Studies & Value Education (Internal)

50 MCQs will be asked for each internal assessment tests (50 x 1=50 Marks) and converted for 15 marks

Two tests and their average	--	15 marks
Project	--	10 marks

Total		25 Marks
		--------------

    * The students as Individual or Group must visit a local area to document environmental assets – river / forest / grassland / hill / mountain – visit a local polluted site – urban / rural / industrial / agricultural – study of common plants, insects, birds – study of simple ecosystem – pond, river, hill slopes, etc.

SUMMATIVE EXAMINATION PATTERN

Pattern of the Question Paper for Environmental Studies & Value Education only) (External)

75 Multiple choice questions will be asked from five units (75 x 1=75 Marks)

(15MCQ's from each unit)

PART V EXTENSION ACTIVITIES: (MAXIMUM MARKS: 100)

1. NCC
2. NSS
3. Physical Education
4. YRC
5. RRC
6. Health & Fitness Club
7. Eco Club
8. Human Rights Club

Internal Examinations   - - 25 Marks

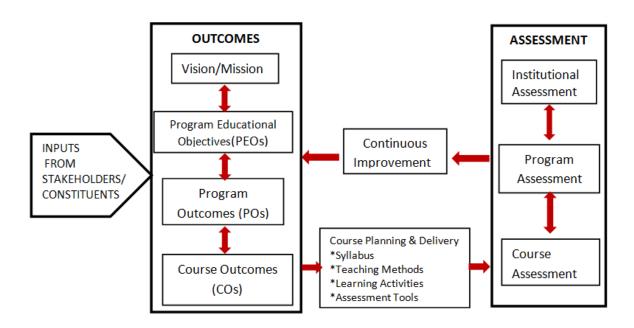Summative Examinations - - 75 Marks

_____

100

_____

OUTCOME BASED EDUCATION:

OBE starts with the identification and articulation of clear and measurable learning outcomes for each course or program. These outcomes describe the skills, knowledge, and abilities that students are expected to acquire. The curriculum, instructional methods, and assessments are aligned with the defined learning outcomes. This ensures that everything taught and evaluated is directly related to what students are expected to learn.

The Learning Outcomes-Based Approach to curriculum planning and transaction in our institution ensures whether the teaching-learning processes are oriented towards enabling students to attain the defined learning outcomes relating to the courses within a programme. The outcome based approach, particularly in the context of undergraduate studies, requires a significant shift from teacher-centric to learner-centric pedagogies and from passive to active/participatory pedagogies.

Assessment Method: The students are assessed with 2 internal examination and the summative examination which includes problem based assignments; practical assignment laboratory reports; observation of practical skills; individual project reports ,case-study reports; team project reports; oral presentations, including seminar presentation; viva voce interviews; computerized adaptive testing; etc. and any other pedagogic approaches as per the context.

INSTITUTIONAL VISION

To Mould the learners into accomplished individuals by providing them with a stimulus for social change through character, confidence and competence.

INSTITUTIONAL MISSION

1. Enlightening the learners on the ethical and environmental issues.

2. Extending holistic training to shape the learners in to committed and competent citizens.

3. Equipping them with soft skills for facing the competitive world.

4. Enriching their employability through career oriented courses.

5. Ensuring accessibility and opportunity to make education affordable to the underprivileged.

Highlights of the Revamped Curriculum:

➢ Student-centric, meeting the demands of industry & society, incorporating industrial components, hands-on training, skill enhancement modules, industrial project, project with viva-voce, exposure to entrepreneurial skills, training for competitive examinations, sustaining the quality of the core components and incorporating application oriented content wherever required.

➢ The Core subjects include latest developments in the education and scientific front, advanced programming packages allied with the discipline topics, practical training, devising mathematical models and algorithms for providing solutions to industry / real life situations. The curriculum also facilitates peer learning with advanced mathematical topics in the final semester, catering to the needs of stakeholders with research aptitude.

➢ The General Studies and Mathematics based problem solving skills are included as mandatory components in the 'Training for Competitive Examinations' course at the final semester, a first of its kind.

➢ The curriculum is designed so as to strengthen the Industry-Academia interface and provide more job opportunities for the students.

- The Industrial Statistics course is newly introduced in the fourth semester, to expose the students to real life problems and train the students on designing a mathematical model to provide solutions to the industrial problems.
- The Internship during the second year vacation will help the students gain valuable work experience that connects classroom knowledge to real world experience and to narrow down and focus on the career path.
- Project with viva-voce component in the fifth semester enables the student, application of conceptual knowledge to practical situations. The state of art technologies in conducting a Explain in a scientific and systematic way and arriving at a precise solution is ensured. Such innovative provisions of the industrial training, project and internships will give students an edge over the counterparts in the job market.
- State-of Art techniques from the streams of multi-disciplinary, cross disciplinary and inter disciplinary nature are incorporated as Elective courses, covering conventional topics to the latest - Artificial Intelligence.
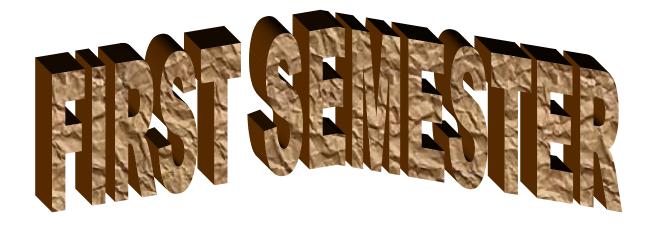
MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS), MADURAI – 625 004
B.SC ELECTRONICS AND COMMUNICATION CURRICULUM
(For the student admitted during the academic year 2023-2024 onwards)

Course Code	Title of the Course	Hrs	Credits	Maximum Marks		
				Int	Ext	Total
FIRST SEMESTER						
Part – I	**Tamil / Alternative Course**					
23UTAGT11	தமிழ் இலக்கிய வரலாறு - I	6	3	25	75	100
Part – II	**English**					
23UENGE11	GENERAL ENGLISH - I	6	3	25	75	100
Part - III	**Core Courses**					
23UELCC11	ELECTRONIC DEVICES	4	4	25	75	100
	ELECTRONIC DEVICES AND CIRCUITS LAB	2	-	-	-	-
Part - III	**Elective Course**					
23UELEC11	APPLIED PHYSICS	4	4	25	75	100
	APPLIED PHYSICS LAB	2	-	-	-	-
Part IV	**Non Major Elective**					
23UELNM11	TROUBLESHOOTING AND MAINTENANCE OF HOME APPLIANCES	2	2	25	75	100
Part IV	**Foundation Course**					
23UELFC11	FUNDAMENTALS OF ELECTRICITY	2	2	25	75	100
Part IV	**Skill Enhancement course**					
23UELSC11	ELECTRONIC MEASUREMENTS	2	2	25	75	100
	Total	**30**	**23**	**175**	**525**	**700**
SECOND SEMESTER						
Part – I	**Tamil / Alternative Course**					
23UTAGT21	தமிழ் இலக்கிய வரலாறு – II	6	3	25	75	100
Part – II	**English**					
23UENGE21	GENERAL ENGLISH - II	6	3	25	75	100
Part - III	**Core Courses**					
23UELCC21	ELECTRONIC CIRCUITS	4	4	25	75	100
23UELCP21	ELECTRONIC DEVICES AND CIRCUITS LAB	2	2	25	75	100
Part - III	**Elective Course**					
23UMTEA24	BASIC MATHEMATICS	4	4	25	75	100
23UELEP21	APPLIED PHYSICS LAB	2	2	25	75	100
Part IV	**Non Major Elective**					
23UELNM21	FUNDAMENTALS OF COMPUTING	2	2	25	75	100
Part IV	**Skill Enhancement course**					
23UELSC21	SATELLITE COMMUNICATION	2	2	25	75	100
23UELSC22	CELLULAR PHONES	2	2	25	75	100
	Total	**30**	**23**	**175**	**525**	**700**

* **During the first semester all the students will study 2 hours each for 23UELCP21 (Electronic Devices and Circuit Lab) and 23UELEP21 (Applied Physics Lab) for which the marks with due credits will be awarded in the second semester.**

FIRST SEMESTER

Course Name	ELECTRONIC DEVICES			
Course Code	23UELCC11	**L**	**P**	**C**
Category	CORE	4	-	4

COURSE OBJECTIVES:

➢ To enable the students to understand and gain knowledge on electronic devices.
➢ To acquaint the students with construction, theory and characteristics of electronic devices.
➢ To learn and use common electronic components.
➢ To design electronic circuits to perform realistic tasks.
➢ To enable the students to understand and gain knowledge on Integrated Circuit fabrication.

UNIT – I PN JUNCTION DIODE	12

Theory of PN Junction diodes – V-I characteristics – Static and Dynamic resistance – Effect of temperature on diodes – Diffusion Capacitance – Applications: clipper, clamper, voltage Doubler – Avalanche and Zener breakdown mechanisms – Zener diode as a voltage regulator – Tunnel diode.

UNIT - II BIPOLARJUNCTION TRANSISTORS	12

Transistor types – Transistor action – current components – CB, CE, CC configurations current gain – Input and output characteristics – Transistor as a switch and an amplifier – Comparison of amplifier configurations – Small signal low frequency hybrid model Analysis – Determination of h-parameter from characteristics–High frequency effects– Hybrid-pi model.

UNIT - III FIELDEFFECTTRANSISTORS	12

Types-comparison of FET and BJT–Characteristics and principal of operation of JFET parameters – JFET as an amplifier – CS, CD, CG configuration – operation of MOSFET as a switch– as a variable resistor– UJT.

UNIT - IV TRANSISTORANDFETBIASINGAND PHOTODEVICES	12

DC and AC load lines– Operating point – Need for stabilizing the Q point – Bias stability –Fixed Bias – Collector to Basic bias – Self Bias – Bias compensation – Methods of FET biasing– Introduction and theory of operation of Photo Electric devices– LED – Photo tube – LDR –Photo diode and Photo transistor– Solar cell – Optocouplers – simple applications.

UNIT - V INTEGRATEDCIRCUITFABRICATION	12

Manufacturing process –Silicon wafer preparation – Oxide growth. Photolithography, Epitaxy, Diffusion, Metallization – Construction of BJT – Monolithic diodes – Integrated Resistors –Monolithic capacitors, inductors– Thin and Thick film technology.

	Total Lecture Hours	**60**

BOOKS FOR STUDY:

- ➢ S. Salivahanan, N. Sureskumar and A. Vallavaraj, "Electronic Devices and Circuits", TMH, 1998.
- ➢ Millman and Halkias, "Eleectronic device and Circuits", Mc Graw Hill, Vreprint, 1993.

BOOKS FOR REFERENCES:

- ➢ V. K. Mehta, Principles of Electronics, S. Chand publications, Delhi, eleventh edition2000.
- ➢ R.S. Sedha, **Applied Electronics**,S.Chand&CompanyLtd,NewDelhi,firstEdition,1990

WEB RESOURCES:

- ❖ **https://nptel.ac.in/courses/08/108/108108122/**
- ❖ **https://nptel.ac.in/courses/08/108/108108112/**
- ❖ **https://nptel.ac.in/courses/15/102/115102103/**

Nature of Course	EMPLOYABILITY	✓	SKILL ORIENTED		ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL	✓	GLOBAL	
Changes Made in the Course	Percentage of Change	**60**	No Changes Made		New Course		

*Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.*

COURSE OUTCOMES:		K LEVEL
After studying this course, the students will be able to:		
CO1	Understand the characteristics and operations of PN junction and special diodes	**K1 to K4**
CO2	Understand the characteristics and operations of bipolar junction transistors	**K1 to K4**
CO3	Understand the characteristics and operations of FET and UJT	**K1 to K4**
CO4	Use the diodes, transistors, optical devices for various applications	**K1 to K4**
CO5	Understand the concepts of integrated circuit fabrication.	**K1 to K4**

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	1	2	1	2	2	2	3	2
CO2	1	1	1	1	1	2	2	2	1	1
CO3	1	2	1	1	3	2	1	1	2	2
CO4	1	2	2	1	1	3	2	1	2	3
CO5	2	1	2	2	1	2	2	1	2	2

3- STRONG   **2 – MEDIUM**   **1 - LOW**

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	1	3
CO 2	3	2	3	1	1
CO 3	3	3	2	2	2
CO 4	3	2	3	3	3
CO 5	3	3	3	3	2
WEITAGE	15	13	14	10	11
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	86	93	66	73

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	**PN JUNCTION DIODE** Theory of PN Junction diodes – V-I characteristics – Static and Dynamic resistance – Effect of temperature on diodes – Diffusion Capacitance – Applications: clipper, clamper, voltage Doubler – Avalanche and Zener breakdown mechanisms – Zener diode as a voltage regulator – Tunnel diode	12	**Chalk & Talk, Power Point Presentation**
II	**BIPOLARJUNCTION TRANSISTORS** Transistor types – Transistor action – current components – CB, CE, CC configurations current gain – Input and output characteristics – Transistor as a switch and an amplifier – Comparison of amplifier configurations – Small signal low frequency hybrid model Analysis – Determination of h-parameter from characteristics–High frequency effects– Hybrid-pi model.	12	**Chalk & Talk, Power Point Presentation**
III	**FIELDEFFECTTRANSISTORS**	12	**Chalk & Talk, Power Point**

	Types-comparison of FET and BJT–Characteristics and principal of operation of JFET parameters – JFET as an amplifier – CS, CD, CG configuration – operation of MOSFET as a switch– as a variable resistor– UJT.		**Presentation**
IV	**TRANSISTORANDFETBIASINGAND PHOTODEVICES** DC and AC load lines– operating point – Need for stabilizing the Q point – Bias stability –Fixed Bias – collector to Basic bias – Self Bias – Bias compensation – Methods of FET biasing – Introduction and theory of Operation of photo electric devices– LED – photo tube – LDR –photo diode and photo transistor– solar cell – optocouplers – simple application.	**12**	**Chalk & Talk, Power Point Presentation**
V	**INTEGRATEDCIRCUITFABRICATION** Manufacturing process –Silicon wafer preparation – oxide growth.Photolithography, Epitaxy,Diffusion, Metallization – Construction of BJT – Monolithic diodes – Integrated Resistors – Monolithic capacitors, inductors– Thin and thick film technology.	**12**	**Chalk & Talk, Power Point Presentation**

<table>
<tr><td colspan="8" align="center">**Learning Outcome Based Education & Assessment (LOBE)**
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)</td></tr>
<tr><td rowspan="3" align="center">**Internal**</td><td rowspan="3" align="center">**Cos**</td><td rowspan="3" align="center">**K Level**</td><td colspan="2" align="center">**Section A**</td><td rowspan="2" align="center">**Section B**
Either or
Choice</td><td rowspan="2" align="center">**Section C**
Either or Choice</td></tr>
<tr><td colspan="2" align="center">**MCQs**</td></tr>
<tr><td align="center">**No. of.**
Questions</td><td align="center">**K -**
Level</td></tr>
<tr><td align="center">**CI**
AI</td><td align="center">**CO1**</td><td align="center">**K1 – K4**</td><td align="center">2</td><td align="center">K1&K2</td><td align="center">2 (K3&K3)</td><td align="center">2 (K3&K3)</td></tr>
<tr><td align="center">**CO2**</td><td align="center">**K1 – K4**</td><td align="center">2</td><td align="center">K1&K2</td><td align="center">2 (K3&K3)</td><td align="center">2 (K3&K3)</td></tr>
<tr><td align="center">**CI**
AII</td><td align="center">**CO3**</td><td align="center">**K1 – K4**</td><td align="center">2</td><td align="center">K1&K2</td><td align="center">2 (K3&K3)</td><td align="center">2 (K3&K3)</td></tr>
<tr><td align="center">**CO4**</td><td align="center">**K1 – K4**</td><td align="center">2</td><td align="center">K1&K2</td><td align="center">2 (K4&K4)</td><td align="center">2 (K4&K4)</td></tr>
<tr><td rowspan="4" align="center">**Question**
Pattern
CIA I & II</td><td colspan="2" align="center">**No. of Questions to**
be asked</td><td align="center">4</td><td></td><td align="center">4</td><td align="center">4</td></tr>
<tr><td colspan="2" align="center">**No. of Questions to**
be answered</td><td align="center">1</td><td></td><td align="center">2</td><td align="center">2</td></tr>
<tr><td colspan="2" align="center">**Marks for each**
question</td><td align="center">1</td><td></td><td align="center">5</td><td align="center">8</td></tr>
<tr><td colspan="2" align="center">**Total Marks for**
each section</td><td align="center">4</td><td></td><td align="center">10</td><td align="center">16</td></tr>
</table>

<table>
<tr><td colspan="8" align="center">**Distribution of Marks with K Level CIA I & CIA II**</td></tr>
<tr><td></td><td align="center">**K**
Level</td><td align="center">**Section A**
(Multiple
Choice
Questions)</td><td align="center">**Section B**
(Either /
Or Choice)</td><td align="center">**Section C**
(Either /
Or Choice)</td><td align="center">**Total**
Marks</td><td align="center">**% of (Marks**
without choice)</td><td align="center">**Consolidate of %**</td></tr>
<tr><td rowspan="5" align="center">**CIA**
I</td><td align="center">**K1**</td><td align="center">2</td><td align="center">-</td><td align="center">-</td><td align="center">2</td><td align="center">**3.6**</td><td rowspan="2" align="center">7</td></tr>
<tr><td align="center">**K2**</td><td align="center">2</td><td align="center">-</td><td align="center">-</td><td align="center">2</td><td align="center">**3.6**</td></tr>
<tr><td align="center">**K3**</td><td align="center">-</td><td align="center">20</td><td align="center">32</td><td align="center">52</td><td align="center">**93**</td><td align="center">93</td></tr>
<tr><td align="center">**K4**</td><td align="center">-</td><td align="center">-</td><td align="center">-</td><td align="center">-</td><td align="center">**-**</td><td align="center">-</td></tr>
<tr><td align="center">**Marks**</td><td align="center">**4**</td><td align="center">**20**</td><td align="center">**32**</td><td align="center">**56**</td><td align="center">**100**</td><td align="center">**100**</td></tr>
<tr><td rowspan="5" align="center">**CIA**
II</td><td align="center">**K1**</td><td align="center">2</td><td align="center">-</td><td align="center">-</td><td align="center">2</td><td align="center">**3.6**</td><td rowspan="2" align="center">7.2</td></tr>
<tr><td align="center">**K2**</td><td align="center">2</td><td align="center">-</td><td align="center">-</td><td align="center">2</td><td align="center">**3.6**</td></tr>
<tr><td align="center">**K3**</td><td align="center">-</td><td align="center">10</td><td align="center">16</td><td align="center">26</td><td align="center">**46.4**</td><td align="center">46.4</td></tr>
<tr><td align="center">**K4**</td><td align="center">-</td><td align="center">10</td><td align="center">16</td><td align="center">26</td><td align="center">**46.4**</td><td align="center">46.4</td></tr>
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</table>

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K - LEVEL
			No. of Questions	K – Level		
1	CO1	K1 – K4	2	K1&K2	2 (K3&K3)	2 (K3&K3)
2	CO2	K1 – K4	2	K1&K2	2 (K3&K3)	2 (K3&K3)
3	CO3	K1 – K4	2	K1&K2	2 (K3&K3)	2 (K3&K3)
4	CO4	K1 – K4	2	K1&K2	2 (K4&K4)	2 (K4&K4)
5	CO5	K1 – K4	2	K1&K2	2 (K3&K3)	2 (K3&K3)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5	-	-	5	3.6	7
K2	5	-	-	5	3.6	
K3	-	40	64	104	74.3	74
K4	-	10	16	26	18.5	19
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer **ALL** the questions			**PART – A**		**(10 x 1 = 10 Marks)**
	Unit - I	**CO 1**	**K1**		
1.				a)	b)
				c)	d)
	Unit - I	**CO 1**	**K2**		
2.				a)	b)
				c)	d)
	Unit - II	**CO 2**	**K1**		
3.				a)	b)
				c)	d)
	Unit - II	**CO 2**	**K2**		
4.				a)	b)
				c)	d)
	Unit - III	**CO 3**	**K1**		
5.				a)	b)
				c)	d)
	Unit - III	**CO 3**	**K2**		
6.				a)	b)
				c)	d)
	Unit - IV	**CO 4**	**K1**		
7.				a)	b)
				c)	d)
	Unit - IV	**CO 4**	**K2**		
8.				a)	b)
				c)	d)
	Unit - V	**CO 5**	**K1**		
9.				a)	b)
				c)	d)
	Unit - V	**CO 5**	**K2**		
10.				a)	b)
				c)	d)

Answer **ALL** the questions		PART – B		(5 x 5 = 25 Marks)
11. a)	**Unit - I**	**CO 1**	**K3**	
		OR		
11. b)	**Unit - I**	**CO 1**	**K3**	
12. a)	**Unit - II**	**CO 2**	**K3**	
		OR		
12. b)	**Unit - II**	**CO 2**	**K3**	
13. a)	**Unit - III**	**CO 3**	**K3**	
		OR		
13. b)	**Unit - III**	**CO 3**	**K3**	
14. a)	**Unit - IV**	**CO 4**	**K4**	
		OR		
14. b)	**Unit - IV**	**CO 4**	**K4**	
15. a)	**Unit - V**	**CO 5**	**K3**	
		OR		
15. b)	**Unit - V**	**CO 5**	**K3**	

Answer **ALL** the questions		PART – C		(5 x 8 = 40 Marks)
16. a)	**Unit - I**	**CO 1**	**K3**	
		OR		
16. b)	**Unit - I**	**CO 1**	**K3**	
17. a)	**Unit - II**	**CO 2**	**K3**	
		OR		
17. b)	**Unit - II**	**CO 2**	**K3**	
18. a)	**Unit - III**	**CO 3**	**K3**	
		OR		
18. b)	**Unit - III**	**CO 3**	**K3**	
19. a)	**Unit - IV**	**CO 4**	**K4**	
		OR		
19. b)	**Unit - IV**	**CO 4**	**K4**	
20. a)	**Unit - V**	**CO 5**	**K3**	
		OR		
20. b)	**Unit - V**	**CO 5**	**K3**	

Course Name	APPLIED PHYSICS			
Course Code	23UELEC11	**L**	**P**	**C**
Category	ALLIED	4	-	4

COURSE OBJECTIVES:

➤ To enable the students to understand and gain knowledge about types of magnetic materials and its properties.
➤ To learn the fundamental relations between Electricity and Magnetism
➤ To study the basic concepts of network theorems& fundamental laws involved in electrical circuits.
➤ To study the concepts of resonance circuit.
➤ To introduce the concepts of AC & DC and principle involved in an electromagnetic devices.

UNIT – I	**12**

Dia, Para and Ferro magnetic substances – Properties – Curie temperature. Relation between I and H.- Susceptibility, Determination of Susceptibility of Ferromagnetic materials-Vibrating sample magnetometer, Magnetic alloys. Ultrasonic production-Detection and application.

UNIT - II	**12**

Force on a straight conductor carrying current kept in a magnetic field – Moving coil Ballisticgalvanometer- Theory and uses – Coupling between current carrying coils- Wattmeter- Movingiron metal – Electromagnetic Induction- Induced emf- self-induction of a solenoid – Mutualinduction between pair of coils– Coefficient of coupling.

UNIT - III	**12**

Ohm‟s law- Kirchoff‟s law- Simple problem- Electric power- Power dissipation on resistance-Power formulae. Analysis of Series. Parallel and Series-Parallel circuits- Star delta network-SuperpositionTheorem-TheveninsTheorem andNortonTheorem-MillmanTheorem–Applications.

UNIT - IV	**12**

Emf Induced in a coil rotating in a uniform magnetic field- mean, RMS and peak values of alternating currents and emf- power factor in the case of an AC circuit containing 1) resistance 2)inductance3)capacitance4)inductanceandresistance-wattlesscurrent-Acircuits having capacitance and resistance–ACcircuitshavinginductancecapacitanceandresistance-seriesand parallel resonance circuits- Q factor- construction and working of transformers- skin effect-Teslacoil

UNIT - V		12
Production and distribution of three phase AC- Advantages of AC over DC- Dynamic Armaturewinding- Series wound, Shunt wound and Compound wound, dynamics and their characteristics DC motor-Principles of inductive motor-Microphones and Loudspeakers		
	Total Lecture Hours	**60**

BOOKS FOR STUDY:
- ➤ Brijlaland Subramaniam-ElectricityandMagnetism

BOOKS FOR REFERENCES:
- ➤ ResnickandHalliday,Physics,VolII.,WileyEasternEd. IV.
- ➤ SeighalandChopra, ElectricityandMagnetism.

WEB RESOURCES:
- ❖ **https://archive.nptel.ac.in/content/storage2/courses/112108150/pdf/Web _Pages/WEBP_M16.pdf**
- ❖ **https://archive.nptel.ac.in/courses/108/106/108106172**
- ❖ **https://nptel.ac.in/courses/117103065**

Nature of Course	EMPLOYABILITY		SKILL ORIENTED	✓	ENTREPRENEURSHIP	
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL	✓	GLOBAL	
Changes Made in the Course	Percentage of Change	100	No Changes Made		New Course	✓

*Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.

COURSE OUTCOMES:	K LEVEL
After studying this course, the students will be able to:	
CO1 Summarize the magnetic materials and its applications.	**K1 to K4**
CO2 Explain the knowledge about the principles of electricity and magnetism.	**K1 to K4**
CO3 Understand the concept of Ohm's law, Kirchhoff's law used in an electrical circuit	**K1 to K4**
CO4 Gain the knowledge about resonance circuit.	**K1 to K4**
CO5 Acquire the knowledge on AC&DC circuits and characteristics of an electromagnetic device.	**K1 to K4**

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	1	2	1	2	2	2	3	2
CO2	1	1	1	1	1	2	2	2	1	1

CO3	1	2	1	1	3	2	1	1	2	2
CO4	1	2	2	1	1	3	2	1	2	3
CO5	2	1	2	2	1	2	2	1	2	2

3- STRONG	**2 – MEDIUM**	**1 - LOW**

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	1	1
CO 2	2	2	3	2	2
CO 3	3	3	2	2	2
CO 4	2	3	3	3	3
CO 5	3	3	3	3	2
WEITAGE	13	14	14	11	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	86	93	93	73	67

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	Dia, Para and Ferro magnetic substances – Properties – Curie temperature. Relation between I and H.-Susceptibility, Determination of Susceptibility of Ferromagnetic materials-Vibrating sample magnetometer, Magnetic alloys. Ultrasonic production-Detection and application.	12	**Chalk & Talk, Power Point Presentation**
II	Force on a straight conductor carrying current kept in a magnetic field – Moving coil ballisticgalvanometer- theory and uses – coupling between current carrying coils- wattmeter- Movingiron metal – Electromagnetic Induction- Induced emf- self induction of a solenoid – mutualinductionbetween pair of coils– coefficient ofcoupling.	12	**Chalk & Talk, Power Point Presentation**
III	Ohm's law- Kirchoff's law- Simple problem- Electric power- Power dissipation on resistance-Power formulae. Analysis of Series. Parallel and Series-Parallel circuits- Star delta network- superpositiontheorem-Thevenin'stheoremandNortonTheorems-	12	**Chalk & Talk, Power Point Presentation**

| IV | Emf Induced in a coil rotating in a uniform magnetic field- mean, RMS and peak values ofalternating currents and emf- power factor in the case of an AC circuit containing 1) resistance 2)inductance3)capacitance4)inductanceandresistance-wattlesscurrent-Acircuitshavingcapacitanceandresistance–ACcircuitshavinginductancecapacitanceandresistance-seriesand parallel resonance circuits- Q factor- construction and working of transformers- skin effect-Teslacoil | 12 | Chalk & Talk, Power Point Presentation |

| V | Production and distribution of three phase AC- Advantages of AC over DC- Dynamic Armaturewinding- Series wound, shunt wound and compound wound, dynamics and their characteristicsDCmotor-Principles of inductivemotor-Microphones adLoudspeakers | 12 | Chalk & Talk, Power Point Presentation |

Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)

Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of. Questions	K - Level		
CI AI	CO1	K1 – K4	2	K1&K2	2 (K3&K3)	2 (K3&K3)
	CO2	K1 – K4	2	K1&K2	2 (K3&K3)	2 (K3&K3)
CI AII	CO3	K1 – K4	2	K1&K2	2 (K3&K3)	2 (K3&K3)
	CO4	K1 – K4	2	K1&K2	2 (K4&K4)	2 (K4&K4)
Question Pattern CIA I & II	No. of Questions to be asked		4		4	4
	No. of Questions to be answered		1		2	2
	Marks for each question		1		5	8
	Total Marks for each section		4		10	16

Distribution of Marks with K Level CIA I & CIA II							
	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2	-	-	2	3.6	7
	K2	2	-	-	2	3.6	
	K3	-	20	32	52	93	93
	K4	-	-	-	-	-	-
	Marks	4	20	32	56	100	100
CIA II	K1	2	-	-	2	3.6	7.2
	K2	2	-	-	2	3.6	
	K3	-	10	16	26	46.4	46.4
	K4	-	10	16	26	46.4	46.4
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K - LEVEL
			No. of Questions	K – Level		
1	CO1	K1 – K4	2	K1&K2	2 (K3&K3)	2 (K3&K3)
2	CO2	K1 – K4	2	K1&K2	2 (K3&K3)	2 (K3&K3)
3	CO3	K1 – K4	2	K1&K2	2 (K3&K3)	2 (K3&K3)
4	CO4	K1 – K4	2	K1&K2	2 (K4&K4)	2 (K4&K4)
5	CO5	K1 – K4	2	K1&K2	2 (K3&K3)	2 (K3&K3)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

	Distribution of Marks with K Level					
K Level	**Section A (Multiple Choice Questions)**	**Section B (Either or Choice**	**Section C (Either/ or Choice)**	**Total Marks**	**% of (Marks without choice)**	**Consolidated %**
K1	5	-	-	5	3.6	7
K2	5	-	-	5	3.6	
K3	-	40	64	104	74.3	74
K4	-	10	16	26	18.5	19
Marks	**10**	**50**	**80**	**140**	**100**	**100**

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer **ALL** the questions				**PART – A**	**(10 x 1 = 10 Marks)**
1.	Unit - I	CO 1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO 1	K2		
				a)	b)
				c)	d)
3.	Unit - II	CO 2	K1		
				a)	b)
				c)	d)
4.	Unit - II	CO 2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO 3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO 3	K2		
				a)	b)
				c)	d)
7.	Unit - IV	CO 4	K1		
				a)	b)
				c)	d)
8.	Unit - IV	CO 4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO 5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO 5	K2		
				a)	b)
				c)	d)

Answer **ALL** the questions			**PART – B**		**(5 x 5 = 25 Marks)**
11. a)	**Unit - I**	**CO 1**	**K3**		
			OR		
11. b)	**Unit - I**	**CO 1**	**K3**		
12. a)	**Unit - II**	**CO 2**	**K3**		
			OR		
12. b)	**Unit - II**	**CO 2**	**K3**		
13. a)	**Unit - III**	**CO 3**	**K3**		
			OR		
13. b)	**Unit - III**	**CO 3**	**K3**		
14. a)	**Unit - IV**	**CO 4**	**K4**		
			OR		
14. b)	**Unit - IV**	**CO 4**	**K4**		
15. a)	**Unit - V**	**CO 5**	**K3**		
			OR		
15. b)	**Unit - V**	**CO 5**	**K3**		

Answer **ALL** the questions			**PART – C**		**(5 x 8 = 40 Marks)**
16. a)	**Unit - I**	**CO 1**	**K3**		
			OR		
16. b)	**Unit - I**	**CO 1**	**K3**		
17. a)	**Unit - II**	**CO 2**	**K3**		
			OR		
17. b)	**Unit - II**	**CO 2**	**K3**		
18. a)	**Unit - III**	**CO 3**	**K3**		
			OR		
18. b)	**Unit - III**	**CO 3**	**K3**		
19. a)	**Unit - IV**	**CO 4**	**K4**		
			OR		
19. b)	**Unit - IV**	**CO 4**	**K4**		
20. a)	**Unit - V**	**CO 5**	**K3**		
			OR		
20. b)	**Unit - V**	**CO 5**	**K3**		

Course Name	TROUBLESHOOTING AND MAINTENANCE OF HOME APPLIANCES			
Course Code	23UELNM11	**L**	**P**	**C**
Category	SKILL	2	-	2

COURSE OBJECTIVES:

➢ To enable the students to understand and gain the knowledge on Electronic components.
➢ To understand the use of measuring equipments.
➢ To understand the working concept of heater based home Appliances and how to handle troubleshooting and servicing Problem.
➢ Understanding the working concept of Motorised appliances and how to handle the troubleshooting and servicing Problem.
➢ To enable the students to understand and gain the knowledge on Refrigeration appliances and how to handle the troubleshooting and servicing Problem

UNIT - I ELECTRONIC COMPONENTS	06

Introduction–Passive components–Transformer–Working principle–application–Active devices: Diode–Transistor– Analog IC–amplifier– oscillators and Digital ICs–logic gates–encoder– decoder.

UNIT - II EQUIPMENTSFORSERVICING	06

Soldering Iron–Flux–lead–Zero defect soldering–Desoldering pump– soldering station–Basics of Multimeter–Measurement of current, voltage and resistance using multimeter–Checkingtransistors and diodes

UNIT - III HEATINGAPPLIANCES	06

Heater types–working principle– Heating Rod–Iron Box–Iron box with steamer– Toasters–Geysers–Microwave Ovens– Oven –Disassembling and assembling procedure– Fault indicator– Testing and Troubleshooting methods

UNIT - IV MOTORISEDAPPLIANCES	06

Types of Motors–DC and AC motor– Fans– mixers– blenders–wet grinders– circuit connection-testing methods. Washing machine–Electrical connections–assembly—Electrical connection–Testing and Troubleshooting methods

UNIT - V REFRIGERATIONAPPLIANCES	06

Fridge– Electrical connection– Compressor–coolants–Automatic defrost circuits –Testing and troubleshooting of refrigerators–Air coolers and Air conditioners– Mounting and fixing of Air Conditioners–testing and troubleshooting methods.

Total Lecture Hours	**30**

BOOKS FOR STUDY:

➢ Eric Kleinert, Troubleshooting and Repairing major appliances, McGraw Hill Professional, third edition,2012.

BOOKS FOR REFERENCES:

➢ S P Bali, Consumer Electronics, Pearson

WEB RESOURCES:

❖ **https://archive.nptel.ac.in/courses/112/105/112105248/**
❖ **https://archive.nptel.ac.in/courses/112/105/112105129/**
❖ **https://en.wikipedia.org/wiki/Washing_machine**

Nature of Course	EMPLOYABILITY		SKILL ORIENTED	✓	ENTREPRENEURSHIP	
Curriculum Relevance	LOCAL	REGIONAL	NATIONAL	✓	GLOBAL	
Changes Made in the Course	Percentage of Change	**100**	No Changes Made		New Course	✓

*Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.

COURSE OUTCOMES:		K LEVEL
After studying this course, the students will be able to:		
CO1	Understanding the knowledge about electronics components.	**K1 to K2**
CO2	Understanding the usage of service equipments.	**K1 to K2**
CO3	Understanding the working concept of heater based home Appliances and how to handle troubleshooting and servicing Problem.	**K1 to K2**
CO4	Understanding the working concept of Motorised appliances and how to handle the troubleshooting and servicing Problem.	**K1 to K2**
CO5	Understanding the working concept of Refrigeration appliances and how to handle the troubleshooting and servicing Problem	**K1 to K2**

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	1	2	1	2	2	3	3	2
CO2	1	1	2	1	1	2	2	2	3	1
CO3	2	2	1	2	3	1	1	1	2	2
CO4	1	2	2	1	1	3	2	1	2	3
CO5	2	1	3	2	1	1	2	1	2	2

3- STRONG	**2 – MEDIUM**	**1 - LOW**

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	1	3
CO 2	3	2	3	1	1
CO 3	3	3	2	2	2
CO 4	3	2	3	3	3
CO 5	3	3	3	3	2
WEITAGE	15	13	14	10	11
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	86	93	66	73

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	**ELECTRONICCOMPONENTS** Introduction–Passive components–Transformer–Working principle–application–Active devices: Diode–Transistor– Analog IC–amplifier– oscillators and Digital ICs–logic gates–encoder–decoder.	06	**Chalk & Talk, Power Point Presentation**
II	**EQUIPMENTSFORSERVICING** Soldering Iron–Flux–lead–Zero defect soldering–Desoldering pump– soldering station–Basics ofMultimeter–Measurementofcurrent,voltageandresistanceusingmultimeter–Checkingtransistorsand diodes	06	**Chalk & Talk, Power Point Presentation**
III	**HEATINGAPPLIANCES** Soldering Iron–Flux–lead–Zero defect soldering–Desoldering pump– soldering station–Basics of Multimeter–Measurement of current, voltage and resistance using multimeter–Checking	06	**Chalk & Talk, Power Point Presentation**

	transistors and diodes		
IV	**MOTORISEDAPPLIANCES** Heater types–working principle– Heating Rod–Iron Box–Iron box with steamer– Toasters– Geysers– Microwave Ovens– Oven – Disassembling and assembling procedure– Fault indicator– Testing and Troubleshooting methods	**06**	**Chalk & Talk, Power Point Presentation**
V	**REFRIGERATION APPLIANCES** Fridge– Electrical connection– Compressor–coolants– Automatic defrost circuits –Testing and troubleshooting of refrigerators–Air coolers and Air conditioners– Mounting and fixing of Air Conditioners–testing and troubleshooting methods.	**06**	**Chalk & Talk, Power Point Presentation**

Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)

Internal	Cos	K Level	Section A	
			MCQs	
			No. of. Questions	K - Level
CI AI	CO1	K1 – K2	25	K1,K2
	CO2	K1 – K2	25	K1,K2
CI AII	CO3	K1 – K2	25	K1,K2
	CO4	K1 – K2	25	K1,K2
Question Pattern CIA I & II		No. of Questions to be asked	50	
		No. of Questions to be answered	50	
		Marks for each question	1	
		Total Marks for each section	50	

* Two Formative examinations will be conducted as a part of Continuous Internal Assessment under which, 50 MCQ's will be asked [50X1=50 marks] from any 4 CO's. (Ist Test-2 CO's & IInd Test-2 CO's) in equal weightage

Distribution of Marks with K Level CIA I & CIA II					
	K Level	**Section A (Multiple Choice Questions)**	**Total Marks**	**% of (Marks without choice)**	**Consolidate of %**
CIA I	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	**50**	**50**	**100**	**100**
CIA II	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	**50**	**50**	**100**	**100**

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)				
S. No	**COs**	**K - Level**	**Section A (MCQs)**	
			No. of Questions	**K – Level**
1	CO1	K1-K2	15	K1,K2
2	CO2	K1-K2	15	K1,K2
3	CO3	K1-K2	15	K1,K2
4	CO4	K1-K2	15	K1,K2
5	CO5	K1-K2	15	K1,K2
No. of Questions to be Asked			75	
No. of Questions to be answered			75	
Marks for each question			1	
Total Marks for each section			75	
(Figures in parenthesis denotes, questions should be asked with the given K level)				

In summative examinations, 75 MCQ's will be asked [75X1=75 marks] from all 5 CO's in equal weightage.

Distribution of Marks with K Level				
K Level	**Section A (Multiple Choice Questions)**	**Total Marks**	**% of (Marks without choice)**	**Consolidated %**
K1	40	40	53	100
K2	35	35	47	
K3				
K4				
Marks		75	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.				

Course Name	FUNDAMENTALS OF ELECTRICITY			
Course Code	23UELFC11	**L**	**P**	**C**
Category	FOUNDATION	2	-	2

COURSE OBJECTIVES:

➢ To enable the students to understand and gain the knowledge on fundamental electricity laws
➢ To understand the concept of coulombs theorem and Electric potential energy.
➢ To learn the working of capacitor and its types
➢ To understand the concept of Electrical Measurements of thermo EMF and Peltier Effect.
➢ To enable the students to understand and gain the knowledge on three phase AC Generators and distribution of Three phase AC

UNIT - I	06

Introduction – Charges and Fields – Coulombs Law – Electric Field – Electric Dipole – Lines of force– Electric Potential–Electric Intensity—Gauss's Law–Differential form of Gauss Law –Applications of Gauss Law.

UNIT - II	06

Coulombs Theorem–Potential Difference–Electric potential as line Integral of Electric Field––Electric Potential Energy–Electrical Images.

UNIT - III	06

Capacitors – Principle of Capacitor – Capacitance of a Spherical Capacitor- Outer and Innersphere earthed – Capacitance of a Cylindrical and Parallel plate capacitor – Effect of Dielectric –Capacitorsin Series andParallel– Typesof Capacitors.

UNIT - IV	06

Electrical Measurements – Carey Foster Bridge – Potentiometer – Measurement of Thermo EMF using Potentiometer–Peltier Effect–Demonstration of Peltier effect–Thomson effect–Thermodynamics of Thermocouple – Thermo electric Diagrams– Uses.

UNIT - V	06

Three phase AC Generators – Distribution of three phase AC – AC Dynamo Generator – DC Dynamo – Field Excitation – DC Motor – Magnetic Properties of Materials – Properties of Diamagnetic Materials-Electron Theory of Magnetism –Langevin"s Theory of Diamagnetism.

	Total Lecture Hours	**30**

BOOKS FOR STUDY:

➢ Electricityand magnetism, R Murugeshan,S. Chand &CompanyLtd, 1995.
➢ Electricity&Magnetism,D.L.Sehgal,K.L.Chopra,N.K.Shegal.

BOOKS FOR REFERENCES:

➢ Fundamentals of magnetism and Electricity, D.N. Vasudeva S. Chand &CompanyLtd, 2011.

WEB RESOURCES:

❖ **https://archive.nptel.ac.in/content/storage2/courses**
❖ **https://www.vedantu.com/physics/capacitor-and-capacitance**.
❖ **https://unacademy.com/content/jee/study-material/physics/ac-and-dc-generator/**

Nature of Course	EMPLOYABILITY		SKILL ORIENTED	✓	ENTREPRENEURSHIP	
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL	✓	GLOBAL	
Changes Made in the Course	Percentage of Change		No Changes Made		New Course	✓

*Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.*

COURSE OUTCOMES:		K LEVEL
After studying this course, the students will be able to:		
CO1	Acquire the knowledge on fundamental laws in electricity.	**K1 to K2**
CO2	Understand concepts of coulombs theorem and Electric potential energy.	**K1 to K2**
CO3	Gain the knowledge about principles and types of capacitor	**K1 to K2**
CO4	Summarize the concept on Electrical Measurements of thermo EMF and Peltier Effect.	**K1 to K2**
CO5	Understand the basic principles on three phase AC Generators and distribution of three phases.	**K1 to K2**

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	1	2	1	2	2	2	3	2
CO2	1	1	1	1	1	2	2	2	1	1
CO3	1	2	1	1	3	2	1	1	2	2
CO4	1	2	2	1	1	3	2	1	2	3
CO5	2	1	2	2	1	2	2	1	2	2
3- STRONG				**2 – MEDIUM**					**1 - LOW**	

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	1	3
CO 2	3	2	2	1	1
CO 3	3	3	2	2	2
CO 4	3	2	3	3	3
CO 5	2	3	2	3	2
WEITAGE	14	13	12	10	11
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	93	86	80	66	73

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	Introduction – Charges and Fields – Coulombs Law – Electric Field – Electric Dipole – Lines of force–Electric Potential–Electric Intensity—Gauss's Law–Differential form of Gauss Law – Applications of Gauss Law	06	Chalk & Talk, Power Point Presentation
II	Coulombs Theorem–Potential Difference–Electric potential as line Integral of Electric Field—Electric Potential Energy–Electrical Images.	06	Chalk & Talk, Power Point Presentation
III	Capacitors – Principle of Capacitor – Capacitance of a Spherical Capacitor- Outer and Innersphere earthed – Capacitance of a Cylindrical and Parallel plate capacitor – Effect of Dielectric – Capacitorsin Series andParallel– Typesof Capacitors.	06	Chalk & Talk, Power Point Presentation
IV	Electrical Measurements – Carey Foster Bridge – Potentiometer – Measurement of Thermo EMF using Potentiometer–Peltier Effect–Demonstration of Peltier effect–Thomson effect–Thermodynamics of Thermocouple – Thermo electric Diagrams–Uses.	06	Chalk & Talk, Power Point Presentation

V	Three phase AC Generators – Distribution of three phase AC – AC Dynamo Generator – DCDynamo – Field Excitation – DC Motor – Magnetic Properties of Materials – Properties of Diamagnetic Materials-Electron Theory of Magnetism – Langevin''s Theory of Diamagnetism.	06	Chalk & Talk, Power Point Presentation

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)				
Internal	**Cos**	**K Level**	**Section A**	
			MCQs	
			No. of. Questions	**K - Level**
CI AI	CO1	K1 – K2	25	K1,K2
	CO2	K1 – K2	25	K1,K2
CI AII	CO3	K1 – K2	25	K1,K2
	CO4	K1 – K2	25	K1,K2
Question Pattern CIA I & II	No. of Questions to be asked		50	
	No. of Questions to be answered		50	
	Marks for each question		1	
	Total Marks for each section		50	

* Two Formative examinations will be conducted as a part of Continuous Internal Assessment under which, 50 MCQ's will be asked [50X1=50 marks] from any 4 CO's. (Ist Test-2 CO's & IInd Test-2 CO's) in equal weightage

Distribution of Marks with K Level CIA I & CIA II					
	K Level	**Section A (Multiple Choice Questions)**	**Total Marks**	**% of (Marks without choice)**	**Consolidate of %**
CIA I	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	**50**	**50**	**100**	**100**
CIA II	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	**50**	**50**	**100**	**100**

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)				
S. No	**COs**	**K - Level**	**Section A (MCQs)**	
			No. of Questions	**K – Level**
1	CO1	K1-K2	15	K1,K2
2	CO2	K1-K2	15	K1,K2
3	CO3	K1-K2	15	K1,K2
4	CO4	K1-K2	15	K1,K2
5	CO5	K1-K2	15	K1,K2
No. of Questions to be Asked			75	
No. of Questions to be answered			75	
Marks for each question			1	
Total Marks for each section			75	
(Figures in parenthesis denotes, questions should be asked with the given K level)				

In summative examinations, 75 MCQ's will be asked [75X1=75 marks] from all 5 CO's in equal weightage.

K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidated %
Distribution of Marks with K Level				
K1	40	40	53	100
K2	35	35	47	
K3				
K4				
Marks		75	100	100

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.

Course Name	ELECTRONIC MEASUREMENTS			
Course Code	23UELSC11	**L**	**P**	**C**
Category	SKILL	2	-	2

COURSE OBJECTIVES:

➢ To enable the students to understand and gain knowledge of units and standards used in measurements.
➢ To understand the measurement of Voltage,CurrentandPower.
➢ To understand the measurement of Resistance, Inductance and Capacitance
➢ To understand the concepts of Frequency and Period measurements.
➢ To enable the students to understand and gain knowledge on waveforms and phase measurements.

UNIT - I INDICATINGINSTRUMENTS	06

Review of Fundamental and derived units–Measurement Errors–Standards of Measurements–

Ammeters, Volt meters, Watt meter and Energy meters–DVM - Digital microvolt meter.

UNIT - II VOLTAGE,CURRENTANDPOWER	06

Measurement of direct current and voltage–Methods of measuring alternating voltage and

currents– Power measuring techniques–Bolometer method–Calorimeter method

UNIT - III RLCMEASUREMENTS	06

DC resistance–AC Wheatstone bridge–Wien bridge,Twin-T and Bridged,T-null networks–

Resistance and Q of resonant circuit–Measurement of low value capacitance

UNIT - IV FREQUENCYANDPERIODMEASUREMENTS	06

Standards of frequency–Comparison method–Heterodyne frequency meter–Capacitor charge

–discharge method –Digital Frequency meter.

UNIT - V WAVEFORMAND PHASEMEASUREMENTS	06

Wave and distortion analyzers for audio frequency waves–Phase measurements using

oscilloscope– Null balance method – Phase shift to pulse conversion method

	Total Lecture Hours	30

BOOKS FOR STUDY:

➢ Sawhney A.K.,"A course in Electrical and Electronic Measurements and Instrumentation",Dhanpati Rai&Sons, 11thedition, 1995.
➢ Kushmir E.,"Radio Measurements" MIR Publishers,Moscow,1978.

BOOKS FOR REFERENCES:

➢ Terman, F.E., and Petit J. M.,"Electronic Measurements" McGraw Hill Book Co.,1984.
➢ Cooper W.D.,"Electronic Instrumentation and Measurement Techniques",Prentice Hall India,3rdRe print 1995.

WEB RESOURCES:

❖ **http://nptel.ac.in/courses/10815064/http://nptel.ac.in/courses/108105062/**
❖ **https://archive.nptel.ac.in/courses/108/105/108105153/**
❖ **https://onlinecourses.nptel.ac.in/noc19_ee44/preview**

Nature of Course	EMPLOYABILITY		SKILL ORIENTED	✓	ENTREPRENEURSHIP	
Curriculum Relevance	LOCAL	REGIONAL		NATIONAL	✓	GLOBAL	
Changes Made in the Course	Percentage of Change	100%	No Changes Made		New Course	✓

*Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.

COURSE OUTCOMES:		K LEVEL
After studying this course, the students will be able to:		
CO1	Recognize the evolution and history of units and standards in measurements	K1 to K2
CO2	Gain the knowledge about measurement of Voltage, Current and Power	K1 to K2
CO3	Identify the various parameters that are measurable in Electronics Instrumentation	K1 to K2
CO4	Understand the concepts of Frequency and Period measurements.	K1 to K2
CO5	Understand and gain knowledge on waveforms and phase measurements.	K1 to K2

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	1	2	1	2	2	2	3	2
CO2	2	1	2	3	1	2	2	2	1	1
CO3	1	2	1	1	3	3	1	3	3	2
CO4	1	2	2	1	1	3	2	1	2	3
CO5	2	1	2	3	1	2	2	1	2	2

3- STRONG   2 – MEDIUM   1 - LOW

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	2	3
CO 2	3	2	3	2	1
CO 3	3	3	2	2	2
CO 4	3	2	3	3	3
CO 5	2	3	3	3	2
WEITAGE	14	13	14	12	11
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	96	86	93	80	73

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	ReviewofFundamentalandderivedunits–Measurementerrors– Standardsofmeasurements–Ammeters,Voltmeters,Wattmeterand Energymeters–DVM - Digital microvoltmeter.	06	Chalk & Talk, Power Point Presentation
II	Measurementofdirectcurrentandvoltage– methodsofmeasuringalternatingvoltageandcurrents– Powermeasuringtechniques–Bolometer method–Calorimeter method	06	Chalk & Talk, Power Point Presentation
III	DCresistance–ACwhetstonebridge–Wienbridge,Twin- TandBridged,Tnullnetworks–Resistanceand Q ofresonant circuit– measurement of lowvalue capacitance	06	Chalk & Talk, Power Point Presentation
IV	Standardsoffrequency–Comparisonmethod– Heterodynefrequencymeter–Capacitorcharge–dischargemethod –Digital Frequencymeter.	06	Chalk & Talk, Power Point Presentation

V	Waveanddistortionanalyzersforaudiofrequencywaves– Phasemeasurementsusingoscilloscope– Null balancemethod – Phaseshift to pulseconversion method	06	Chalk & Talk, Power Point Presentation

<table>
<tr><th colspan="6">Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)</th></tr>
<tr><td rowspan="3">Internal</td><td rowspan="3">Cos</td><td rowspan="3">K Level</td><td colspan="3">Section A</td></tr>
<tr><td colspan="3">MCQs</td></tr>
<tr><td colspan="2">No. of. Questions</td><td>K - Level</td></tr>
<tr><td>CI
AI</td><td>CO1</td><td>K1 – K2</td><td colspan="2">25</td><td>K1,K2</td></tr>
<tr><td></td><td>CO2</td><td>K1 – K2</td><td colspan="2">25</td><td>K1,K2</td></tr>
<tr><td>CI
AII</td><td>CO3</td><td>K1 – K2</td><td colspan="2">25</td><td>K1,K2</td></tr>
<tr><td></td><td>CO4</td><td>K1 – K2</td><td colspan="2">25</td><td>K1,K2</td></tr>
<tr><td rowspan="4">Question Pattern
CIA I & II</td><td colspan="3">No. of Questions to be asked</td><td colspan="2">50</td></tr>
<tr><td colspan="3">No. of Questions to be answered</td><td colspan="2">50</td></tr>
<tr><td colspan="3">Marks for each question</td><td colspan="2">1</td></tr>
<tr><td colspan="3">Total Marks for each section</td><td colspan="2">50</td></tr>
</table>

* Two Formative examinations will be conducted as a part of Continuous Internal Assessment under which, 50 MCQ's will be asked [50X1=50 marks] from any 4 CO's. (I[st] Test-2 CO's & IInd Test-2 CO's) in equal weightage

Distribution of Marks with K Level CIA I & CIA II					
	K Level	**Section A (Multiple Choice Questions)**	**Total Marks**	**% of (Marks without choice)**	**Consolidate of %**
CIA I	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	**50**	**50**	**100**	**100**
CIA II	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	**50**	**50**	**100**	**100**

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)				
S. No	**COs**	**K - Level**	**Section A (MCQs)**	
			No. of Questions	**K – Level**
1	CO1	K1-K2	15	K1,K2
2	CO2	K1-K2	15	K1,K2
3	CO3	K1-K2	15	K1,K2
4	CO4	K1-K2	15	K1,K2
5	CO5	K1-K2	15	K1,K2
No. of Questions to be Asked			**75**	
No. of Questions to be answered			**75**	
Marks for each question			**1**	
Total Marks for each section			**75**	
(Figures in parenthesis denotes, questions should be asked with the given K level)				

In summative examinations, 75 MCQ's will be asked [75X1=75 marks] from all 5 CO's in equal weightage.

Distribution of Marks with K Level				
K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidated %
K1	40	40	53	100
K2	35	35	47	
K3				
K4				
Marks		75	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.				

Course Name	ELECTRONIC DEVICES AND CIRCUITS LAB			
Course Code	23UELCP21	**L**	**P**	**C**
Category	CORE	-	2	-

COURSE OBJECTIVES:

➢ TounderstandtheV-I characteristics of electronicdevices.

➢ Tomakeamplifier and oscillator circuit by use ofelectronic components.

➢ Toconstructfewapplication circuitsusingsemiconductordevices.

➢ Tostudythecharacteristics of Operational Amplifier and its uses.

➢ Tolearnthesimulation of AC and DC Circuits.

Any12Experiments

1. Characteristicsofjunctiondiode.
2. CharacteristicsofZener diode.
3. RCCoupledamplifier
4. Feedbackamplifier
5. Hartleyoscillator
6. Colpitt oscillator
7. CharacteristicofUJT
8. CharacteristicsofSCRandSCRPowercontrol
9. JFETCharacteristics
10. Op-ampcharacteristics
11. Op-ampamplifiers
12. Differentialamplifier,Bridgeamplifiers, Instrumentationamplifier
13. Waveformgenerators
14. Op-ampfilters
15. VoltageControlledOscillator
16. StudyofcircuitanalysisPSPICE
17. SimulationofDCcircuits
18. SimulationofACcircuits
19. Halfandfullwaverectifiers
20. Dual power supply

BOOKS FOR STUDY:
➢ MicroelectronicsLaboratoryusingsoftwaretoolsPSPICE,
➢ ORCAD,MULTISIMbyMuhammadH.Rashid-CENGAGELearning-2016

BOOKS FOR REFERENCES:
➢ **Practical Physics and Electronics,** C.C.Ouseph, U.J.Rao and V.Vijayendran

WEB RESOURCES:
❖ **https://nptel.ac.in/courses/122/106/122106025/**
❖ **https://nptel.ac.in/courses/122/106/122106026/**

Nature of Course	EMPLOYABILITY		✔	SKILL ORIENTED			ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL			NATIONAL	✔	GLOBAL	
Changes Made in the Course	Percentage of Change		50 %	No Changes Made			New Course		

*Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.

COURSE OUTCOMES:		K LEVEL
After studying this course, the students will be able to:		
CO1	Understand the V-I characteristics of Electronic components.	**K1 to K4**
CO2	Construct the amplifier and oscillator circuits	**K1 to K4**
CO3	Construct the rectifier and operational amplifier circuits	**K1 to K4**
CO4	Use diodes, transistors, optical devices for various applications	**K1 to K4**
CO5	Understand the Simulation concepts of AC and DC circuits.	**K1 to K4**

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	1	2	1	3	2	2	3	2
CO2	2	1	2	1	1	2	2	3	1	1
CO3	1	2	1	2	3	2	1	1	2	2
CO4	1	2	2	1	1	3	2	1	3	3
CO5	2	1	2	2	1	2	2	1	2	2

3- Advanced Application 2 – Intermediate Development 1 – Introductory Level

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5

CO 1	3	3	3	1	3
CO 2	3	2	3	1	1
CO 3	3	3	2	2	2
CO 4	3	2	3	3	3
CO 5	3	3	3	3	2
WEITAGE	15	13	14	10	11
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	86	93	66	73

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	Characteristicsofjunctiondiode. CharacteristicsofZener diode. Common Emitter transistor characteristics Transistor amplifier	**12**	**Practical**
II	CharacteristicsofJFET CharacteristicsofUJT CharacteristicsofSCR	**12**	**Practical**
III	Half wave and Full wave rectifier circuits Bridge rectifier circuit IC regulated power supply	**12**	**Practical**
IV	Inverting and Non- inverting amplifier Summing and differential amplifier Wave form generator using op-amp IC	**12**	**Practical**
V	Hartley oscillator Colpitt oscillator Dual power supply	**12**	**Practical**

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)							
Internal	Cos	K Level	Aim and Apparatus	Circuit diagram	Circuit construction	Readings &Calculation	Result
CI AI	CO1	K1	5				
	CO2	K2		5			
	CO3	K3			5		
	CO4	K3				5	
	CO5	K4					5
Question Pattern CIA	No. of Questions to be asked		2	2	2	2	2
	No. of Questions to be answered		2	2	2	2	2
	Marks for each question		2.5	2.5	2.5	2.5	2.5
	Total Marks for each section		5	5	5	5	5

Distribution of Marks with K Level CIA									
	K Level	Aim and Apparatus	Circuit diagram	Circuit construction	Readings &Calculation	Result	Total Marks	% of (Marks without choice)	Consolidated %
CIA	K1	5					5	20	20
	K2		5				5	20	20
	K3			5	5		10	40	40
	K4					5	5	20	20
	Marks						25	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)							
Internal	**Cos**	**K Level**	**Aim & Apparatus**	**Circuit diagram**	**Circuit construction**	**Readings &Calculation**	**Result**
CI AI	CO1	K1	15				
	CO2	K2		15			
	CO3	K3			15		
	CO4	K3				15	
	CO5	K4					15
Question Pattern		No. of Questions to be asked	2	2	2	2	2
		No. of Questions to be answered	2	2	2	2	2
		Marks for each question	7.5	7.5	7.5	7.5	7.5
		Total Marks for each section	15	15	15	15	15

Distribution of Marks with K Level								
K Level	**Aim & Apparatus**	**Circuit diagram**	**Circuit construction**	**Readings &Calculation**	**Result**	**Total Marks**	**% of (Marks without choice)**	**Consolidated %**
K1	15					15	20	20
K2		15				15	20	20
K3			15	15		30	40	40
K4					15	15	20	20
Marks						75	100	100

Course Name	APPLIED PHYSICS LAB			
Course Code	23UELEP21	L	P	C
Category	ALLIED	-	2	

COURSE OBJECTIVES:

➢ To study the calibration of voltmeterandand ammeter using potentiometer.
➢ To determine the resonance frequency and Q factor in an electrical circuit.
➢ To understand the V-I characteristic of photovoltaic cell.
➢ To construct and study the filters.
➢ To learn how to determine the capacitance and inductance using LCR circuit.

Any12Experiments

1. Potentiometer–calibrationoflowrange ammeter

2. Potentiometer–calibration oflow rangevoltmeter

3. Seriesresonancecircuit–resonancefrequency,Qfactor
4. Potentiometer–calibrationoflowrange ammeter

5. Potentiometer–calibration oflow rangevoltmeter

6. Seriesresonancecircuit–resonancefrequency,Qfactor
   Determinationofthephotovoltaiccellcharacteristics

7. CareyFoster Bridge-determinationofspecificresistance

8. Studyof capacitorfilters and ∏filters

9. LowpassandHighpassfilters

10. DifferentiatingandIntegratingcircuits

11. Usesof CRO– Measurements ofvoltage, current, frequency,phaseanddelaytimes etc.,
12. Temperaturecoefficientofathermistor

BOOKS FOR STUDY:

➤ A Text of Practical Physics, M.N. Srinivasan, S. Balasubramanian and R. Ranganathan, Sulthan Chand & Sons

BOOKS FOR REFERENCES:

➤ **Practical Physics and Electronics,** C.C.Ouseph, U.J.Rao and V.Vijayendran

WEB RESOURCES:

❖ **https://srmvdpcsea2016.files.wordpress.com/2016/09/experiment-61.pdf**

❖ **https://www.scribd.com/document/70070448/Specific-Resistance-by-CareyFoster-s-Bridge**

❖ **https://psbrahmachary.files.wordpress.com/2009/05/thermistor.pdf**

Nature of Course	EMPLOYABILITY		SKILL ORIENTED	✓	ENTREPRENEURSHIP	
Curriculum Relevance	LOCAL	REGIONAL	NATIONAL	✓	GLOBAL	
Changes Made in the Course	Percentage of Change	100 %	No Changes Made		New Course	✓

*Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.*

COURSE OUTCOMES:		K LEVEL
After studying this course, the students will be able to:		
CO1	Understand the principles of calibration of voltmeter ammeter using potentiometer.	**K1 to K4**
CO2	Understand to measure the resonance frequency and Q factor in an electrical circuit.	**K1 to K4**
CO3	Understand the V-I characteristic of photovoltaic cell.	**K1 to K4**
CO4	Understand to construct the filters and integrating circuit.	**K1 to K4**
CO5	Able to measure the capacitance and inductance using LCR circuit	**K1 to K4**

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	2	2	1	2	1	2	3	2
CO2	1	1	1	2	1	2	2	2	1	1
CO3	1	2	1	1	3	2	1	1	3	2
CO4	1	2	2	1	1	3	2	1	2	3
CO5	2	1	2	2	1	2	2	1	2	2

3- Advanced Application   2 – Intermediate Development   1 –Introductory Level

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	1	1
CO 2	2	2	3	2	2
CO 3	3	3	2	2	2
CO 4	2	3	3	3	3
CO 5	3	3	3	3	2
WEITAGE	13	14	14	11	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	86	93	93	73	67

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	1. Potentiometer–calibration of low range ammeter 2. Potentiometer–calibration of low range voltmeter 3. Series resonance circuit– resonance frequency, factor	12	Practical
II	4. Potentiometer– calibration no flow range ammeter 5. Potentiometer–calibration of low range voltmeter 6. Series resonance circuit– resonance frequency, factor	12	Practical
III	7. Determination of the photo voltaic cell characteristics 8. Carey Foster Bridge - determination of specific resistance 9. Study of capacitor filters and ∏filters	12	Practical
IV	10. Low pass and High pass filters 11. Differentiating and Integrating circuits 12. Uses of CRO– Measurements of voltage, current, frequency,	12	Practical
V	13. Phase and delay times etc., 14.Temperature coefficient of at thermistor	12	Practical

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)							
Internal	**Cos**	**K Level**	**Aim and Apparatus**	**Circuit diagram**	**Circuit construction**	**Readings &Calculation**	**Result**
CI AI	CO1	K1	5				
	CO2	K2		5			
	CO3	K3			5		
	CO4	K3				5	
	CO5	K4					5
Question Pattern CIA		No. of Questions to be asked	2	2	2	2	2
		No. of Questions to be answered	2	2	2	2	2
		Marks for each question	2.5	2.5	2.5	2.5	2.5
		Total Marks for each section	5	5	5	5	5

.Distribution of Marks with K Level CIA									
	K Level	**Aim and Apparatus**	**Circuit diagram**	**Circuit construction**	**Readings &Calculation**	**Result**	**Total Marks**	**% of (Marks without choice)**	**Consolidated %**
CIA	K1	5					5	20	20
	K2		5				5	20	20
	K3			5	5		10	40	40
	K4					5	5	20	20
	Marks						25	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO will be allotted for individual Assignment which carries five marks as part of CIA component.

					Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)	
Internal	**Cos**	**K Level**	**Aim & Apparatus**	**Circuit diagram**	**Circuit construction**	**Readings &Calculation**	**Result**
CI AI	CO1	K1	15				
	CO2	K2		15			
	CO3	K3			15		
	CO4	K3				15	
	CO5	K4					15
Question Pattern		No. of Questions to be asked	2	2	2	2	2
		No. of Questions to be answered	2	2	2	2	2
		Marks for each question	7.5	7.5	7.5	7.5	7.5
		Total Marks for each section	15	15	15	15	15

Distribution of Marks with K Level								
K Level	**Aim & Apparatus**	**Circuit diagram**	**Circuit construction**	**Readings &Calculation**	**Result**	**Total Marks**	**% of (Marks without choice)**	**Consolidated %**
K1	15					15	20	20
K2		15				15	20	20
K3			15	15		30	40	40
K4					15	15	20	20
Marks						75	100	100

SECOND SEMESTER

Course Name	ELECTRONIC CIRCUITS			
Course Code	23UELCC21	**L**	**P**	**C**
Category	CORE	4	-	4

COURSE OBJECTIVES:

➢ To gain knowledge on rectifiers and regulators.
➢ To acquaint the students with construction, theory and characteristics of the electronic amplifier circuits.
➢ To learn the working principles of feedback amplifier.
➢ To understand and the working principles of harmonic oscillator
➢ To enable the students understand and in the knowledge on power amplifier

UNIT - I	POWERSUPPLIES	12

Rectifiers – Half wave and full wave rectifiers – Average and RMS values – Ripple factor – Regulation – Rectification efficiency – Transformer utility factor – filters – inductor, capacitor,L-type, PI type – Ripple factor and regulation – Need for voltage regulation – series and shuntregulators– Comparison–Current limited and protectioncircuits.

UNIT - II	SMALLSIGNALAMPLIFIERS	12

Generalprincipleofoperation–classification–RCCoupledamplifiers–Gainfrequencyresponse – Input, output impedance calculation. Transformer coupled amplifier – Equivalentcircuitat low, medium and high frequencies– Analysis andfrequencyresponse.

UNIT - III	FEEDBACKAMPLIFIERS	12

Basicconceptsoffeedbackamplifiers–characteristics–Effectofnegativefeedbackongain,gainstability, distortion andbandwidth– voltageand current feedbackcircuits.

UNIT - IV	HARMONICOSCILLATORS	12

BarkhausenCriteria–Hartley,ClappandColpitt'soscillator–
RCphaseshiftoscillator,Weinbridgeoscillator– Frequencystabilityof oscillators– Crystal oscillators.

UNIT - V	POWERAMPLIFIERS	12

Classification – Class A, Class B, Class C single ended and push pull operation – complementary symmetry power amplifiers.

	Total Lecture Hours	**60**

BOOKS FOR STUDY:

- ➤ S.Salivahanan, N. SureskumarandA.Vallavaraj,"ElectronicDevicesandCircuits",TMH, 1998.
- ➤ MillmanandHalkias,"EleectronicdeviceandCircuits",McGrawHill,Vreprint,1993.

BOOKS FOR REFERENCES:

- ➤ V. K. Mehta, Principles of Electronics, S.Chand publications, Delhi, eleventh edition2000.
- ➤ R.S.Sedha,**AppliedElectronics**,S.Chand&CompanyLtd,NewDelhi,firstEdition,1990

WEB RESOURCES:

- ❖ **http://www.ee.iitm.ac.in/~ani/2012/ec5135/lectures.htmlLectureNotes**
- ❖ **https://nptel.ac.in/courses/108/102/108102097/#IntroductiontoElectroniccircuitsNPTEL.**
- ❖ **https://nptel.ac.in/courses/108/102/108102095/AnalogElectroniccircuitsNPTEL.**

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED		ENTREPRENEURSHIP			
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL		✓	GLOBAL	
Changes Made in the Course	Percentage of Change		**40**	No Changes Made			New Course		

<p style="text-align:center">*Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.</p>

COURSE OUTCOMES:		K LEVEL
After studying this course, the students will be able to:		
CO1	Understand theconceptsofrectifiersandregulators	**K1 to K4**
CO2	Summarizeaboutsmallsignalamplifiers	**K1 to K4**
CO3	Distinguishtheperformanceofnegativeaswellaspositivefeedbackcircuits	**K1 to K4**
CO4	Analysethefunctionsofharmonic oscillator	**K1 to K4**
CO5	Analysethefunctionsofpoweramplifiers	**K1 to K4**

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	1	2	1	2	2	2	3	2
CO2	1	1	1	1	1	2	2	2	1	1
CO3	1	2	1	1	3	2	1	1	2	2
CO4	1	2	2	1	1	3	2	1	2	3
CO5	2	1	2	2	1	2	2	1	2	2
3- STRONG				**2 – MEDIUM**				**1 - LOW**		

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	1	3
CO 2	3	2	3	1	1
CO 3	3	3	2	2	2
CO 4	3	2	3	3	3
CO 5	3	3	3	3	2
WEITAGE	15	13	14	10	11
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	86	93	66	73

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	**POWERSUPPLIES** Rectifiers – Half wave and full wave rectifiers – Average and RMS values – Ripple factor –Regulation – Rectification efficiency – Transformer utility factor – filters – inductor, capacitor,L-type, PI type – Ripple factor and regulation – Need for voltage regulation – series and shuntregulators– Comparison–Current limited and protectioncircuits.	12	**Chalk & Talk, Power Point Presentation**
II	**SMALLSIGNALAMPLIFIERS** Generalprincipleofoperation–classification– RCCoupledamplifiers–Gainfrequencyresponse – Input, output impedance calculation. Transformer coupled amplifier – Equivalentcircuitat low, medium and high frequencies– Analysis andfrequencyresponse.	12	**Chalk & Talk, Power Point Presentation**
III	**FEEDBACKAMPLIFIERS**	12	**Chalk & Talk, Power Point Presentation**

	Basicconceptsoffeedbackamplifiers–characteristics–Effectofnegativefeedbackongain,gainstability, distortion andbandwidth– voltageand current feedbackcircuits.		
IV	**HARMONICOSCILLATORS** BarkhausenCriteria–Hartley,ClappandColpitt‶soscillator–RCphaseshiftoscillator,Weinbridgeoscillator–Frequencystabilityof oscillators– crystal oscillators.	**12**	**Chalk & Talk, Power Point Presentation**
V	**POWERAMPLIFIERS** Classification – Class A, Class B, Class C single ended and push pull operation – complementarysymmetrypoweramplifiers. .	**12**	**Chalk & Talk, Power Point Presentation**

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)						
Internal	**Cos**	**K Level**	**Section A**		**Section B Either or Choice**	**Section C Either or Choice**
			MCQs			
			No. of. Questions	**K - Level**		
CI AI	**CO1**	**K1 – K4**	2	K1&K2	2 (K3&K3)	2 (K3&K3)
	CO2	**K1 – K4**	2	K1&K2	2 (K3&K3)	2 (K3&K3)
CI AII	**CO3**	**K1 – K4**	2	K1&K2	2 (K3&K3)	2 (K3&K3)
	CO4	**K1 – K4**	2	K1&K2	2 (K4&K4)	2 (K4&K4)
Question Pattern CIA I & II		**No. of Questions to be asked**	4		4	4
		No. of Questions to be answered	1		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
Distribution of Marks with K Level CIA I & CIA II							
CIA I	K1	2	-	-	2	3.6	7
	K2	2	-	-	2	3.6	
	K3	-	20	32	52	93	93
	K4	-	-	-	-	-	-
	Marks	**4**	**20**	**32**	**56**	**100**	**100**
CIA II	K1	2	-	-	2	3.6	7.2
	K2	2	-	-	2	3.6	
	K3	-	10	16	26	46.4	46.4
	K4	-	10	16	26	46.4	46.4
	Marks	**4**	**20**	**32**	**56**	**100**	**100**

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K - LEVEL
			No. of Questions	K – Level		
1	CO1	K1 – K4	2	K1&K2	2 (K3&K3)	2 (K3&K3)
2	CO2	K1 – K4	2	K1&K2	2 (K3&K3)	2 (K3&K3)
3	CO3	K1 – K4	2	K1&K2	2 (K3&K3)	2 (K3&K3)
4	CO4	K1 – K4	2	K1&K2	2 (K4&K4)	2 (K4&K4)
5	CO5	K1 – K4	2	K1&K2	2 (K3&K3)	2 (K3&K3)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

	Distribution of Marks with K Level					
K Level	**Section A (Multiple Choice Questions)**	**Section B (Either or Choice**	**Section C (Either/ or Choice)**	**Total Marks**	**% of (Marks without choice)**	**Consolidated %**
K1	5	-	-	5	**3.6**	**7**
K2	5	-	-	5	**3.6**	
K3	-	40	64	104	**74.3**	**74**
K4	-	10	16	26	**18.5**	**19**
Marks	**10**	**50**	**80**	**140**	**100**	**100**

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer **ALL** the questions			**PART – A**		**(10 x 1 = 10 Marks)**
1.	Unit - I	CO 1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO 1	K2		
				a)	b)
				c)	d)
3.	Unit - II	CO 2	K1		
				a)	b)
				c)	d)
4.	Unit - II	CO 2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO 3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO 3	K2		
				a)	b)
				c)	d)
7.	Unit - IV	CO 4	K1		
				a)	b)
				c)	d)
8.	Unit - IV	CO 4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO 5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO 5	K2		
				a)	b)
				c)	d)

Answer **ALL** the questions			PART – B	(5 x 5 = 25 Marks)	
11. a)	**Unit - I**	**CO 1**	**K3**		
			OR		
11. b)	**Unit - I**	**CO 1**	**K3**		
12. a)	**Unit - II**	**CO 2**	**K3**		
			OR		
12. b)	**Unit - II**	**CO 2**	**K3**		
13. a)	**Unit - III**	**CO 3**	**K3**		
			OR		
13. b)	**Unit - III**	**CO 3**	**K3**		
14. a)	**Unit - IV**	**CO 4**	**K4**		
			OR		
14. b)	**Unit - IV**	**CO 4**	**K4**		
15. a)	**Unit - V**	**CO 5**	**K3**		
			OR		
15. b)	**Unit - V**	**CO 5**	**K3**		

Answer **ALL** the questions			PART – C	(5 x 8 = 40 Marks)	
16. a)	**Unit - I**	**CO 1**	**K3**		
			OR		
16. b)	**Unit - I**	**CO 1**	**K3**		
17. a)	**Unit - II**	**CO 2**	**K3**		
			OR		
17. b)	**Unit - II**	**CO 2**	**K3**		
18. a)	**Unit - III**	**CO 3**	**K3**		
			OR		
18. b)	**Unit - III**	**CO 3**	**K3**		
19. a)	**Unit - IV**	**CO 4**	**K4**		
			OR		
19. b)	**Unit - IV**	**CO 4**	**K4**		
20. a)	**Unit - V**	**CO 5**	**K3**		
			OR		
20. b)	**Unit - V**	**CO 5**	**K3**		

Course Name	ELECTRONIC DEVICES AND CIRCUITS LAB			
Course Code	23UELCP21	**L**	**P**	**C**
Category	CORE	-	2	2

COURSE OBJECTIVES:

➢ TounderstandtheV-I characteristics of electronicdevices.

➢ Tomakeamplifier and oscillator circuit by use ofelectronic components.

➢ Toconstructfewapplication circuitsusingsemiconductordevices.

➢ Tostudythecharacteristics of Operational Amplifier and its uses.

➢ Tolearnthesimulation of AC and DC Circuits.

Any12Experiments

1. Characteristicsofjunctiondiode.
2. CharacteristicsofZener diode.
3. RCCoupledamplifier
4. Feedbackamplifier
5. Hartleyoscillator
6. Colpitt oscillator
7. CharacteristicofUJT
8. CharacteristicsofSCRandSCRPowercontrol
9. JFETCharacteristics
10. Op-ampcharacteristics
11. Op-ampamplifiers
12. Differentialamplifier,Bridgeamplifiers, Instrumentationamplifier
13. Waveformgenerators
14. Op-ampfilters
15. VoltageControlledOscillator
16. StudyofcircuitanalysisPSPICE
17. SimulationofDCcircuits
18. SimulationofACcircuits
19. Halfandfullwaverectifiers
20. Dual power supply

BOOKS FOR STUDY:

➤ Microelectronics Laboratory using software tools PSPICE,

➤ ORCAD,MULTISIMbyMuhammadH.Rashid-CENGAGELearning-2016

BOOKS FOR REFERENCES:

➤ **Practical Physics and Electronics,** C.C.Ouseph, U.J.Rao and V.Vijayendran

WEB RESOURCES:

❖ **https://nptel.ac.in/courses/122/106/122106025/**

❖ **https://nptel.ac.in/courses/122/106/122106026/**

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED		ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL	✓	GLOBAL	
Changes Made in the Course	Percentage of Change		**50 %**	No Changes Made		New Course		

*Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.

COURSE OUTCOMES:	K LEVEL
After studying this course, the students will be able to:	

CO1	Understand the V-I characteristics of Electronic components.	**K1 to K4**
CO2	Construct the amplifier and oscillator circuits	**K1 to K4**
CO3	Construct the rectifier and operational amplifier circuits	**K1 to K4**
CO4	Use diodes, transistors, optical devices for various applications	**K1 to K4**
CO5	Understand the Simulation concepts of AC and DC circuits.	**K1 to K4**

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	1	2	1	3	2	2	3	2
CO2	2	1	2	1	1	2	2	3	1	1
CO3	1	2	1	2	3	2	1	1	2	2
CO4	1	2	2	1	1	3	2	1	3	3
CO5	2	1	2	2	1	2	2	1	2	2

3- Advanced Application   2 – Intermediate Development   1 – Introductory Level

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	1	3
CO 2	3	2	3	1	1
CO 3	3	3	2	2	2
CO 4	3	2	3	3	3
CO 5	3	3	3	3	2
WEITAGE	15	13	14	10	11
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	86	93	66	73

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	Characteristics of junction diode. Characteristics of Zener diode. Common Emitter transistor characteristics Transistor amplifier	12	Practical
II	Characteristics of JFET Characteristics of UJT Characteristics of SCR	12	Practical
III	Half wave and Full wave rectifier circuits Bridge rectifier circuit IC regulated power supply	12	Practical
IV	Inverting and Non- inverting amplifier Summing and differential amplifier Wave form generator using op-amp IC	12	Practical
V	Hartley oscillator Colpitt oscillator Dual power supply	12	Practical

Internal	Cos	K Level	Aim and Apparatus	Circuit diagram	Circuit construction	Readings &Calculation	Result
			Learning Outcome Based Education & Assessment (LOBE) **Formative Examination - Blue Print** **Articulation Mapping – K Levels with Course Outcomes (COs)**				
CIAI	CO1	K1	5				
	CO2	K2		5			
	CO3	K3			5		
	CO4	K3				5	
	CO5	K4					5
Question Pattern CIA		No. of Questions to be asked	2	2	2	2	2
		No. of Questions to be answered	2	2	2	2	2
		Marks for each question	2.5	2.5	2.5	2.5	2.5
		Total Marks for each section	5	5	5	5	5

	K Level	Aim and Apparatus	Circuit diagram	Circuit construction	Readings &Calculation	Result	Total Marks	% of (Marks without choice)	Consolidated %
			Distribution of Marks with K Level CIA						
CIA	K1	5					5	20	20
	K2		5				5	20	20
	K3			5	5		10	40	40
	K4					5	5	20	20
	Marks						25	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)							
Internal	**Cos**	**K Level**	**Aim & Apparatus**	**Circuit diagram**	**Circuit construction**	**Readings &Calculation**	**Result**
CI AI	CO1	K1	15				
	CO2	K2		15			
	CO3	K3			15		
	CO4	K3				15	
	CO5	K4					15
Question Pattern		No. of Questions to be asked	2	2	2	2	2
		No. of Questions to be answered	2	2	2	2	2
		Marks for each question	7.5	7.5	7.5	7.5	7.5
		Total Marks for each section	15	15	15	15	15

Distribution of Marks with K Level								
K Level	**Aim & Apparatus**	**Circuit diagram**	**Circuit construction**	**Readings &Calculation**	**Result**	**Total Marks**	**% of (Marks without choice)**	**Consolidated %**
K1	15					15	20	20
K2		15				15	20	20
K3			15	15		30	40	40
K4					15	15	20	20
Marks						75	100	100

Course Name	BASIC MATHEMATICS			
Course Code	23UMTEA24	**L**	**P**	**C**
Category	CORE	4	-	4

COURSE OBJECTIVES:

➢ To enable the students can understand the concepts of Divergence of a Vector Function , Important Vector Identities and related theorem

➢ This course introduces the abstract concepts of matrices.

➢ To study the basic concepts of complex number .

➢ Introduce the basic knowledge of differential equation and related problems.

➢ To enable the students to study fourior transforms and some concepts of properties fourier transform and properties of laplace transform.

UNIT - I VECTORS	12

Gradient of a Scalar Field- Divergence of a Vector Function- Curl of a Vector Function and its Physical Significance- Important Vector Identities- Gauss Divergence Theorem(Statement and simple Problem only)- Deductions from Gauss Divergence Theorem(Statement and simple Problem only)- Stoke's Theorem(Statement and simple Problem only)- Deductions from Stoke's Theorem(Statement and simple Problem only)- Green"s Theorem(Statement and simple Problem only)- Green"s Theorem in a plane(Statement and simple Problem only).

UNIT - II MATRICES	12

Rank of a Matrix- Vector as Matrices and Vector-spaces- Solutions of Linear Equations- Linear Transformations-Similarity Transformation- Eigen Values, Eigen-Vector; Characteristic Equation of a Matrix.

UNIT - III COMPLEX NUMBERS	12

Complex Numbers- Review of Algebraic Operations of Complex Numbers- Complex Conjugates- Modulus and Argument of a Complex Numbers- Graphical Representation on Argand Diagram and Trigonometric Form- Some Definitions Underlying Complex Analysis- Functions of Complex Variable- Limit, Continuity and Differentiability- Definition: Analytic Function- The Necessary and Sufficient Conditions for $f(z)$ to be Analytic: Cauchy-Riemann Differential Equations.

UNIT - IV DIFFERENTIAL EQUATIONS	12

Order and Degree of a Differential Equation- Solution of First Order Differential Equation by the Method of Separation of Variables- Linear Differential Equation of First Order and its Solution.

UNIT - V FOURIER TRANSFORMAND LAPLACE TRANSFORM	12

Properties of Fourier Transform-Fourier Transform of a Derivative-Fourier and cosine Transform of Derivatives (simple problem) - Laplace Transform- Properties of Laplace Transforms- Laplace Transform of Derivatives of a Function (simple problem).

	Total Lecture Hours	**60**

BOOKS FOR STUDY:

➢ Mathematical Physics – H.K.Dass, Dr. Rama verma -S.Chand& Company Pvt.Ltd.(Sixth Revised Edition, 2013)

Unit 1

Chapter 2- sections 2.1-2.11

Chapter 3-sections 3.1-3.9

Unit 2

Chapter 39 – sections 39.1 - 39.3

Chapter 40-sections 40.2,40.3

Chapter 41- Sectons 41.1 - 41.3

Unit 3

Chapter 20 – Sections 20.1 - 20.15

Chapter 22 – Sections 22.1 - 22.12

Unit 4

Chapter 13 – Sections 13.1 - 13.3

Chapter 12 – Sections 12.1 - 12.7

Chapter 14 – Sections 14.3

Unit 5

Chapter 45 – Sections   45.1 - 45.8,45.13,45.17,45.18

➢ Chapter 46 – Sections   46.1 - 46.4,46.8 - 46.19

BOOKS FOR REFERENCES:

➢ Mathematical Physics with Classical Mechanics – SathyaPrakash (Sultan Chand & Sons Sixth Revised edition 2012).
➢ Mathematical Physics – H.K.Dass, Dr. Rama verma -S.Chand& Company Pvt.Ltd.(Sixth Revised Edition, 2013)
➢ Mathematical Physics- B.D. Gupta,4th edition Vikas Publishing company Ltd.2013
➢ Mathematical Physics -S.L. Kakani, C. Hemarajani. 2nd Edition CBS Publishers &Distributors Pvt., LTD., 2010

WEB RESOURCES:

❖ **https://nptel.ac.in/courses/122104018**
❖ **https://archive.nptel.ac.in/courses/111/108/111108081/**
❖ **https://onlinecourses.nptel.ac.in/noc22_ma41/preview**

Nature of Course	EMPLOYABILITY		SKILL ORIENTED	✓	ENTREPRENEURSHIP	
Curriculum Relevance	LOCAL	REGIONAL	NATIONAL	✓	GLOBAL	
Changes Made in the Course	Percentage of Change	**25 %**	No Changes Made		New Course	

*Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.

COURSE OUTCOMES:		K LEVEL
After studying this course, the students will be able to:		
CO1	Compute divergence and curl of vectors	**K1 to K4**
CO2	Define basic concepts of matrices and solve linear equations.	**K1 to K4**
CO3	Understand the concepts Complex Numbers Some Definitions Underlying Complex Analysis, Limit, Continuity and Differentiability.	**K1 to K4**
CO4	Solve basic application problems described by first order linear differential equation with constant coefficients.	**K1 to K4**
CO5	Calculate the finite Fourier transform ,Fourier cosine of elementary functions from the definition	**K1 to K4**

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	1	2	1	2	2	2	3	2
CO2	1	1	1	1	1	2	2	2	1	1
CO3	1	2	1	1	3	2	1	1	2	2
CO4	1	2	2	1	1	3	2	1	2	3
CO5	2	1	2	2	1	2	2	1	2	2

S- STRONG	**M – MEDIUM**	**L - LOW**

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	2	2	3	3	3
CO 2	2	2	3	2	3
CO 3	2	3	2	2	3
CO 4	2	2	2	3	2
CO 5	3	3	2	2	3
WEIGHTAGE	**11**	**12**	**12**	**12**	**14**
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	0.022	0.024	0.024	0.024	0.028

LESSON PLAN:			
UNIT		**HRS**	**PEDAGOGY**
I	Gradient of a Scalar Field- Divergence of a Vector Function- Curl of a Vector Function and its Physical Significance- Important Vector Identities- Gauss Divergence Theorem(Statement and simple Problem only)- Deductions from Gauss Divergence Theorem(Statement and simple Problem only)- Stoke's Theorem(Statement and simple Problem only)- Deductions from Stoke's Theorem(Statement and simple Problem only)- Green"s Theorem(Statement and simple Problem only)- Green"s Theorem in a plane(Statement and simple Problem only).	**12**	**Chalk & Talk, Power Point Presentation**
II	Rank of a Matrix- Vector as Matrices and Vector-spaces- Solutions of Linear Equations- Linear Transformations-Similarity Transformation- Eigen Values, Eigen-Vector; Characteristic Equation of a Matrix.	**12**	**Chalk & Talk, Power Point Presentation**
III	Complex Numbers- Review of Algebraic Operations of Complex Numbers- Complex Conjugates- Modulus and Argument of a Complex Numbers- Graphical Representation on Argand Diagram and Trigonometric Form- Some Definitions Underlying Complex Analysis- Functions of Complex Variable- Limit, Continuity and Differentiability- Definition: Analytic Function- The Necessary and Sufficient Conditions for f(z) to be Analytic: Cauchy-Riemann Differential Equations.	**12**	**Chalk & Talk, Power Point Presentation**
IV	Order and Degree of a Differential Equation- Solution of First Order Differential Equation by the Method of Separation of Variables- Linear Differential Equation of First Order and its Solution.	**12**	**Chalk & Talk, Power Point Presentation**
V	Properties of Fourier Transform-Fourier Transform of a Derivative-Fourier and cosine Transform of Derivatives (simple problem) - Laplace Transform- Properties of Laplace Transforms- Laplace Transform of Derivatives of a Function (simple problem).	**12**	**Chalk & Talk, Power Point Presentation**

<table>
<tr><td colspan="9" align="center">**Learning Outcome Based Education & Assessment (LOBE)**
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)</td></tr>
<tr><td rowspan="3">**Internal**</td><td rowspan="3">**Cos**</td><td rowspan="3">**K Level**</td><td colspan="2" align="center">**Section A**</td><td rowspan="2" colspan="1" align="center">**Section B**
Either or
Choice</td><td rowspan="3" align="center">**Section C**
Either or Choice</td></tr>
<tr><td colspan="2" align="center">**MCQs**</td></tr>
<tr><td align="center">**No. of.**
Questions</td><td align="center">**K –**
Level</td><td></td></tr>
<tr><td>**CI**</td><td>**CO1**</td><td>**K1 – K4**</td><td align="center">2</td><td align="center">K1&K2</td><td align="center">2 (K3&K3)</td><td align="center">2 (K3&K3)</td></tr>
<tr><td>**AI**</td><td>**CO2**</td><td>**K1 – K4**</td><td align="center">2</td><td align="center">K1&K2</td><td align="center">2 (K3&K3)</td><td align="center">2 (K3&K3)</td></tr>
<tr><td>**CI**</td><td>**CO3**</td><td>**K1 – K4**</td><td align="center">2</td><td align="center">K1&K2</td><td align="center">2 (K3&K3)</td><td align="center">2 (K3&K3)</td></tr>
<tr><td>**AII**</td><td>**CO4**</td><td>**K1 – K4**</td><td align="center">2</td><td align="center">K1&K2</td><td align="center">2 (K4&K4)</td><td align="center">2 (K4&K4)</td></tr>
<tr><td rowspan="4" colspan="2">**Question**
Pattern
CIA I & II</td><td>**No. of Questions to**
be asked</td><td align="center">4</td><td></td><td align="center">4</td><td align="center">4</td></tr>
<tr><td>**No. of Questions to**
be answered</td><td align="center">1</td><td></td><td align="center">2</td><td align="center">2</td></tr>
<tr><td>**Marks for each**
question</td><td align="center">1</td><td></td><td align="center">5</td><td align="center">8</td></tr>
<tr><td>**Total Marks for**
each section</td><td align="center">4</td><td></td><td align="center">10</td><td align="center">16</td></tr>
</table>

<table>
<tr><td colspan="8" align="center">**Distribution of Marks with K Level CIA I & CIA II**</td></tr>
<tr><td></td><td align="center">**K**
Level</td><td align="center">**Section A**
(Multiple
Choice
Questions)</td><td align="center">**Section B**
(Either /
Or Choice)</td><td align="center">**Section C**
(Either /
Or Choice)</td><td align="center">**Total**
Marks</td><td align="center">**% of (Marks**
without choice)</td><td align="center">**Consolidate of %**</td></tr>
<tr><td rowspan="5">**CIA**
I</td><td>**K1**</td><td align="center">2</td><td align="center">-</td><td align="center">-</td><td align="center">2</td><td align="center">3.6</td><td rowspan="2" align="center">7</td></tr>
<tr><td>**K2**</td><td align="center">2</td><td align="center">-</td><td align="center">-</td><td align="center">2</td><td align="center">3.6</td></tr>
<tr><td>**K3**</td><td align="center">-</td><td align="center">20</td><td align="center">32</td><td align="center">52</td><td align="center">93</td><td align="center">93</td></tr>
<tr><td>**K4**</td><td align="center">-</td><td align="center">-</td><td align="center">-</td><td align="center">-</td><td align="center">-</td><td align="center">-</td></tr>
<tr><td>**Marks**</td><td align="center">4</td><td align="center">20</td><td align="center">32</td><td align="center">56</td><td align="center">100</td><td align="center">100</td></tr>
<tr><td rowspan="5">**CIA**
II</td><td>**K1**</td><td align="center">2</td><td align="center">-</td><td align="center">-</td><td align="center">2</td><td align="center">3.6</td><td rowspan="2" align="center">7.2</td></tr>
<tr><td>**K2**</td><td align="center">2</td><td align="center">-</td><td align="center">-</td><td align="center">2</td><td align="center">3.6</td></tr>
<tr><td>**K3**</td><td align="center">-</td><td align="center">10</td><td align="center">16</td><td align="center">26</td><td align="center">46.4</td><td align="center">46.4</td></tr>
<tr><td>**K4**</td><td align="center">-</td><td align="center">10</td><td align="center">16</td><td align="center">26</td><td align="center">46.4</td><td align="center">46.4</td></tr>
<tr><td>**Marks**</td><td align="center">4</td><td align="center">20</td><td align="center">32</td><td align="center">56</td><td align="center">100</td><td align="center">100</td></tr>
</table>

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K - LEVEL
			No. of Questions	K – Level		
1	CO1	K1 – K4	2	K1&K2	2 (K3&K3)	2 (K3&K3)
2	CO2	K1 – K4	2	K1&K2	2 (K3&K3)	2 (K3&K3)
3	CO3	K1 – K4	2	K1&K2	2 (K3&K3)	2 (K3&K3)
4	CO4	K1 – K4	2	K1&K2	2 (K4&K4)	2 (K4&K4)
5	CO5	K1 – K4	2	K1&K2	2 (K3&K3)	2 (K3&K3)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5	-	-	5	3.6	7
K2	5	-	-	5	3.6	
K3	-	40	64	104	74.3	74
K4	-	10	16	26	18.5	19
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions				**PART – A**	**(10 x 1 = 10 Marks)**
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K2		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K1		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K2		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K1		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K2		
				a)	b)
				c)	d)

				Answer ALL the questions PART – B (5 x 5 = 25 Marks)
11. a)	**Unit - I**	**CO1**	**K3**	
				OR
11. b)	**Unit - I**	**CO1**	**K3**	
12. a)	**Unit - II**	**CO2**	**K3**	
				OR
12. b)	**Unit - II**	**CO2**	**K3**	
13. a)	**Unit - III**	**CO3**	**K3**	
				OR
13. b)	**Unit - III**	**CO3**	**K3**	
14. a)	**Unit - IV**	**CO4**	**K4**	
				OR
14. b)	**Unit - IV**	**CO4**	**K4**	
15. a)	**Unit - V**	**CO5**	**K3**	
				OR
15. b)	**Unit - V**	**CO5**	**K3**	

				Answer ALL the questions PART – C (5 x 8 = 40 Marks)
16. a)	**Unit - I**	**CO1**	**K3**	
				OR
16. b)	**Unit - I**	**CO1**	**K3**	
17. a)	**Unit - II**	**CO2**	**K3**	
				OR
17. b)	**Unit - II**	**CO2**	**K3**	
18. a)	**Unit - III**	**CO3**	**K3**	
				OR
18. b)	**Unit - III**	**CO3**	**K3**	
19. a)	**Unit - IV**	**CO4**	**K4**	
				OR
19. b)	**Unit - IV**	**CO4**	**K4**	
20. a)	**Unit - V**	**CO5**	**K3**	
				OR
20. b)	**Unit - V**	**CO5**	**K3**	

Course Name	APPLIED PHYSICS LAB			
Course Code	23UELEP21	L	P	C
Category	ALLIED	-	2	2

COURSE OBJECTIVES:

➢ To study the calibration of voltmeter and ammeter using potentiometer.
➢ To determine the resonance frequency and Q factor in an electrical circuit.
➢ To understand the V-I characteristic of photovoltaic cell.
➢ To construct and study the filters.
➢ To learn how to determine the capacitance and inductance using LCR circuit.

Any12Experiments

1. Potentiometer–calibrationoflowrange ammeter

2. Potentiometer–calibration oflow rangevoltmeter

3. Seriesresonancecircuit–resonancefrequency,Qfactor
4. Potentiometer–calibrationoflowrange ammeter

5. Potentiometer–calibration oflow rangevoltmeter

6. Seriesresonancecircuit–resonancefrequency,Qfactor
   Determinationofthephotovoltaiccellcharacteristics

7. CareyFoster Bridge-determinationofspecificresistance

8. Studyof capacitorfilters and ∏filters

9. LowpassandHighpassfilters

10. DifferentiatingandIntegratingcircuits

11. Usesof CRO– Measurements ofvoltage, current, frequency,phaseanddelaytimes etc.,
12. Temperaturecoefficientofathermistor

BOOKS FOR STUDY:

➢ A Text of Practical Physics, M.N. Srinivasan, S. Balasubramanian and R. Ranganathan, Sulthan Chand & Sons

BOOKS FOR REFERENCES:

➢ **Practical Physics and Electronics,** C.C.Ouseph, U.J.Rao and V.Vijayendran

WEB RESOURCES:

❖ **https://srmvdpcsea2016.files.wordpress.com/2016/09/experiment-61.pdf**

❖ **https://www.scribd.com/document/70070448/Specific-Resistance-by-CareyFoster-s-Bridge**

❖ **https://psbrahmachary.files.wordpress.com/2009/05/thermistor.pdf**

Nature of Course	EMPLOYABILITY		SKILL ORIENTED	✓	ENTREPRENEURSHIP	
Curriculum Relevance	LOCAL	REGIONAL		NATIONAL	✓	GLOBAL	
Changes Made in the Course	Percentage of Change	100 %	No Changes Made		New Course	✓

*Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.*

COURSE OUTCOMES:		K LEVEL
After studying this course, the students will be able to:		
CO1	Understand the principles of calibration of voltmeter ammeter using potentiometer.	**K1 to K4**
CO2	Understand to measure the resonance frequency and Q factor in an electrical circuit.	**K1 to K4**
CO3	Understand the V-I characteristic of photovoltaic cell.	**K1 to K4**
CO4	Understand to construct the filters and integrating circuit.	**K1 to K4**
CO5	Able to measure the capacitance and inductance using LCR circuit	**K1 to K4**

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	2	2	1	2	1	2	3	2
CO2	1	1	1	2	1	2	2	2	1	1
CO3	1	2	1	1	3	2	1	1	3	2
CO4	1	2	2	1	1	3	2	1	2	3
CO5	2	1	2	2	1	2	2	1	2	2

3- Advanced Application   2 – Intermediate Development   1 –Introductory Level

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	1	1
CO 2	2	2	3	2	2
CO 3	3	3	2	2	2
CO 4	2	3	3	3	3
CO 5	3	3	3	3	2
WEITAGE	13	14	14	11	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	86	93	93	73	67

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	14. Potentiometer–calibration of low range ammeter 15. Potentiometer–calibration of low range voltmeter 16. Series resonance circuit– resonance frequency, factor	12	Practical
II	17. Potentiometer– calibration no flow range ammeter 18. Potentiometer–calibration of low range voltmeter 19. Series resonance circuit– resonance frequency, factor	12	Practical
III	20. Determination of the photo voltaic cell characteristics 21. Carey Foster Bridge - determination of specific resistance 22. Study of capacitor filters and ∏filters	12	Practical
IV	23. Low pass and High pass filters 24. Differentiating and Integrating circuits 25. Uses of CRO– Measurements of voltage, current, frequency,	12	Practical
V	26. Phase and delay times etc., 14.Temperature coefficient of at thermistor	12	Practical

Internal	Cos	K Level	Aim and Apparatus	Circuit diagram	Circuit construction	Readings &Calculation	Result
CI AI	CO1	K1	5				
	CO2	K2		5			
	CO3	K3			5		
	CO4	K3				5	
	CO5	K4					5
Question Pattern CIA		No. of Questions to be asked	2	2	2	2	2
		No. of Questions to be answered	2	2	2	2	2
		Marks for each question	2.5	2.5	2.5	2.5	2.5
		Total Marks for each section	5	5	5	5	5

.Distribution of Marks with K Level CIA									
	K Level	Aim and Apparatus	Circuit diagram	Circuit construction	Readings &Calculation	Result	Total Marks	% of (Marks without choice)	Consolidated %
CIA	K1	5					5	20	20
	K2		5				5	20	20
	K3			5	5		10	40	40
	K4					5	5	20	20
	Marks						25	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)							
Internal	Cos	K Level	Aim & Apparatus	Circuit diagram	Circuit construction	Readings &Calculation	Result
CI AI	CO1	K1	15				
	CO2	K2		15			
	CO3	K3			15		
	CO4	K3				15	
	CO5	K4					15
Question Pattern		No. of Questions to be asked	2	2	2	2	2
		No. of Questions to be answered	2	2	2	2	2
		Marks for each question	7.5	7.5	7.5	7.5	7.5
		Total Marks for each section	15	15	15	15	15

Distribution of Marks with K Level								
K Level	Aim & Apparatus	Circuit diagram	Circuit construction	Readings &Calculation	Result	Total Marks	% of (Marks without choice)	Consolidated %
K1	15					15	20	20
K2		15				15	20	20
K3			15	15		30	40	40
K4					15	15	20	20
Marks						75	100	100

Course Name	SATELLITE COMMUNICATION			
Course Code	23UELSC21	**L**	**P**	**C**
Category	SKILL	2	-	2

COURSE OBJECTIVES:

➢ To gain knowledge about the history of satellites and Ionosphere.
➢ To gain knowledge on Transponders and Antennas.
➢ To understand the satellite constructions.
➢ To know the concept of multiplexing, time and frequency multiplexing in Earth stations.
➢ To know the concept of FDMA and TDMA.

UNIT - I	INTRODUCTION	06

Historical progress, Orbits of Satellites, Types – low, medium, geostationary – maincharacteristics – angle, shape and period – Ionosphere

UNIT - II	SATELLITE LINKS	06

General characteristics, delay, transponders, earth station, antenna and earth Coverage, altitudecontrol.

UNIT - III	SATELLITE CONSTRUCTIONS	06

Subsystems and functions, antennas, transponders, power supplies Command & telemetry, thrustand stabilization.

UNIT - IV	EARTH STATION	06

General block schematics, transmitter and receivers, antenna System & tracking – Multiplexing,space, time and frequency multiplexing

UNIT - V	MULTIPLE ACCESS PRINCIPLE	06

FDMA, spade system, TDMA – system concept of configuration - System timing, frame formatbasic principles of spread spectrum. Multiple accesses

	Total Lecture Hours	**30**

BOOKS FOR STUDY:

- ➢ J MARTIN, Communication Satellites(PH)
- ➢ J JSpilker, Digital Communication by Satellites(PH)
- ➢ R.M. Gagliardi, Satellite Communications-CBS

BOOKS FOR REFERENCES:

- ➢ M. Mitra Satellite Communications

WEB RESOURCES:

- ❖ **https://archive.nptel.ac.in/courses/117/105/117105131/**
- ❖ **https://archive.nptel.ac.in/noc/courses/noc17/SEM2/noc17-ec14/**
- ❖ **https://nptel.ac.in/courses/117104115**

Nature of Course	EMPLOYABILITY		SKILL ORIENTED	✓	ENTREPRENEURSHIP	
Curriculum Relevance	LOCAL	REGIONAL		NATIONAL	✓	GLOBAL	
Changes Made in the Course	Percentage of Change	**100**	No Changes Made		New Course	✓

*Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.*

COURSE OUTCOMES:		K LEVEL
After studying this course, the students will be able to:		
CO1	Explain the history of satellites and understand the structure of Ionosphere	**K1 to K2**
CO2	Understand the characteristics, transponders and altitude control.	**K1 to K2**
CO3	Understand the subsystems, power supplies etc for satellite construction.	**K1 to K2**
CO4	Understand the blocks of Transmitters and Receivers	**K1 to K2**
CO5	Understand the concepts of FDMA and TDMA	**K1 to K2**

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	1	2	1	2	2	3	3	2
CO2	1	1	2	1	1	2	2	2	3	1
CO3	2	2	1	2	3	1	1	1	2	2
CO4	1	2	2	1	1	3	2	1	2	3
CO5	2	1	3	2	1	1	2	1	2	2

3- STRONG   **2 – MEDIUM**   **1 - LOW**

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	1	3

CO 2	**3**	**2**	**2**	**1**	**1**
CO 3	**3**	**3**	**2**	**2**	**2**
CO 4	**3**	**2**	**3**	**3**	**3**
CO 5	**2**	**3**	**2**	**3**	**2**
WEITAGE	**14**	**13**	**12**	**10**	**11**
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	**93**	**86**	**80**	**66**	**73**

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	**INTRODUCTION** Historical progress, Orbits of Satellites, Types – low, medium, geostationary – maincharacteristics – angle, shape and period – Ionosphere	**06**	**Chalk & Talk, Power Point Presentation**
II	**SATELLITE LINKS** General characteristics, delay, transponders, earth station, antenna and earth Coverage, altitudecontrol.	**06**	**Chalk & Talk, Power Point Presentation**
III	**SATELLITE CONSTRUCTIONS** Subsystems and functions, antennas, transponders, power supplies Command & telemetry, thrustand stabilization.	**06**	**Chalk & Talk, Power Point Presentation**
IV	**EARTH STATION** General block schematics, transmitter and receivers, antenna System & tracking – Multiplexing,space, time and frequency multiplexing	**06**	**Chalk & Talk, Power Point Presentation**
V	**MULTIPLE ACCESS PRINCIPLE** FDMA, spade system, TDMA – system concept of configuration - System timing, frame formatbasic principles of spread spectrum. Multiple accesses	**06**	**Chalk & Talk, Power Point Presentation**

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)				
			Section A	
			MCQs	
Internal	Cos	K Level	No. of. Questions	K - Level
CI AI	CO1	K1 – K2	25	K1,K2
	CO2	K1 – K2	25	K1,K2
CI AII	CO3	K1 – K2	25	K1,K2
	CO4	K1 – K2	25	K1,K2
Question Pattern CIA I & II		No. of Questions to be asked	50	
		No. of Questions to be answered	50	
		Marks for each question	1	
		Total Marks for each section	50	

* Two Formative examinations will be conducted as a part of Continuous Internal Assessment under which, 50 MCQ's will be asked [50X1=50 marks] from any 4 CO's. (I[st] Test-2 CO's & IInd Test-2 CO's) in equal weightage

Distribution of Marks with K Level CIA I & CIA II					
	K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	100	100
CIA II	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)				
S. No	**COs**	**K - Level**	**Section A (MCQs)**	
			No. of Questions	**K – Level**
1	CO1	K1-K2	15	K1,K2
2	CO2	K1-K2	15	K1,K2
3	CO3	K1-K2	15	K1,K2
4	CO4	K1-K2	15	K1,K2
5	CO5	K1-K2	15	K1,K2
No. of Questions to be Asked			75	
No. of Questions to be answered			75	
Marks for each question			1	
Total Marks for each section			75	
(Figures in parenthesis denotes, questions should be asked with the given K level)				

In summative examinations, 75 MCQ's will be asked [75X1=75 marks] from all 5 CO's in equal weightage.

Distribution of Marks with K Level				
K Level	**Section A (Multiple Choice Questions)**	**Total Marks**	**% of (Marks without choice)**	**Consolidated %**
K1	40	40	53	**100**
K2	35	35	47	
K3				
K4				
Marks		75	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.				

Course Name	CELLULAR PHONES			
Course Code	23UELSC22	**L**	**P**	**C**
Category	SKILL	2	-	2

COURSE OBJECTIVES:

➢ To understand the working of a Telephone system.
➢ To understand the concepts of GSM, CDMA, GPS. etc.
➢ To gain knowledge on Mobile OS
➢ To understand IMEI Number Detection, Mobile GSM Utility Codes
➢ To understand the card readers and virus protections.

UNIT - I	06

Working of a Telephone - Local Exchange - Initiating a call - Calling a Number - Making a Connection - Answering a Call - Conversation - Ending a Call - Hook Switch - Transmitter - Receiver - Ringer - Cellular Mobile Telephone System - Mobile Phone Service Area.

UNIT - II	06

GSM - CDMA - GPRS - EDGE - WCDMA - UMTS - HSDPA - Satellite Phones - GPS - Mobile Browsers - WAP.

UNIT - III	06

Types of: Wireless Options, Batteries, Memory Cards, Messaging, Ring Tones, Keypad Types, Display Types. Handset Form Factor - Mobile OS.

UNIT - IV	06

Hardware/Software Repairing - Various Locks - Installation of: UFS Driver, UFS Suite & Flashing Files - IMEI Number Detection - Mobile GSM Utility Codes (Any Five)

UNIT - V	06

Ultrasonic Cleaner - Computer Connectors - SIM Card Reader - Memory Card Reader - Mobile Virus - Virus Prevention - Removing Virus - Health Hazards with Mobiles - SAR.

	Total Lecture Hours	**30**

BOOKS FOR STUDY:

- ➢ Modern Mobile Phone Introduction & Servicing – Manahar Lotia
  Unit - I
- ➢ Modern Mobile Phone Repair Using Computer Software & Service Devices –
  ManaharLotia- Units I, IV & V
- ➢ Modern Mobile Phone Unlocking & Utility Codes For GSM & CDMA Phones –
  ManaharLotia - Unit – IV.
- ➢ Mobile Telephony - Digit Magazine - Supplement - Jan 2006 - Jasubhai Digital Media
  Publications. Unit II & III

BOOKS FOR REFERENCES:

- ➢ Blue Tooth Technology – CSR Prabhu & APrathap Reddi – PHI
- ➢ Mobile & Personal Communication Systems & Services - Raj Pandya - PHI

WEB RESOURCES:

- ❖ **https://nptel.ac.in/courses/106105082**
- ❖ **https://www.academia.edu/29219522/REPAIR_AND_MAINTENANCE_OF_M
  OBILE_CELL_PHONES_Mobile_Phone_Repair_and_Maintenance**
- ❖ **https://joyofandroid.com/basics-troubleshooting-android-phones/**

Nature of Course	EMPLOYABILITY		SKILL ORIENTED	✓	ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL	REGIONAL		NATIONAL	✓	GLOBAL	
Changes Made in the Course	Percentage of Change		**100**	No Changes Made		New Course	✓
*Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.							

COURSE OUTCOMES:		K LEVEL
After studying this course, the students will be able to:		
CO1	Understand of the working of a Telephone, Cellular Mobile Telephone System, and Mobile Phone Service Area.	**K1 to K2**
CO2	Understand GSM, CDMA, GPS concepts.	**K1 to K2**
CO3	Gain knowledge about keypad, display, mobile OS.	**K1 to K2**
CO4	Understand the concepts of hardware and software repairing.	**K1 to K2**
CO5	Understand the SIM card reader, Memory card readers, and virus protections for cellular phones.	**K1 to K2**

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	1	2	1	2	2	3	3	2
CO2	1	1	2	1	1	2	2	2	3	1
CO3	2	2	1	2	3	1	1	1	2	2
CO4	1	2	2	1	1	3	2	1	2	3
CO5	2	1	3	2	1	1	2	1	2	2

3- STRONG	**2 – MEDIUM**	**1 - LOW**

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	2	3
CO 2	3	2	3	2	1
CO 3	3	3	2	2	2
CO 4	3	2	3	3	3
CO 5	3	3	3	3	2
WEITAGE	15	13	14	12	11
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	86	93	80	73

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	Working of a Telephone - Local Exchange - Initiating a call - Calling a Number - Making a Connection - Answering a Call - Conversation - Ending a Call - Hook Switch - Transmitter - Receiver - Ringer - Cellular Mobile Telephone System - Mobile	**06**	**Chalk & Talk, Power Point Presentation**

	Phone Service Area.		
II	GSM - CDMA - GPRS - EDGE - WCDMA - UMTS - HSDPA - Satellite Phones - GPS – Mobile Browsers - WAP.	**06**	**Chalk & Talk, Power Point Presentation**
III	Types of: Wireless Options, Batteries, Memory Cards, Messaging, Ring Tones, Keypad Types, Display Types. Handset Form Factor - Mobile OS.	**06**	**Chalk & Talk, Power Point Presentation**
IV	Hardware/Software Repairing - Various Locks - Installation of: UFS Driver, UFS Suite & Flashing Files - IMEI Number Detection - Mobile GSM Utility Codes (Any Five)	**06**	**Chalk & Talk, Power Point Presentation**
V	Ultrasonic Cleaner - Computer Connectors - SIM Card Reader - Memory Card Reader - Mobile Virus - Virus Prevention - Removing Virus - Health Hazards with Mobiles - SAR.	**06**	**Chalk & Talk, Power Point Presentation**

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)				
			Section A	
Internal	Cos	K Level	MCQs	
			No. of. Questions	K - Level
CI AI	CO1	K1 – K2	25	K1,K2
	CO2	K1 – K2	25	K1,K2
CI AII	CO3	K1 – K2	25	K1,K2
	CO4	K1 – K2	25	K1,K2
Question Pattern CIA I & II		No. of Questions to be asked	50	
		No. of Questions to be answered	50	
		Marks for each question	1	
		Total Marks for each section	50	

* Two Formative examinations will be conducted as a part of Continuous Internal Assessment under which, 50 MCQ's will be asked [50X1=50 marks] from any 4 CO's. (I[st] Test-2 CO's & IInd Test-2 CO's) in equal weightage

Distribution of Marks with K Level CIA I & CIA II					
	K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	100	100
CIA II	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)				
S. No	**COs**	**K - Level**	**Section A (MCQs)**	
			No. of Questions	**K – Level**
1	CO1	K1-K2	15	K1,K2
2	CO2	K1-K2	15	K1,K2
3	CO3	K1-K2	15	K1,K2
4	CO4	K1-K2	15	K1,K2
5	CO5	K1-K2	15	K1,K2
No. of Questions to be Asked			75	
No. of Questions to be answered			75	
Marks for each question			1	
Total Marks for each section			75	
(Figures in parenthesis denotes, questions should be asked with the given K level)				

In summative examinations, 75 MCQ's will be asked [75X1=75 marks] from all 5 CO's in equal weightage.

Distribution of Marks with K Level				
K Level	**Section A (Multiple Choice Questions)**	**Total Marks**	**% of (Marks without choice)**	**Consolidated %**
K1	40	40	53	100
K2	35	35	47	
K3				
K4				
Marks		75	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.				

Course Name	FUNDAMENTALS OF COMPUTING			
Course Code	23UELNM21	**L**	**P**	**C**
Category	SKILL	2	-	2

COURSE OBJECTIVES:

➢ To understand the overview, application, evolution of computers.
➢ To understand the number systems and computer codes.
➢ To understand the computer software and internet terminologies.
➢ To plan a computer program.
➢ To understand the office packages.

UNIT - I	INTRODUCTION TO COMPUTERS	06

Overview of Computers – Applications of Computers - Evolution of the Computers-Computer Generations – Classification of computers – Basic computer organization

UNIT - II	NUMBER SYSTEMS AND COMPUTER CODES	06

Decimal System - Binary System - Hexadecimal System – Octal System – 4-bit BCD systems – 8-bit BCD Systems – 16-bit Unicode - Conversion of Numbers.

UNIT - III	COMPUTER SOFTWARE	06

Overview of Computer Software – Types of Computer software – System Management Programs – System Development Programs – Standard Application programs – Applications programs – Software Development Steps – Internet Terminologies – Internet Applications.

UNIT - IV	PROBLEM SOLVING	06

Introduction – Planning the computer program – Problem solving – Structuring the logic – Application Software packages.

UNIT - V	OFFICE AUTOMATION	06

Introduction to Office packages – MS Word – MS Excel – MS PowerPoint – MS Access.

	Total Lecture Hours	**30**

BOOKS FOR STUDY:

➢ Fundamentals of Computing by E.Balagurusamy, McGrawHill, Second Edition.
   Unit I: Chap1-1.1 to 1.8;
   Unit II: Chap 1-1.9 to 1.17;
   Unit III: Chap 2;
   Unit IV: Chap 3-3.1 to 3.5;
   Unit V: Chap 3-3.6 to 3.10

BOOKS FOR REFERENCES:

➢ Digital fundamentals – Floyd & Jain – Pearson Education
➢ Introduction to computers – Norton – McGraw Hill
➢ Computer fundamentals – B.Ram – New Age International
➢ Computer fundamentals – Jaggi and Jain

WEB RESOURCES:

❖ https://www.tutorialspoint.com/basics_of_computers/basics_of_computers_introduction.htm
❖ https://archive.nptel.ac.in/courses/106/105/106105214/
❖ https://www.rgycsm.org/uploads/books/MICROSOFT-OFFICE-BOOK.pdf

Nature of Course	EMPLOYABILITY		SKILL ORIENTED	✓	ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL	✓	GLOBAL	
Changes Made in the Course	Percentage of Change	**100**	No Changes Made		New Course		✓

*Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.

COURSE OUTCOMES:		K LEVEL
After studying this course, the students will be able to:		
CO1	Gain knowledge on application and on evolution of computers.	**K1 to K2**
CO2	Gain knowledge on number systems and computer codes.	**K1 to K2**
CO3	Understand the computer software and internet terminologies.	**K1 to K2**
CO4	Gain knowledge to plan a computer program.	**K1 to K2**
CO5	Understand the office packages.	**K1 to K2**

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	1	2	1	2	2	3	3	2
CO2	1	1	2	1	1	2	2	2	3	1
CO3	2	2	1	2	3	1	1	1	2	2
CO4	1	2	2	1	1	3	2	1	2	3

CO5	2	1	3	2	1	1	2	1	2	2

3- STRONG **2 – MEDIUM** **1 - LOW**

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	1	3
CO 2	3	2	3	1	1
CO 3	2	3	2	2	2
CO 4	3	2	3	3	3
CO 5	2	3	3	3	2
WEITAGE	13	13	14	10	11
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	86	86	93	66	73

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	**INTRODUCTION TO COMPUTERS** Overview of Computers – Applications of Computers - Evolution of the Computers-Computer Generations – Classification of computers – Basic computer organization	06	**Chalk & Talk, Power Point Presentation**
II	**NUMBER SYSTEMS AND COMPUTER CODES** Decimal System - Binary System - Hexadecimal System – Octal System – 4-bit BCD systems– 8-bit BCD Systems – 16-bit Unicode - Conversion of Numbers.	06	**Chalk & Talk, Power Point Presentation**
III	**COMPUTER SOFTWARE** Overview of Computer Software – Types of Computer software – System Management Programs – System Development Programs – Standard Application programs – Applications programs – Software Development Steps – Internet Terminologies – Internet Applications.	06	**Chalk & Talk, Power Point Presentation**
IV	**PROBLEM SOLVING**	06	**Chalk & Talk, Power Point**

			Presentation
	Introduction – Planning the computer program – Problem solving – Structuring the logic – Application Software packages.		
V	**OFFICE AUTOMATION** Introduction to Office packages – MS Word – MS Excel – MS PowerPoint – MS Access.	**06**	**Chalk & Talk, Power Point Presentation**

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)				
			Section A	
			MCQs	
Internal	**Cos**	**K Level**	**No. of. Questions**	**K - Level**
CI **AI**	CO1	K1 – K2	25	K1,K2
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Question Pattern **CIA I & II**		**No. of Questions to be asked**	**50**	
		No. of Questions to be answered	**50**	
		Marks for each question	**1**	
		Total Marks for each section	**50**	

* Two Formative examinations will be conducted as a part of Continuous Internal

Assessment under which, 50 MCQ's will be asked [50X1=50 marks] from any 4 CO's. (Ist

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	K Level	**Section A (Multiple Choice Questions)**	**Total Marks**	**% of (Marks without choice)**	**Consolidate of %**
CIA I	K1	30	30	60	**100**
	K2	20	20	40	
	K3				
	K4				
	Marks	**50**	**50**	**100**	**100**
CIA II	K1	30	30	60	**100**
	K2	20	20	40	
	K3				
	K4				
	Marks	**50**	**50**	**100**	**100**

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

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K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)				
S. No	**COs**	**K - Level**	**Section A (MCQs)**	
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4	CO4	K1-K2	15	K1,K2
5	CO5	K1-K2	15	K1,K2
No. of Questions to be Asked			**75**	
No. of Questions to be answered			**75**	
Marks for each question			**1**	
Total Marks for each section			**75**	
(Figures in parenthesis denotes, questions should be asked with the given K level)				

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K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidated %
Distribution of Marks with K Level				
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K2	35	35	47	
K3				
K4				
Marks		75	100	100

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.