MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE

(An Autonomous College)

Affiliated to Periyar University, Salem | Accredited by **NAAC** with '**A**' Grade

Recognized by **UGC** under Section 2(f) & 12 (B)

MUTHAYAMMAL
COLLEGE OF ARTS
AND SCIENCE
(Autonomous)
A UNIT OF VANETRA GROUP
Learn.
Lead

ESTD-1994

DEGREE OF BACHELOR OF SCIENCE

Learning Outcomes – Based Curriculum Framework
– Choice Based Credit System

Syllabus for B.Sc.,Electronics and Communication

(Semester Pattern)

(For Candidates admitted from the academic year
2023-2024 and onwards)

Regulation and Syllabus
for B.Sc., Electronics and Communication
(With effect from the Academic Year 2023-24)

Vision

To redefine the scope of higher education by infusing into each of our pursuits, initiatives that will encourage intellectual, emotional, social and spiritual growth, there by nurturing a generation of committed, Knowledgeable and socially responsible citizens.

Mission:

*To Ensure State of the world learning experience

*To Espouse value based Education

*To Empower rural education

*To Instill the sprite of entrepreneurship and enterprise

*To create a resource pool of socially responsible world citizens

QUALITY POLICY

To Seek–To Strive–To Achieve greater heights in Arts and Science, Engineering, Technological and Management Education without compromising on the Quality of Education

DEPARTMENT OF ELECTRONICS AND COMMUNICATION

Vision:

To provide education that gives self-employment and builds a strong Academic industry.

Mission:

*To provide value and need based education

PREAMBLE

The Bachelor of Science in Electronics and Communication is a dynamic and forward-looking program designed to equip students with the fundamental knowledge and practical skills required to excel in the rapidly evolving fields of electronics and communication technology. This program offers a comprehensive curriculum that integrates the core principles of electronics, including circuit design, digital and analog systems, with advanced communication technologies such as wireless communication, optical communication and signal processing. The curriculum is meticulously structured to provide a balanced education, encompassing theoretical learning, hands-on laboratory experience, and real-world applications. Students are exposed to cutting-edge technologies and contemporary industry practices, preparing them for a wide range of career opportunities in telecommunications, information technology, embedded systems, and more. The program emphasizes innovation, critical thinking, and problem-solving, fostering a research-oriented mindset and a commitment to lifelong learning. Ethical responsibility and professional conduct are integral components, ensuring that graduates are not only technically proficient but also equipped to make positive contributions to society. By nurturing a deep understanding of both the fundamental and applied aspects of electronics and communication, The syllabi for the three-year B.Sc. degree course in Electronics and Communication are framed in such a way that the students at the end of the course, can be adept at Electronic techniques for pursuing higher studies and aims to produce graduates who are ready to lead, innovate, and excel in an increasingly interconnected and technology-driven world.

PROGRAMME LEARNING OUTCOME

NATURE AND EXTENT OF THE PROGRAMME

The undergraduate programme Electronics & Communication is the first level of college or university degree in the country as in several other parts of the world. After obtaining this degree, an Electronics engineer may enter into the job market or opt for undertaking further higher studies in the subject. After graduation the students may join industry, academia, or Telecom Sector and play their role as Electronics technician in a useful manner contributing their knowledge to the welfare of the society. Thus the undergraduate level degree in Electronics & Communication must prepare the students for all these objectives. The LOCF curriculum has been developed encompassing all the diversified aspects of Electronics & Communication y with reasonable depth of knowledge and skills as to specialize them in the various aspects of the subject. It also equips them with the expected professional expertise.

AIM OF THE PROGRAMME

The aim of the undergraduate degree in Electronics & Communication is to make students knowledgeable about the various basic concepts in a wide ranging context which involve the use of knowledge and skills of Electronics & Communication. Their understanding, knowledge and skills in Electronics and Communication needs to be developed through a thorough teaching learning process in the class, practical skills through the laboratory work, their presentation and articulation skills, exposure to industry and interaction with industry experts

GRADUATE ATTRIBUTES

Graduates of the Bachelor of Science in Electronics and Communication program will emerge as well-rounded professionals equipped with a comprehensive set of skills and attributes essential for success in the dynamic field of electronics and communication. They will possess a robust understanding of fundamental and advanced principles in electronics, enabling them to design, analyze, and optimize complex electronic systems and communication networks. Graduates will demonstrate practical proficiency through extensive hands-on experience with modern tools, instruments, and technologies. They will be skilled in problem-solving, critical thinking, and innovative design, allowing them to tackle diverse challenges and contribute to technological advancements.

Effective communication skills will enable them to articulate technical concepts clearly and collaborate efficiently in multidisciplinary teams. Ethical responsibility and professional conduct will guide their decision-making processes, ensuring they adhere to industry standards and contribute positively to society. Graduates will exhibit adaptability and a commitment to lifelong learning, staying abreast of emerging technologies and continually enhancing their expertise. They will understand the global and societal impacts of their work, striving for sustainable and socially responsible solutions. With a strong foundation in research and a mindset geared towards innovation, graduates will be prepared to lead and excel in various roles within the Electronics and Communication sectors.

GA1 Analytical Reasoning

GA2 Critical Thinking

GA3 Problem Solving Skills

GA4 Communication Skills

GA5 Leadership Quality

GA6 Teamwork

GA7 Lifelong Learning

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1: Graduates will be able to promote learning environment to meet the industry expectation

PEO2: Graduates will be incorporated the critical thinking with Good Communication and Leader ship skills to become a self-employed

PEO3: Graduates will be up hold the human values and environmental sustenance for the better men to the society.

PROGRAMME OUTCOMES (POs)

PO1: Graduates will acquire dynamic skills through proper perception of the course Objectives that leads to scientific and analytical comprehension of the concepts.

PO2: Graduates will focus on sustainable goals that might bring about spherical developments

PO3: Graduates will infuse a spirit converging on bricking a team work, interpersonal and administrative skills to think critically and execute effectively

PO4: Graduates will apply reasoning appropriately to scale the humps in learning and solute them to the core.

PO5: Graduates will engage the skills obtained in independent and collaborative Learning as a perennial process.

PROGRAMME SPECIFIC OUTCOMES(PSOs)

PSO-1: Apply proficiency in use of software and hardware required to practice electronics and communication profession.

PSO-2: Graduates will be able to apply fundamentals of electronics in various aspects of analog and digital systems.

PSO-3: Design and analyze specific engineering problems of communication, electronic circuits, computer programming, embedded systems and VLSI design and semiconductor technology by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.

PSO-4: Graduates will be able to communicate effectively with excellent interpersonal skills and demonstrate the practice of professional ethics for societal benefit.

PSO-5: Graduates will be able to apply fundamentals of electronics in various domains of analog and digital systems and also use embedded system concepts for developing IoT application

REGULATIONS (2023-2024)

1. DURATION OF THE PROGRAME

1.1. Three years(six semesters)

1.2. Each academic year shall be divided into two semesters. The odd semesters shall consist of the period from June to November of each year and the even semesters from December to May of each year.

1.3. There shall be not less than 90 working days for each semester.

2. ELIGIBILITY FOR ADMISSION

2.1. Candidate for admission to the first year of B.Sc. Degree Course in Electronics and Communication shall be required to have passed the Higher Secondary Examination with Any + 2 Stream as per norms set by the Government of Tamilnadu or an Examination Accepted as equivalent there to by the syndicate.

3. CREDIT REQUIRMENTS AND ELIGIBILITY FORAWARD OF DEGREE

3.1. A Candidate shall be eligible for the award of the Degree only if he/she has under gone the prescribed course of study in a College affiliated to the University for a period of not less than three academic years and passed the examinations of all the Six Semesters prescribed earning a minimum of 140 credits as per the distribution given in Regulation for Part I, II, III, IV & V and also fulfilled such other conditions as have been prescribed there of.

4. COURSE OF STUDY, CREDITS AND SCHEME OF EXAMINATION

The Course Components and Credit Distribution shall consist of the following:

(Minimum Number of Credits to be obtained)

Part Wise Distribution	Study Components	Credit Distribution
PARTI	Tamil or Other Languages	12
PARTII	English	12
PARTIII	Core, Allied, Elective and Project Courses	91
PARTIV	i. Basic Tamil/Advanced Tamil/NME	04
	ii. Soft Skill Courses/SBEC	10
	iii. Environmental Studies	02
	iv. Value Education	02
	v. Internship	02
	vi. Foundation Course	02
	vii. Professional Competency Skills	02
PARTV	Extension Activity	01
Total Credits		**140**

4.2 DETAILS OF COURSE OF STUDY OF PARTS I–V

4.2.1 PARTI: Tamil and Other Languages Hindi or French at the option of candidates and according to the syllabus and text-books prescribed from time to time:

4.2.2 PART II: English: According to the syllabus and text-books prescribed from time to time

4.2.3 PART III: Core, Allied Project and Elective Courses: As prescribed by the concerned Board of Studies

4.2.4 PART IV:

i. Basic Tamil/Advanced Tamil/NME:

a. Students who have not studied Tamil up to XII STD and have taken any Language other than Tamil in Part I shall take Basic Tamil comprising of Two Courses (level will be at 6thStandard).
b. Students who have studied Tamil up to XII STD and have taken any Language other than Tamil in Part – I shall take Advanced Tamil comprising of Two Courses.
c. Students who have studied Tamil up to XII STD and also have taken Tamil in Part–I shall take Non-Major Elective comprising of Two Courses.

i. Soft Skill Courses/SBEC
ii. Environmental Studies
iii. Value Education
iv. Internship
v. Foundation Course
vi. Professional Competency Skills (Online)

4.2.5 PARTV: Extension Activity:

Students shall be awarded a maximum of 1 Credit for Compulsory Extension Service. All the Students shall have to enroll for NSS /NCC/ NSO (Sports & Games) Retract / Youth Red Cross or any other Service Organizations in the College and shall have to put in compulsory minimum attendance of 40 hours which shall be duly certified by the Principal of the College before 31st March in a year. If a student lacks40 hour's attendance in the first year, he or she shall have to compensate the same during the sub sequent years.

Those students who complete minimum attendance of 40 hours in one year will get 'half-a- credit and those who complete the attendance of 80 or more hours in Two Years will get 'one credit'. Literacy and Population Education and Field Work shall be compulsory components in the above extension service activities

4.3. Inclusion of the Massive Open Online Courses (MOOCs) available on SWAYAM and NPTEL

4.3.1 Students can choose the MOOC Course Available on SWAYAM and NPTEL under Core, Elective or Soft skill category. He/ she will be awarded degree only after producing valid certificate of the MOOC course for credit Mobility

5. REQUIREMENTS FOR PROCEEDING TO SUBSEQUENT SEMESTER

5.1 Eligibility: Students shall be eligible to go to subsequent semester only if they earn sufficient attendance as prescribed by the Periyar University.

5.2. Attendance: All Students must earn 75% and above of attendance for appearing for the End Semester Examination. (Theory/Practical)

5.3. Condonation of shortage of attendance: If a Student fails to earn the minimum attendance (Percentage stipulated), the Principals shall condone the shortage of attendance up to a maximum limit of 10% (i.e. between 65% and above and less than75%) after collecting the prescribed fee for Theory/Practical examination separately, towards the condonation of shortage of attendance. Such fees collected and should be remitted to the University.

5.4. Non-eligibility for condonation of shortage of attendance: Students who have secured less than 65% but more than 50% of attendance are NOTELIGIBLE for condonation of shortage of attendance and such Students will not be permitted to appear for the regular examination, but will be allowed to proceed to the next year/next semester of the program and they may be permitted to take next University examination by paying the prescribed condonation fee

5.5. Detained students for want of attendance: Students who have earned less than 50% of attendance shall not be permitted to proceed to then next semester and to complete the Program of study. Such Students shall have to repeat the semester, which they have missed by rejoining after completion of final semester of the course, by paying the fee for the break of study as prescribed by the College from time to time.

5.6. Condonation of shortage of attendance for married women students: Inrespect of married women students undergoing UG programs, the minimum attendance for condonation (Theory/Practical) shall be relaxed and prescribed as 55%instead of 65% if they conceive during their academic career. Medical certificate from the Doctor (D.G.O) from the Government Hospital and the prescribed fee along with attendance details shall be forwarded to the college to consider the condonation of attendance mentioning the category

5.7. Zero Percent (0%) Attendance: The Students, who have earned 0% of attendance, have to repeat the program (by rejoining) without proceeding to succeeding semester and they have to obtain prior permission from the College/University immediately to rejoin the program.

5.8.1 Transfer of Students is permitted from one Institution to another Institution for the same program with same nomenclature.

Provided, there is a vacancy in the respective program of Study in the Institution where the transfer is requested.

Provided the Student should have passed all the courses in the Institution from where the transfer is requested.

5.8.2 The marks obtained in the courses will be converted and grades will be assigned as per the College norms.

5.8.3 The transfer students are eligible for classification.

5.8.4 The transfer students are not eligible for Ranking, Prizes and Medals.

5.8.5 Students who want to go to foreign Universities up to two semesters or Project Work with the prior approval of the Departmental/College Committee are allowed to get transfer of credits and marks which will be converted in to Grades as per the University norms and are eligible to get CGPA and Classification; they are not eligible for Ranking, Prizes and Medals.

5.9 Students are exempted from attendance requirements for online courses of the College and MOOC's.

6. EXAMINATION AND EVALUATION

6.1 Register for all subjects: Students shall be permitted to proceed from the First Semester up to Final Semester irrespective of their failure in any of the Semester Examination. For this purpose, Students shall register for all the arrear subjects of earlier semesters along with the current (subsequent) Semester Subjects.

6.2 Marks for Internal and End Semester Examinations for PARTI, II, III, and IV

Category	Theory	Practical
Internal Assessment	25	**40**
End semester Examination	**75**	**60**

6.3 Procedure for Awarding Internal Marks Internal Examination Marks–Theory

Components	Marks
CIA I & II	**15**
Attendance	**5**
Assignment/Quiz	**5**
Total	**25**

6.4 Awarding Marks for Attendance (out of 5)

Percentage of Attendance	Marks
Below 60%	0 marks
60% to 75%	3 marks
75% to 90%	4 marks
Above 90%	5 marks

6.5 Components for Practical CIA.

Components	Marks
CIA–I	**15**
CIA- II	**15**
Observation Note	**05**
Attendance	**5**
Total	**40**

6.6 Components for Practical ESE.

Components	Marks
Completion of Experiments	**50**
Record	**05**
Viva voce	**05**
Total	**60**

6.7 Guidelines for Value Education Yoga and Environmental Studies (Part IV)

6.7.1. The Course Value Education Yoga is to be treated as 100% CIA course which is offered in V Semester for I year UG students.

6.7.2. The Course Environmental Studies is to be treated as 100% CIA course which is offered in IV Semester for I year UG students.

6.7.3 Total Marks for the Course =100

Components	Marks
Two Tests(2x30)	**60**
Field visit and report (10+10)	**20**
Two assignments(2x10)	**20**
Total	**100**

The passing minimum for this course is 40%

6.7.3 Incase, the candidate fails to secure 40% passing minimum, he/she may have to reappear for the same in the subsequent odd/even semesters.

6.8 Internship/Industrial Training, Mini Project and Major Project Work

Internship/IndustrialTraining		MiniProject	Major Project Work		
Components	**Marks**	**Marks**	**Components**		Marks
CIA*2			**CIA** a) Attendance **b)** Review /Work Diary*1	10 Marks 30 Marks	**40**
Work Diary	25	-			
Report	50	50			
Viva–voce	25	50			
Examination					
Total	**100**	**100**	**ESE***2 a) Final Report 40 Marks b)Viva-voce 20 Marks		**60**
			Total		**100**

*1.Review is for Individual Project and Work Diary is for Group Projects (Group consisting of minimum 3 and maximum 5)

*2 Evaluation of report and conduct of viva voce will be done jointly by Internal and External Examiners

6.9 Guidelines for Professional Competency Skill-Online Mode (Part IV)- Online Exam 3 hours

Components	Marks
100 Objective Type Questions **100*1=100Marks**	**100**

Objective type Questions from Question Bank.

- The passing minimum for this paper is 40%
- Incase, the candidate fails to secure 40% passing minimum, he/she may have to reappear for the same in the subsequent semesters.

Objective type Questions from Question Bank.

- The passing minimum for this paper is 40%
- Incase, the candidate fails to secure 40% passing minimum, he/she may have to reappear for the same in the subsequent semesters.

QUESTION PAPER PATTERN FOR CIAI, II AND ESE	
(3HOURS)	**MAXIMUM:75Marks**
SECTION-A **(Objective Type)** **Answer ALL Questions** ALL Questions Carry EQUAL Marks	(10x1=10marks)
SECTION-B**(Either or Type)** **Answer ALL Questions** ALL Questions Carry EQUAL Marks	(5x5=25marks)
SECTION-C **(Either or Type)** **Answer ALL Questions** ALL Questions Carry EQUAL Marks	(5x8=40marks)
(Syllabus for CIA-I2.5 Unit, Syllabus for CIA-II All 5Unit)	

6.10 PASSING MINIMUM

6.10.1 There shall be no passing minimum for Internal.

6.10.2 For external examination, passing minimum shall be40% [Forty Percentage] of the maximum marks prescribed for the course for each Course/Practical/Project and Viva-Voce.

6.10.3 In the aggregate [External/Internal] the passing minimum shall be of 40%.

6.10.4 He/ She shall be declared to have passed the whole examination, if he/ she passes in all the Courses and Practical wherever prescribed as per the scheme of the examinations by earning 140 CREDITS in Part I, II, III, IV& V. He/she shall also fulfill the extension activities prescribed earning a minimum of 1 credit to qualify for the Degree.

6.11 SUPPLIMENTARY EXAMINATION:

Supplementary Examinations is conducted for the students who appeared in the final semester examinations. Eligible criteria for appearing in the Supplementary Examinations are as follows:

6.11.1 Eligibility: A Student who is having arrear of only one theory course in any of the semester or two theory course in the Final semester of the UG degree programme alone is eligible for Supplementary Examinations.

6.11.2 Non-eligibility for those completed the program: Students who have completed their Program duration but having arrears are not eligible to appear for Supplementary Examinations.

6.12 RETOTALLING, REVALUATION AND PHOTOCOPY OF THE ANSWER SCRIPTS:

6.12.1 Re-totaling: All UG Students who appeared for their Semester Examinations are eligible for applying for re-totaling of their answer scripts.

6.12.2 Revaluation: All current batch Students who have appeared for their Semester Examinations are eligible for Revaluation of their answer scripts. Passed out candidates are not eligible for Revaluation.

6.12.3 Photo copy of the answer scripts: Students who have applied for revaluation can apply for the Photocopy of answer scripts by paying prescribed fee.

7. CLASSIFICATION OF SUCCESSFUL STUDENTS

RANGE OF MARKS	GRADE POINTS	LETTERGRADE	DESCRIPTION
90-100	9.0-10.0	O	**Outstanding**
80-89	8.0-8.9	D+	**Excellent**
75-79	7.5-7.9	D	**Distinction**
70-74	7.0-7.4	A+	**Very Good**
60-69	6.0-6.9	A	**Good**
50-59	5.0-5.9	B	**Average**
40-49	4.0-4.9	C	**Satisfactory**
00-39	0.0	U	**Re-appear**
ABSENT	0.0	AAA	**ABSENT**

7.1 Computation of Grade Point Average (GPA) in a Semester, Cumulative Grade Point Average (CGPA) and Classification

GPA for a Semester: =∑iCiGi,∑iCi

That is, GPA is the sum of the multiplication of grade points by the credits of the courses divided by the sum of the credits of the courses in a semester.

CGPA for the entire programme: = ∑n∑iCniGni ,∑n∑iCni That is, CGPA is the sum of the multiplication of grade points by the credits of the entire programme divided by the sum of the credits of the courses of the entire programme

Where,

Ci=Credits earned for course in any semester,

Gi=Grade Points obtained for course in any semester=Semester in which such courses were credited

7.2 Letter Grade and Classification

CGPA	GRADE	CLASSIFICATIONOFFINALRESULT
9.5-10.0	**O+**	**First Class-Exemplary***
9.0 and above but below9.5	**O**	
8.5 and above but below9.0	**D++**	**First Class with Distinction***
8.0 and above but below8.5	**D+**	
7.5 and above but below8.0	**D**	
7.0 and above but below7.5	**A++**	**First Class**
6.5 and above but below7.0	**A+**	
6.0and above but below6.5	**A**	
5.5 and above but below6.0	**B+**	**Second Class**
5.0 and above but below5.5	**B**	
4.5 and above but below5.0	**C+**	**Third Class**
4.0 and above but below4.5	**C**	
0.0 and above but below4.0	**U**	**Re-appear**

*The Students who have passed in the first appearance and within the prescribed semester of the UG Programme (Major, Allied and Elective courses only) are eligible.

8. RANKING

Students who pass all the examinations prescribed for the Program in the FIRST APPEARANCE ITSELF ALONE are eligible for Ranking I, II and III.

9. MAXIMUM PERIOD FOR COMPLETION OF THE PROGRAM TO QUALIFY FOR A DEGREE

9.1 A Student who for whatever reasons is not able to complete the program within the normal period (N) or the Minimum duration prescribed for the programme, may be allowed two years period beyond the normal period to clear the backlog to be qualified for the degree. (Time Span=N+2 years for the completion of programme.)

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B.Sc., Electronics and Communication abstract under LOCF-CBCS Pattern with effect from 2023-2024 Onwards

Structure of Credit Distribution as per the TANSCHE / UGC Guidelines

S.No.	Study Components	Part	Sem I		Sem II		Sem III		Sem IV		Sem V		Sem VI		No.of Paper	Total Credit
			No.of Paper	Credit	No.of Paper	Credit	No.of Paper	Credit	No.of Paper	Credit	No.of Paper	Credit	No.of Paper	Credit		
1	LANGUAGE - I	I	1	3	1	3	1	3	1	3					4	12
2	LANGUAGE - II	II	1	3	1	3	1	3	1	3					4	12
3	DISCIPLINE SPECIFIC COURSES (DSC) - THEORY	III	1	5	1	5	1	5	1	4	2	8	2	8	8	35
4	DSC - PRACTICAL	III	1	3	1	3	1	3	1	3	2	6	1	3	7	21
5	GENERIC ELECTIVE COURSES (GEC) - THEORY	III	1	3	1	3	1	3	1	3					4	12
6	GEC PRACTICAL	III					1	2	1	2					2	4
7	DISCIPLINE SPECIFIC ELECTIVE COURSES(DSE)	III									2	8	2	8	4	16
8	PROJECT WORK	III											1	3	1	3
9	INTERNSHIP	IV									1	2			1	2
10	ONLINE - COMPETITIVE EXAMINATION	IV											1	2	1	2
11	FOUNDATION COURSE	IV	1	2											1	2
12	SKILL ENHANCEMENT COURSES (SEC)-SBEC	IV			1	2	1	2	1	2	1	2	1	2	5	10

13	NON MAJOR ELECTIVE COURSES(NMEC)	IV	1	**2**	1	**2**									**2**	**4**
14	ABILITY ENHANCEMENT COMPULSORY COURSES(AECC)-EVS	IV							1	**2**					**1**	**2**
15	ABILITY ENHANCEMENT COMPULSORY COURSES(AECC)-VALUE EDUCATION - YOGA	IV									1	**2**			**1**	**2**
16	EXTENSION ACTIVITY	V											1	**1**	**1**	**1**
	Cumulative Credits		**7**	**21**	**7**	**21**	**7**	**21**	**8**	**22**	**9**	**28**	**9**	**27**	**47**	**140**

Total No.of Subjects	47
Marks	**4600**

PART	**No. of Credits**
PART - I	12
PART - II	12
PART - III	91
PART - IV	24
PART - V	1
Grand Total	**140**
Extra Credit	4
	144

MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE(Autonomous) - RASIPRAM - 637 408

Scheme of Examinations LOCF-CBCS Pattern as per TANSCHE Norms
(for the Students Admitted from the Academic Year:2023-2024 Onwards)
Programme : B.Sc., Electronics and Communication

S.No.	PART	STUDY COMPONENTS	COURSE CODE	TITLE OF THE COURSE	Hrs/W		CREDIT POINTS	MAX.MARKS		
					Lect	Lab		CIA	ESE	TOTAL
SEMESTER - I										
1	I	LANGUAGE-I	23M1UFTA01	TAMIL-I	6	-	3	25	75	100
2	II	LANGUAGE-II	23M1UFEN01	ENGLISH-I	6	-	3	25	75	100
3	III	DSC THEORY-I	23M1UELC01	FUNDAMENTALS OF ELECTRONICS	5	-	5	25	75	100
4	III	DSC PRACTICAL-I	23M1UELP01	PRACTICAL: BASIC ELECTRONICS	-	5	3	40	60	100
5	III	GEC THEORY -I	23M1UMAA03	ALLIED:DISCRETE MATHEMATICS - I	4	-	3	25	75	100
6	IV	NMEC -I		NMEC -I	2	-	2	25	75	100
7	IV	FC THEORY-1	23M1UELFC1	APPLIED ELECTRIC CIRCUITS	2	-	2	25	75	100
				TOTAL	**25**	**5**	**21**	**190**	**510**	**700**
SEMESTER - II										
1	I	LANGUAGE-I	23M2UFTA02	TAMIL-II	6	-	3	25	75	100
2	II	LANGUAGE-II	23M2UFEN02	ENGLISH-II	6	-	3	25	75	100
3	III	DSC THEORY-II	23M2UELC02	APPLIED DIGITAL ELECTRONICS	5	-	5	25	75	100
4	III	DSC PRACTICAL-II	23M2UELP02	PRACTICAL: DIGITAL ELECTRONICS		5	3	40	60	100
5	III	GEC THEORY -II	23M2UMAA04	DISCRETE MATHEMATICS - II	4	-	3	25	75	100
6	IV	NMEC -II		NMEC -II	2	-	2	25	75	100
7	IV	SEC-I	23M2UELS01	POWER ELECTRONICS	2	-	2	25	75	100
				TOTAL	**25**	**5**	**21**	**190**	**510**	**700**

SEMESTER - III										
1	I	LANGUAGE-I	23M3UFTA03	TAMIL-III	6	-	3	25	75	100
2	II	LANGUAGE-II	23M3UFEN03	ENGLISH - III	6	-	3	25	75	100
3	III	DSC THEORY-III	23M3UELC03	ELECTRONIC CIRCUITS	6	-	5	25	75	100
4	III	DSC PRACTICAL-III	23M3UELP03	PRACTICAL : ELECTRONIC CIRCUITS	-	4	3	40	60	100
5	III	GEC THEORY - III	23M3UCSA02	C PROGRAMMING	4	-	3	25	75	100
6	III	GEC PRACTICAL I	23M3UCSAP2	PRACTICAL : C PROGRAMMING		2	2	40	60	100
7	IV	SEC-II	23M3UELS02	8051 MICROCONTROLLER AND ITS APPLICATIONS	2	-	2	25	75	100
				TOTAL	**24**	**6**	**21**	**205**	**495**	**700**
SEMESTER - IV										
1	I	LANGUAGE-I	23M4UFTA04	TAMIL-IV	6	-	3	25	75	100
2	II	LANGUAGE-II	23M4UFEN04	ENGLISH - IV	6	-	3	25	75	100
3	III	DSC THEORY-IV	23M4UELC04	PRINCIPLES OF COMMUNICATION SYSTEMS	5	-	4	25	75	100
4	III	DSC PRACTICAL-IV	23M4UELP04	PRACTICAL : COMMUNICATION SYSTEMS	-	3	3	40	60	100
5	III	GEC THEORY - IV	23M4UCSAP4	ALLIED: PYTHON PROGRAMMING	4	-	3	25	75	100
6	III	GEC PRACTICAL -II	23M4UCSAP3	PRACTICAL : PYTHON PROGRAMMING	-	2	2	40	60	100
7	IV	SEC-III	23M4UELS03	MODERN ELECTRONIC MEASUREMENTS AND INSTRUMENTS	4	-	2	25	75	100
8	IV	**AECC-ENVIRONMENTAL STUDIES (EVS)***	23M4UEVS01	ENVIRONMENTAL STUDIES (EVS)	-	-	2	100	-	100
		*** Self Study**		**TOTAL**	**25**	**5**	**22**	**305**	**495**	**800**

SEMESTER - V										
1	III	DSC THEORY-V	23M5UELC05	LINEAR INTEGRATED CIRCUITS AND ITS APPLICATIONS	5	-	4	25	75	100
2	III	DSC THEORY-VI	23M5UELC06	EMBEDDED SYSTEMS AND PIC MICROCONTROLLER	5	-	4	25	75	100
3	III	DSC PRACTICAL-V	23M5UELP05	PRACTICAL : LINEAR INTEGRATED CIRCUITS	-	3	3	40	60	100
4	III	DSC PRACTICAL-VI	23M5UELP06	PRACTICAL: EMBEDDED SYSTEMS	-	3	3	40	60	100
5	III	DSE THEORY - I		ELECTIVE -I	5	-	4	25	75	100
6	III	DSE THEORY - II		ELECTIVE-II	5	-	4	25	75	100
7	IV	SEC-IV	23M5UELS04	COMPETITIVE SKILS	2	-	2	25	75	100
8	IV	AECC-VALUE EDUCATION	23M5UVED01	YOGA	2	-	2	100	-	100
9	IV	INTERNSHIP	23M5UELIS1	INTERNSHIP	-	-	2	100	-	100
				TOTAL	**24**	**6**	**28**	**405**	**495**	**900**
SEMESTER - VI										
1	III	DSC THEORY-VII	23M6UELC07	PCB DESIGN AND FABRICATION	5	-	4	25	75	100
2	III	DSC THEORY-VIII	23M6UELC08	VLSI DESIGN AND VHDL PROGRAMMING	5	-	4	25	75	100
3	III	DSC PRACTICAL-VI	23M6UELP06	PRACTICAL : VHDL PROGRAMMING	-	3	3	40	60	100

4	III	DSE THEORY - III		ELECTIVE-III	5	-	4	25	75	100
5	III	DSE THEORY - IV		ELECTIVE-IV	5	-	4	25	75	100
6	III	PROJECT WORK	23M6UELPR1	PROJECT WORK	-	3	3	25	75	100
7	IV	SEC-V	23M4UELS05	LIFE AND ENTREPRENUER DEVELOPMENT SKILLS	2	-	2	25	75	100
8	IV	PROFESSIONAL COMPETENCY SKILLS	23M6UELOE1	ELECTRONICS AND COMMUNICATION FOR COMPETITIVE EXAMINATION	2		2	100	-	100
9	V	EXTENSION ACTIVITY	23M6UEXA01	EXTENSION ACTIVITY	-	-	1	-	-	-
				TOTAL	**24**	**6**	**27**	**290**	**510**	**800**
				OVERALL TOTAL	**147**	**33**	**140**	**1585**	**3015**	**4600**
10		EXTRA CREDIT COURSE		MOOC Courses offered in SWAYAM / NPTEL	-	-	2	-	-	-
11		VALUE ADDED		VALUE ADDED COURSE	-	-	2	-	-	-

HOD **MEMBER SECRETARY ACADEMIC COUNCIL** **PRINCIPAL**

B.Sc.-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M1UELC01	FUNDAMENTALS OF ELECTRONICS	DSC THEORY-I	I	5	5	-	-	5
Objective	To enable the students to understand and gain the knowledge on Basic Electronics devices.							

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Semiconductors and PN Junction Diode**: Structure of an Atom - Atomic Number - Valence Electrons - Bonding in Conductors - Insulators – Semiconductors - Energy Band Structure and Conduction in Insulator – Semiconductor - Conductor - Intrinsic Semiconductors – Extrinsic Semiconductor – Doping - P Type Semiconductor - N type Semiconductor- Formation for PN Junction – PN Junction Diode – Characteristics - Drift Current and Diffusion Current- Applications of PN junction Diode.	K2	12
II	**Special Diodes:** Zener Diode - Varactor Diode- Shcottkey Diode -Tunnel Diode - Impatt Diode - PIN Diode - PNPN Diode Construction – Operation – Characteristics –Applications – Breakdown – Zener diode as a voltage regulator.	K3	11
III	**BJT and Biasing:** Introduction to Bipolar Junction Transistor – Construction - Transistor Biasing - Operation of NPN and PNP Transistor - CB, CE and CC Configuration – Input Characteristics – Output Characteristics - Transfer Characteristics - Comparison - Bias Stability - Load Line **Method of Biasing:** Fixed Bias - Collector to Base Bias - Voltage Divider Bias – Bias Compensation - Thermal Runaway – Heat Sink.	K4	12
IV	**Field Effect Transistors and UJT:** JFET: Introduction to FET - Types - Construction – Operation - Characteristics of JFET - Applications of JFET - JFET as a Voltage Variable Resistor – Comparison of FET and BJT.**MOSFET:** Construction – Operation - Characteristics of MOSFET - Applications of MOSFET – Comparison of E-MOSFET and DE_MOSFET.**UJT:** Construction – Operation - Characteristics of UJT - Applications of UJT - UJT as Relaxation Oscillator.	K2	13
V	**Opto Electric Devices:** Introduction to Opto electric devices - Construction - Operation and Characteristics of Opto Electronic Devices - LDR – Photo Diode - Photo Transistor – Photo Voltaic Cell – Solar Cell – LED – IR Emitter – LCD –Seven Segment Display – Opto couplers- LASER Diode .	K4	12
Course Outcome	**CO1:** Recognize the various concepts of semiconductor physics.	K1	
	CO2: Understand the operation and characteristics of various Semiconductor devices.	K2	

	CO3: Apply the operation of the devices to various application designs	K3	
	CO4: Illustrate the functionality of different kinds of special diodes and opto electric devices.	K3	
	CO5: Analyze the characteristics of the devices in different aspects.	K4	

Learning Resources	
Text Books	1. S. Salivahanan, N. Suresh Kumar, A. Vallavaraj, "Electronics Devices and Circuits", Tata McGraw Hill Publishing Company Limited, New Delhi, 8th edition. 2. V.K.Metha, Rohit Metha, —Principles of Electronics" S Chand, 7th Edision-2014 3. R. S. Sedha, "A Text Book of Applied Electronics" , S.Chand and Company Ltd., 2010.
Reference Books	1. S.L. Kakani,K. C. BhanDai—"A text book Of Electronics". 2. Bernard Grob-"Basic Electronics"-Tata McGraw-Hill Publishing Company Limited, New Delhi.
Website Link	https://nptel.ac.in/courses/108/108/108108122/ https://nptel.ac.in/courses/108/108/108108112/

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
21M1UELC01	FUNDAMENTALS OF ELECTRONICS	DSC THEORY - I	I	5	5	-	-	5

CO-PO Mapping

CO Number	PO1	PO2	PO 3	PO4	PO 5	PSO1	PSO 2	PSO3	PSO 4	PSO5
CO1	M	L	L	L	S	S	S	M	L	S
CO2	M	M	L	L	S	M	S	M	L	S
CO3	S	M	L	M	M	S	S	M	L	M
CO4	M	M	L	M	M	S	S	S	L	S
CO5	M	M	L	M	S	M	M	S	L	S

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
MR.I. BALAKRISHNAN	**MR.S. ARULMANI**	**Dr.S.SHAHITHA**

B.Sc.–Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M1UELP01	PRACTICAL: BASIC ELECTRONICS	DSC PRACTICAL - I	I	5	-	-	5	3
Objective	To get familiarized with the various electronic instruments and components which basically equip Students to construct complex circuits in near future.							

S.No.	**Course Content**	**Knowledge Levels**	**Sessions**
1	Colour Coding of Resistors.	K1	3
2	PN Junction Diode Characteristics.	K3	3
3	Zener Diode Characteristics.	K3	3
4	Input, Output & Transfer characteristics of CE Configuration.	K3	3
5	JFET Characteristics.	K3	3
6	SCR Characteristics.	K3	3
7	DIAC / TRIAC Characteristics	K3	3
8	LDR Characteristics.	K3	3
9	Verification of Ohm's Law.	K3	3
10	Verification of KVL and KCL.	K4	3
11	Verification of Thevinin's theorem.	K4	3
12	Verification of Notorn’s theorem.	K4	3
13	Verification of Super position theorem.	K4	3
Course Outcome	**CO1:** Recall the colour coding of resister, measurement of voltage, current and frequency.	K1	
	CO2: Simplify the complex circuits to small circuits using various laws and Theorems	K4	
	CO3: Design and Evaluate the operations of various gates and Combinational logic circuits.	K5	
	CO4: Evaluate and Justify the working of special digital ICs	K5	
	CO5: Build the DC regulated power supply.	K6	

Learning Resources	
Text Books	1. K A Navas - “Electronics Lab Manual- Volume-I “- 6th Edition - PHI Learning Pvt.Ltd. New Delhi.

Reference Books	2. A. M. Zungeru, J. M. Chuma, M. Mangwala, H. U. Ezea," Handbook of Laboratory Experiments in Electronics Engineering Vol. 1, Volume 1" Notion Press, Incorporated, 2016									
Website Link	1. http://vlabs.iitkgp.ernet.in/be/# 2. http://vlabs.iitkgp.ac.in/dec/#									
	L-Lecture		T-Tutorial	P-Practical		C-Credit				
B. Sc–Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards										
Course Code	**Course Title**		**Course Type**		**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M1UELP01	PRACTICAL: BASIC ELECTRONICS		DSC PRACTICAL - I		I	5	-	-	5	3
CO-PO Mapping										
CO Number	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	S	M	L	L	L	M	S	S	L	M
CO2	S	M	L	S	L	M	M	S	L	M
CO3	M	M	L	M	M	M	S	S	M	M
CO4	S	M	L	S	M	M	L	S	S	M
CO5	S	M	L	S	M	M	M	S	S	M
Level of Correlation between CO and PO	L-LOW					M-MEDIUM			S-STRONG	
Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz									
Teaching and Learning Methods	Demonstration, Hands on Training and Practical Sessions									
Assessment Methods	Observation, CIA-I, CIA-II and ESE									
Designed By			**Verified By**			**Approved By Member Secretary**				
MR.I. BALAKRISHNAN			**MR.S. ARULMANI**			**Dr.S.SHAHITHA**				

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M2UELC02	APPLIED DIGITAL ELECTRONICS	DSC THEORY - II	II	5	5	-	-	5
Objective	To impart basic knowledge to the students for understanding of various number systems, Boolean algebra and design of combinational and sequential logic circuits.							

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Number systems:** Binary Signals – Binary Number System – Decimal Number System - Octal Number System – Hexadecimal Number System – Conversion from One Number System to Another Number System - BCD – Gray code – Excess 3 Code – ASCII code. **Boolean algebra**: Binary Arithmetic - 1's and 2's Complements - 9's & 10's Complements- Basic laws - Duality Theorem – De Morgan's Theorem - SOP and POS- Karnaugh Maps upto 4 variables.	K2	12
II	**Combinational Elements:** Logic Gates - AND, OR, NOT, EX-OR, EX-NOR, NAND & NOR - Logic Gates using Discrete Components - Universal Gates - Half & Full Adder – Half & Full Subtractor -4 bit Binary adder- Encoder - Decoder - Multiplexer - Demultiplexer - Implementation using 74147, 7442, 74153 & 74155 IC's.	K3	12
III	**Sequential Elements:** Flip Flops- RS - Clocked RS - JK - JK Master Slave - D & T Flip Flops – Shift Registers: SIPO – SISO – PIPO – PISO – Shift Left – Shift Right - Counters - Hexadecimal Up - Hexadecimal Down - Modulo Up - Modulo Down - UP/DOWN Counters - Decade Counter -Ring counter – Twisted Ring Counter. Johnson Counter - Implementation Using 7476, 7495, 7493 & 7490 IC's.	K3	12
IV	**A/D AND D/A Conversion:** Parallel Comparator Type of ADC - Counter Ramp Type of ADC - Successive Approximation Type of ADC - Dual Slope Type of ADC - ADC Accuracy and Resolution - Binary weighted Resistor type of DAC - R-2R Ladder Type of DAC - DAC Accuracy and Resolution - Implementation using ADC 0809 & DAC 0800 IC's.	K4	12
V	**8085 Microprocessor:** Introduction - Pin details - Architecture - Addressing Modes - Instruction formats- Classification of Instruction Set - Machine Cycles of Opcode Fetch, Memory Read/Write, IN and OUT instructions- Stack and Stack Operations - Interrupts - Applications.	K3	12
Course Outcome	**CO1:** Recognize and outline the various number systems and Boolean Algebra.	K1	
	CO2: Understand and apply the design procedure of digital circuits.	K2	

	CO3: Demonstrate the design procedures over combinational and sequential circuits.	K3
	CO4: Perform the data conversion process using various A/D and D/A converters.	K3
	CO5: Illustrate and analyze the digital logics using basic microprocessor.	K4

Learning Resources	
Text Books	1. Donald, P.Leach, Albert Paul Malvino and Goutam Saha, "Digital Principles and Applications", 8th Edition- 2014 TMH, New Delhi. 2. S. Salivahanan, "Digital Circuits and Design", 4th Edition S.Chand- 2012. 3. Ramesh.S Gaonkar "Microprocessor Architecture, Programming and Applications With the 8085/8080A –New Age International – 5th Edition.
Reference Books	1. Virendra Kumar, "Digital Technology Principles and Practice", 2nd Edition- New Age International publications, New Delhi - 2015. 2. Jacob.Millman and Christos Halkias , "Integrated Electronics Analog and Digital Circuits and Systems", Second Edition- 2011. TMH, New Delhi.
Website Link	1. https://onlinecourses.nptel.ac.in/noc22_ee110/preview 2. https://onlinecourses.swayam2.ac.in/cec21_cs16/preview

L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M2UELC02	APPLIED DIGITAL ELECTRONICS	DSC THEORY - II	II	5	5	-	-	5

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	L	S	M	M	M	M	M	L
CO2	S	M	L	S	M	S	M	M	M	M
CO3	L	M	L	S	M	S	M	M	M	M
CO4	M	M	L	M	S	L	M	S	S	M
CO5	M	M	L	M	M	S	M	S	M	M

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
MR.I. BALAKRISHNAN	**MR.S.ARULMANI**	**Dr.S.SHAHITHA**

B.Sc.–Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M2UELP02	PRACTICAL: DIGITAL ELECTRONICS	DSC PRACTICAL-II	II	5	-	-	5	3
Objective	To get familiarized with the various electronic instruments and components which basically equip Students to construct complex circuits in near future.							

S.No.	Course Content	Knowledge Levels	Sessions
1	Truth Table Verification of Basic Gates.	K4	3
2	NAND and NOR as a Universal Gate (Any 3 Logics)	K5	3
3	Verification of De Morgan's Theorem.	K5	3
4	Truth Table Verification of Half Adder	K5	3
5	Truth Table Verification of Full Adder	K5	3
6	Truth Table Verification of Half Subtractor	K5	3
7	Truth Table Verification of Full Subtractor	K6	3
8	Encoder Using 74147 IC	K6	3
9	Decoder Using 7442 IC	K6	3
10	Multiplexer Using 74153 IC	K6	3
11	Demultiplexer Using 74155 IC	K6	3
12	Parity Generator and Checker.	K6	3
13	MS JK Flip Flop Using 7476 IC	K6	3
14	Parallel In Parallel Out Shift Register Using 7495 IC	K6	3
Course Outcome	**CO1:** Recall the color coding of resister, measurement of voltage, current and frequency.	**K1**	

	CO2: Simplify the complex circuits to small circuits using various laws and Theorems	**K4**	
	CO3: Design and Evaluate the operations of various gates and Combinational logic circuits.	**K5**	
	CO4: Evaluate and Justify the working of special digital ICs	**K5**	
	CO5: Build the DC regulated power supply.	**K6**	

Learning Resources	
Text Books	1. K A Navas - "Electronics Lab Manual- Volume-I " - 6th Edition - PHI Learning Pvt.Ltd., New Delhi.
Reference Books	2. A. M. Zungeru, J. M. Chuma, M. Mangwala, H. U. Ezea," Handbook of Laboratory Experiments in Electronics Engineering Vol. 1, Volume 1" Notion Press, Incorporated, 2016
Website Link	1. http://vlabs.iitkgp.ernet.in/be/# 2. http://vlabs.iitkgp.ac.in/dec/#

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards												
Course Code	**Course Title**			**Course Type**		**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M2UELP02	PRACTICAL:DIGITAL ELECTRONICS			DSC PRACTICAL - II		II	5	-	-	5	3	
CO-PO Mapping												
CO Number	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**		
CO1	S	M	L	L	L	M	S	S	L	M		
CO2	S	M	L	S	L	M	M	S	L	M		
CO3	M	M	L	M	M	M	S	S	M	M		
CO4	S	M	L	S	M	M	L	S	S	M		
CO5	S	M	L	S	M	M	M	S	S	M		
Level of Correlation between CO and PO	L-LOW			M-MEDIUM			S-STRONG					

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Demonstration,Hands on Training and Practical Sessions
Assessment Methods	Observation, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
MR.I. BALAKRISHNAN	**MR.S. ARULMANI**	**Dr.S.SHAHITHA**

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3UELC03	ELECTRONIC CIRCUITS	DSC THEORY - III	III	6	4	2	-	5

Objective	To acquaint the students to understand and gain the knowledge on power supplies, various amplifiers, Oscillators and Multivibrators.		
Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Power Supply:** Half Wave Rectifier - Full Wave Rectifier - Bridge Rectifier - Average value - RMS value - Form factor - Peak factor - Ripple factor - Efficiency - TUF - PIV - Filters: C, L, LC, CLC, CRC – Voltage Regulators : Series Regulators - Shunt Regulators - IC Voltage Regulators (78XX & 79XX) -Design of dual IC regulated power supply	K3	15
II	**Wave shaping circuits:** introduction to Wave Shaping Circuits – RC & RL Circuits – Basic Differentiator - Basic Integrator - Clipping Circuits - Clamping Circuits – Voltage Doubler – Tripler – Quadrupler.	K3	15
III	**BJT Amplifiers:** Transistor as an amplifier-small signal Analysis of Common Emitter-AC Load line, Voltage swing limitations- Common collector amplifier- common base amplifiers – Differential amplifiers- CMRR- Darlington Amplifier- Bootstrap technique - Cascaded stages - Cascade Amplifier-Large signal Amplifiers - Class A, Class B and Class C Power Amplifiers	K5	15
IV	**Feedback Amplifiers:** Basics concepts of Feedback - Effects of negative feedback – Gain-Bandwidth- Distortion, Noise- Input and Output Impedance - Types of Negative Feedback - Voltage Series - Voltage Shunt - Current Series and Current Shunt Feedback.	K5	12
V	**Oscillators and Multivibrators:** Concept of sustained oscillation- Barkhausen Criterion- Classification of Oscillators - Hartley Oscillator – Colpitt's Oscillator - Clapp Oscillator - Phase Shift Oscillator - Wein Bridge - Crystal Oscillator - Frequency stability of Oscillators - Astable Multivibrator - Monostable Multivibrator - Bistable Multivibrator - Schmitt Trigger. ***Current Trends:** Design of Function Generators	K4	15
Course Outcome	**CO1:** Remember the applications of diodes and apply it over power supply design	K1	
	CO2: Interpret the functionality of different wave shaping circuits using diode.	K2	
	CO3: Classify and Model the BJT amplifiers based on the frequency, power and coupling method.	K3	
	CO4: Analyze the principles of feedback systems behind the design of amplifiers and oscillators.	K4	

	CO5: Evaluate the performance of various electronic circuits.	K5	

Learning Resources	
Text Books	1. S. Salivahanan, N. Suresh Kumar, A. Vallavaraj, "Electronics Devices and Circuits", Tata McGraw Hill Publishing Company Limited, New Delhi, 8th Ed. 2. V. K. Metha, Rohit Metha, —Principles of Electronics" S Chand, 2006. 3. R. S. Sedha, " A Text Book of Applied Electronics" , S. Chand and Company Ltd., 2010.
Reference Books	1. B.Sasikala, C.Poornachandra, Electronic Devices and Circuits", Scitech 2003. 2.B. L. Theraja, "Basic Electronics – Solid state Devices", S.Chand & Company Ltd. 2000
Website Link	http://www.ee.iitm.ac.in/~ani/2012/ec5135/lectures.htmlLecture Notes https://nptel.ac.in/courses/108/102/108102095/Analog Electronic circuits
***Self Study Material**	https://www.startus-insights.com/innovators-guide/electronics-manufacturing-trends/

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M3UELC03	ELECTRONIC CIRCUITS	DSC THEORY - III	III	6	4	2	-	5	

CO-PO Mapping

CO Number	**PO 1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	M	M	L	M	M	S	S	M	M	M
CO2	M	L	L	L	M	S	S	M	L	M
CO3	M	M	L	M	L	S	M	M	L	M
CO4	M	M	L	M	M	M	M	M	M	S
CO5	M	M	L	M	M	S	S	M	M	S

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
MR.I. BALAKRISHNAN	**MR.S. ARULMANI**	**Dr.S.SHAHITHA**

B. Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M3UELP03	PRACTICAL:ELECTRONIC CIRCUITS	DSC PRACTICAL - III	III	4	-	-	4	3
Objective	To prepare the students to design and analyze various electronic circuits using discrete active and passive components.							

S.No.	**List of Experiments / Programs (Any 10)**	**Knowledge Levels**	**Sessions**
1	Half wave, Full wave and Bridge Rectifier with capacitor filter.	K2	5
2	Basic Integrator and Differentiator.	K4	5
3	Clipper and Clapper Circuits (Positive and Negative)	K4	5
4	Voltage Doubler and Tripler	K5	5
5	Hartley Oscillator, Colpitt's Oscillator Using Transistor.	K5	5
6	RC Phase shift Oscillator using transistor.	K5	5
7	Crystal Oscillator using Transistor	K5	5
8	UJT as relaxation Oscillator.	K5	5
9	Astable and Monostable Multivibrator Using Transistors.	K5	5
10	Bistable Multivibrator and Schmitt Trigger Using Transistors.	K5	5
11	Design of Dual Regulated Power supply using IC 78XX and 79XX.	K6	5
12	Automatic Street light control using LDR.	K6	5
13	Lamp Dimmer using DIAC and TRIAC.	K6	5
Course Outcome	**CO1:** Remember and understand the applications of PN junction Diode.		K1
	CO2: Demonstrate and analyze the various wave shaping circuits using discrete components.		K3
	CO3: Evaluate the performance of electronic circuits.		K5

	CO4: Create a DC regulated Power supply.	K6
	CO5: Build simple real time applications using basic discrete components.	K6

Learning Resources	
Text Books	1. K A Navas - "Electronics Lab Manual- Volume-I "- 6th Edition - PHI Learning Pvt. Ltd., New Delhi.
Reference Books	1. A. M. Zungeru, J. M. Chuma, M. Mangwala, H. U. Ezea," Handbook of Laboratory Experiments in Electronics Engineering Vol. 1, Volume 1" Notion Press, Incorporated, 2016
Website Link	1. http://vlabs.iitkgp.ac.in/ssd/#

L-Lecture	T-Tutorial	P-Practical	C-Credit

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
23M3UELP03	PRACTICAL: ELECTRONIC CIRCUITS	DSC PRACTICAL - III	III	4	-	-	4	3

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	L	M	S	S	M	S	M	S
CO2	M	L	L	M	S	S	M	S	M	S
CO3	M	S	L	M	S	S	M	S	M	M
CO4	M	S	L	S	S	S	M	S	S	M
CO5	M	S	L	S	S	S	M	S	S	M

Level of Correlation between CO and PO: L-LOW, M-MEDIUM, S-STRONG

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Demonstration, Hands on Training and Practical Sessions
Assessment Methods	Observation, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
MR.I. BALAKRISHNAN	**MR.S. ARULMANI**	**Dr.S.SHAHITHA**

B.Sc.-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4UELC04	PRINCIPLES OF COMMUNICATION SYSTEMS	DSC THEORY - IV	IV	5	3	2	-	4

Objective	Students learn about the concept of wave propagation methods, acquire knowledge on modulation techniques and to inculcate the principle of radio receivers.

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Wave propagations and Antennas:** EM frequency spectrum – Propagation of EM wave - Ground wave propagation - Space wave propagation – Sky wave propagation - Antennas - Types of antennas- Monopole and dipole antenna- directional and Omni directional antenna- VSAT - UHF and VHF Transmitting and Receiving Antenna - parabolic antenna- applications.	K3	12
II	**Analog modulation:** Types of modulation –Frequency spectrum - Amplitude modulation –Modulation index – DSBSC – DSBFC - SSB and VSB - Frequency modulation - modulation index – Pre-Emphasis – De Emphasis- - Phase modulation – Basic principle- Modulation Index	K4	12
III	**Receivers: AM Receiver**: AM Receivers: Types of receivers - TRF Receivers – Super heterodyne receivers – SSB receiver – AGC types – Simple and Delayed AGC **FM receiver:** Stereophonic FM receiver – Analog FM Receiver – Digital FM receiver	K4	12
IV	**Pulse modulation:** Definition-Types: Generation and Detection of PAM, PWM, PPM, DPCM, PCM – Sampling theorem – Quantization – Quantization error – Companding	K3	12
V	**Digital modulation Techniques**: ASK – FSK- CPFSK – CPM –GMSK – MSK – PSK ***Current Trends-** Multiple Access Techniques	K3	12
Course Outcome	**CO1:** Recall the principles of the electromagnetic spectrum and wave propagation methods.	K1	
	CO2: Contrast and illustrate the various needs of modulation and principles of modulation techniques.	K2	
	CO3: Predict and criticize the performance of different stages of communication receivers.	K3	
	CO4: Analyze the performance of various pulse modulation techniques.	K3	

	CO5: Classify and select the appropriate peripheral devices to design Microcontroller based systems.	K5	

Learning Resources	
Text Books	1. K.D. Prasad and Sathya Prakash, "Antenna wave propagation", IstEd (2017) 2. George Kennedy, "Electronic Communication systems",6thEd, TMH,New Delhi, 3. Roddy and Collen, "Electronic Communication systems", Pearson India (2008)
Reference Books	1. Louis E Frenzel, "Communication Electronics principles and Applications", TMH, New Delhi, 3rd Ed (2008) 2. Sanjeev Gupta, "Electronic Communications", Khanna publications, 3rd Ed (1997)
Website Link	1. https://onlinecourses.nptel.ac.in/noc22_ee115/preview 2. https://onlinecourses.nptel.ac.in/noc22_ee73/preview 3. https://onlinecourses.nptel.ac.in/noc22_ee118/preview
***Self Study Material**	https://nlist.inflibnet.ac.in/search/Search/Results?lookfor=Blockchain+Integration+in+Telecommunication%7E

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M4UELC04	PRINCIPLES OF COMMUNICATION SYSTEMS	DSC THEORY - IV	IV	5	3	2	-	4

23M4UELC04

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	S	S	L	S	L	S	L	L
CO2	S	M	L	M	L	M	M	M	S	M
CO3	S	M	L	M	M	M	S	S	M	S
CO4	M	S	L	S	M	S	M	M	L	M
CO5	M	S	L	L	M	S	M	S	S	M
Level of Correlation between CO and PO	L-LOW					M-MEDIUM			S-STRONG	

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
Mrs.P.VIJAYALAKSHMI	**MR.S. ARULMANI**	**Dr.S.SHAHITHA**

B. Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M4UELP04	PRACTICAL: COMMUNICATION SYSTEMS	DSC PRACTICAL-IV	IV	3	-	-	3	3
Objective	To Impart the students in design and Analysis of various Communication Circuits.							

S.No.	**List of Experiments / Programs (Any 10)**	**Knowledge Levels**	**Sessions**
1	Design a K - Low Pass Filter	K5	5
2	Design a K - High Pass Filter	K5	5
3	Amplitude Modulation and Demodulation	K4	5
4	Frequency Modulation and Demodulation	K4	5
5	PAM generation and detection	K4	5
6	PWM generation and detection	K4	5
7	PPM generation and detection	K4	5
8	Pre-Emphasis and De-Emphasis	K4	5
9	Generation of ASK	K4	5
10	Study of PCM Generation and Detection	K2	5
11	AM/FM receiver circuits	K2	5
12	Generation of FSK	K2	5
13	Installation and Alignment of DTH Receiver	K5	5
Course Outcome	**CO1:** Understand the AM/FM Receivers.		K1
	CO2: Design and analyze filters for communication devices.		K3
	CO3: Demonstrate and analyze the different Modulators and Detectors		K3

	CO4: Design and analysis of Pulse modulators and detectors.	K4
	CO5: Build and align a DTH receiver	K5

Learning Resources	
Text Books	1. S. Poorna Chandra, B. Sasikala, "Electronics Laboratory Primer", S. Chand and Company, Reprint (2005)
Reference Books	1. K A Navas, Electronics Lab Manual- Volume-II, PHI Learning Pvt.Ltd. New Delhi, Sixth Edition
Website Link	https://www.youtube.com/watch?v=E5evBWUI9zI https://www.scribd.com/document/36000190/DTH-Installation-Procedure

L-Lecture	T-Tutorial	P-Practical	C-Credit

B. Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M4UELP04	PRACTICAL: COMMUNICATION SYSTEMS	DSC PRACTICAL-IV	IV	3	-	-	3	3	

CO-PO Mapping

CO Number	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO1	S	M	L	L	M	S	L	M	L	M
CO2	S	M	L	M	L	M	S	M	L	M
CO3	M	M	S	M	L	M	L	S	M	M
CO4	M	M	L	M	M	S	M	M	L	M
CO5	M	M	L	M	M	M	M	S	M	M

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Demonstration,Hands on Training and Practical Sessions
Assessment Methods	Observation, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
Mrs.P.VIJAYALAKSHMI	**MR.S. ARULMANI**	**Dr.S.SHAHITHA**

B. Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M5UELC05	LINEAR INTEGRATED CIRCUITS AND ITS APPLICATIONS	DSC THEORY – V	V	5	3	2	-	4
Objective	To learn about the IC fabrication process and the fundamental building blocks of linear integrated circuits, as well as to become acquainted with linear integrated circuit applications.							

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**IC Fabrication and Logic Families:** Introduction of IC and its Types – IC Integration Density & Its Types –Fundamentals of Monolithic IC technology-Basic Planar Process - Fabrication of FET, MOSFET& CMOS - Characteristics of logic families – DL – RTL – DTL – TTL – ECL – IIL – CMOS-Comparison of logic families.	K2	12
II	**Operational Amplifiers:** Introduction and Block diagram - The ideal OP-AMP – Manufacturer Designation of Linear IC'S –Internal circuit diagram of IC 741-AC Characteristics -DC Characteristics-Level Translator-Differential Amplifier-Open and closed loop configurations.	K2	12
III	**OP-AMP Applications:**Inverting Amplifier-Non-Inverting Amplifier - Adder - Subtractor - Multiplier - Divider - Integrator - Differentiator - V to I Converter - I to V Converter-Log and Antilog Amplifier – Voltage Follower-Sign Changer-Scale Changer.	K4	12
IV	**Filters and Waveform Generators:**Active filter - First order Low Pass filter - First order High-Pass filter - Band pass filters - Band reject filter - RC Oscillator – LC Oscillators - Square wave generator -Triangular wave - Saw tooth waveform generator.	K4	12
V	**Timer and PLL:** Introduction to IC 555 timer-Description of Functional diagram - Monostable Operation - Astable operations - Schmitt trigger – Introduction to PLL - basic principle and operation-phase detector/comparator-voltage controlled oscillator (IC 566)-Monolithic PLL (IC 565)- Applications of PLL. ***Current Trends:**Variable Voltage Regulator IC LM317/337	K5	12
Course Outcome	**CO1:** Understanding basic knowledge in IC fabrication procedure.	K1	
	CO2: Understand the characteristics of Op-Amp.	K2	
	CO3: Apply knowledge on the Applications of Op-amp.	K3	
	CO4: Analyze to design various filters in circuit and waveform generators.	K4	
	CO5: Analyze functional blocks and the applications of special ICs.	K5	

Learning Resources	
Text Books	1. D.Roy Choudhry, Shail Jain, "Linear Integrated Circuits", New Age International Pvt. Ltd.. 2. Ramakant A. Gayakwad, "Op-amps & Linear Integrated Circuits", 3rd Edition, Prentice Hall India.
Reference Books	1. William D. Stanley, "Operational Amplifier with Linear Integrated Circuits", Pearson Education, 2004. 2. Robert F Coughlin, Fredrick, F. Drisold, "Op-amp and linear ICs", 4th Edition, Pearson education, 2002. 3. 3.S.Salivahanan& V.S. Kanchana Bhaskaran, "Linear Integrated Circuits", TMH, 2008.
Website Link	1. https://onlinecourses.nptel.ac.in/noc24_ee81/preview
***Self Study Material**	https://electrocredible.com/variable-voltage-regulator-circuit-diagram-working/#google_vignette

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B. Sc–Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M5UELC05	LINEAR INTEGRATED CIRCUITS AND ITS APPLICATIONS	DSC THEORY – V	V	5	3	2	-	4

CO-PO Mapping

CO Number	PO 1	PO2	PO 3	PO4	PO5	PSO1	PSO 2	PSO3	PSO 4	PSO5
CO1	S	M	L	L	L	M	S	S	L	M
CO2	S	M	L	S	L	M	M	S	L	M
CO3	M	M	L	M	M	M	S	S	M	M
CO4	S	M	L	S	M	M	L	S	S	M
CO5	S	M	L	S	M	M	M	S	S	M

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
Mr. ARULMANI	**Mr.S. ARULMANI**	**Dr.S.SHAHITHA**

B. Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M5UELC06	EMBEDDED SYSTEMS AND PIC MICROCONTROLLER	DSC THEORY - VI	V	5	3	2	-	4
Objective	To give good understanding to the students about various PIC microcontroller features and software techniques for developing an embedded system.							

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Embedded Systems:** Definition and classification – Overview of microprocessor, Microcontroller, and DSP – exemplary high performance processors – CISC and RISC architecture – hardware unit in an embedded System- software embedded into a system – exemplary applications – embedded systems on a chip and in VLSI circuit	K3	12
II	**PIC 16F877 Architecture and Instruction Set:** Device Overview - Architecture - Memory Organization - Status Register - Option Register - INTCON Register - PCON Register - I/O Ports - Data EEPROM - Byte Oriented Operations - Bit Oriented Operations Literal and Control Operations.	K3	12
III	**Features of PIC:** TIMER 0 Module - TIMER 1 Module - TIMER 2 Module - Capture/Compare/ PWM Modules - I^2C transmission and reception - USART – SPI - ADC Module - Oscillator Selection - Power on Reset — Power up Timer — Oscillator Startup Timer — Brownout Reset— Interrupts — Watchdog Timer —Sleep.	K4	12
IV	**Interfacing And Applications:** Interfacing of Switch and LEDs – Relay and Solenoid Interfacing – Hex Keyboard Interfacing - 7 Segment Display Interfacing - LCD interfacing – DAC interfacing – Stepper motor interfacing – DC motor interfacing -ADC application -PWM applications. (Use Embedded C Programming)	K4	12
V	**Embedded Software Architecture & Operating System:** Round Robin — Round Robin with Interrupts — Function Queue Scheduling Architecture— Real Time Operating Systems (RTOS) — Tasks and Data —Semaphores and Shared Data— Message Queues, Mail Box and Pipes —Timer Function — Events — Memory Management - Types of RTOS – Study of Micro C/OS-II - Vx Works. ***Current Trends:** RTOS for IoT Systems	K5	12
Course Outcome	**CO1:** Recognize the core concepts of Embedded systems and their applications	K1	
	CO2: Illustrate the hardware details of PIC16F87X microcontroller family.	K2	

	CO3: Identify and practice the programming methods using PIC Instruction	K3	
	CO4: Analyze the software architecture used in embedded systems.	K4	
	CO5: Demonstrate the various development tools of RTOS.	K5	

Learning Resources	
Text Books	1. Rajkamal, "Embedded Systems Architecture, Programming and Design-3rd Edition TATA McGraw- Hill -2017. 2. PIC 16F87X data book, Microchip Technology Inc.,
Reference Books	1. Programming and customizing PIC micro controllers- by Mykepredrco – 2nd edition – Tata McGraw Hill .
Website Link	1. https://embeddedschool.in/architecture-and-applications-of-pic-microcontroller/ 2. https://onlinecourses.nptel.ac.in/noc24_cs33/preview
***Self-Study Material**	https://medium.com/@harshhvm/iot-os-and-rtos-for-internet-of-things-devices-967c9b8077c6

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M5UELC06	EMBEDDED SYSTEMS AND PIC MICROCONTROLLER	DSC THEORY - VI	V	5	3	2	-	4

CO-PO Mapping

CO Number	PO1	PO2	PO 3	PO 4	PO 5	PSO 1	PSO2	PSO3	PS O4	PSO5
CO1	S	L	L	S	M	S	M	M	S	M
CO2	M	S	L	S	M	M	M	S	M	L
CO3	S	L	L	S	M	S	M	S	S	L
CO4	M	S	L	L	M	L	M	S	L	S
CO5	L	M	L	S	M	S	M	S	M	S

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
Mr.I. BALAKRISHNAN	**Mr.S.ARULMANI**	**Dr.S.SHAHITHA**

B. Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M5UELP05	PRACTICAL: LINEAR INTEGRATED CIRCUITS	DSC PRACTICAL - V	V	3	-	-	3	3

Objective	To give a practice to the students for handling various linear integrated circuits and their applications.

S.No.	List of Experiments / Programs (Any 10)	Knowledge Levels	Sessions
1	Inverting and Non Inverting Amplifier using IC741	K3	4
2	Summing amplifier using IC 741	K3	4
3	Difference amplifier using IC741	K3	4
4	Integrator and Differentiator using IC 741	K3	4
5	Voltage to Current Converter using IC 741 (Grounded Load)	K3	4
6	Low pass Filter using IC 741	K3	4
7	High Pass Filter using IC 741	K3	4
8	Phase Shift Oscillator using IC 741	K4	4
9	Square and Triangle Wave generation using IC741	K4	4
10	Astable Multivibrator using IC555	K4	4
11	Monostable Multivibrator Using IC555	K5	4
12	Bistable multivibrator using IC 555	K5	4
13	Schmitt Trigger using IC 555	K5	4
Course Outcome	**CO1:** Understand the basic knowledge on basics of PIC microcontrollers		K1
	CO2: Interpret a basic knowledge about programming and system control to perform a specific task		K2
	CO3: Illustrate knowledge about devices and buses used in embedded systems.		K3

	CO4: Determine andDevelop programming skills in embedded systems for various applications	K4
	CO5: Acquire knowledge about basic concepts of circuit emulators.	K4

Learning Resources	
Text Books	1. Joseph Greenfield, Practical digital design using Digital ICS, Prentice Hall 2. Robert Pease, troubleshooting analog circuits Designing Principles – Newnes
Reference Books	1. Ronald Quan, Troubleshooting Electronic circuits-McGraw hill TAB 2. Charles platt, Electronic components,Make community LLC.
Website Link	https://onlinecourses.nptel.ac.in/noc24_ee73/preview https://onlinecourses.nptel.ac.in/noc20_ee08/previewhttps://onlinecourses.nptel.ac.in/noc22_ee58/preview

L-Lecture	T-Tutorial	P-Practical	C-Credit

B. Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M5UELP05	PRACTICAL: LINEAR INTEGRATED CIRCUITS	DSC PRACTICAL - V	V	3	-	-	3	3

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	S	M	M	M	L	S	S	M
CO2	L	L	M	L	S	S	L	L	M	S
CO3	M	M	L	S	L	S	M	M	L	L
CO4	M	M	L	S	S	M	L	S	L	S
CO5	S	S	M	S	S	S	S	S	M	S
Level of Correlation between CO and PO	L-LOW					M-MEDIUM			S-STRONG	

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Demonstration, Hands on Training and Practical Sessions
Assessment Methods	Observation, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
MR. I. BALAKRISHNAN	**MR.S. ARULMANI**	**Dr.S.SHAHITHA**

B. Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M5UELP06	PRACTICAL: EMBEDDED SYSTEMS	DSC PRACTICAL - VI	V	3	-	-	3	3
Objective	To give a practice to the students for handling various I/O Devices with PIC microcontroller and t understand the programming techniques.							

S.No.	**List of Experiments / Programs (Any 10)**	**Knowledge Levels**	**Sessions**
1	Addition and Subtraction of 8 Bit Numbers (Use ALP)	K3	4
2	Multiplication and Division of 8 Bit Numbers (Use ALP)	K3	4
3	Sum of 'N' 8-Bit Numbers (Use ALP)	K3	4
4	Interfacing of Switch	K3	4
5	Interfacing of LEDs	K3	4
6	Interfacing of Relays	K3	4
7	Interfacing of Single Seven segment Display	K3	4
8	Interfacing of Multiple Seven segment Display	K4	4
9	Interfacing of DAC	K4	4
10	Interfacing of LCD	K4	4
11	Interfacing of Stepper motor	K5	4
12	Speed Control of DC motor	K5	4
13	Interfacing of temperature Sensor LM35	K5	4

Course Outcome	**CO1:** Understand the basic knowledge on basics of PIC microcontrollers.	K1
	CO2: Interpret a basic knowledge about programming and system control to perform a specific task	K2
	CO3: Illustrate knowledge about devices and buses used in embedded systems.	K3

	CO4: Determine andDevelop programming skills in embedded systems for various applications	K4
	CO5: Acquire knowledge about basic concepts of circuit emulators.	K4

Learning Resources	
Text Books	1.PIC Microcontroller ,*Mazidi*, *Muhammad Ali*,Pearson 2. Designing Embedded Systems with PIC Microcontrollers Principles and applications – Tim Wilmshurst.
Reference Books	1.Programming 8 bit PIC microcontroller in C- Martin P. Bates 2.Embedded Controller Hardware Design - Ken Arnold
Website Link	https://www.youtube.com/watch?v=y6KivqGyaGI https://www.youtube.com/watch?v=hZNcFhMWBgA https://www.youtube.com/watch?v=AcvQCfrobxM

L-Lecture	T-Tutorial	P-Practical	C-Credit

B. Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M5UELP06	PRACTICAL: EMBEDDED SYSTEMS	DSC PRACTICAL - VI	V	3	-	-	3	3

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	S	M	M	M	L	S	S	M
CO2	L	L	M	L	S	S	L	L	M	S
CO3	M	M	L	S	L	S	M	M	L	L
CO4	M	M	L	S	S	M	L	S	L	S
CO5	S	S	M	S	S	S	S	S	M	S

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Demonstration,Hands on Training and Practical Sessions
Assessment Methods	Observation, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
MR. I. BALAKRISHNAN	**MR.S. ARULMANI**	**Dr.S.SHAHITHA**

B. Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M6UELC07	PCB DESIGN AND FABRICATION	DSC THEORY – VII	VI	5	3	2	-	4
Objective	Understand the need for PCB Design and steps involved in PCB Design and Fabrication process. Familiarize Schematic and layout design flow using Electronic Design Automation (EDA) Tools.							

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Introduction to PCB Design:** Definition and Need/Relevance of PCB-Background and History of PCB-Types of PCB Classes of PCB Design-Terminology in PCB Design-Different Electronic design automation (EDA) tools and comparison.	K2	12
II	**PCB Design Process:** PCB Design Flow, Placement and routing-Steps involved in layout design-Artwork generation Methods – manual and CAD-General design factor for digital and analog circuits-Layout and Artwork making for Single-side-double-side and Multi-layer Boards-Design Manufacturability-Design-specification standards.	K4	12
III	**Introduction to PCB Fabrication and Assembly:** Steps involved in fabrication of PCB-PCB Fabrication techniques-single, double sided and multilayer-Etching: chemical principles and mechanisms-Post operations- stripping, black oxide coating and solder masking-PCB component assembly processes	K4	12
IV	**Transmission Line and Crosstalk:** Transmission Line: Transmission lines and its effects-Significance of Transmission line in Board design-Types of Transmission lines. Crosstalk: The crosstalk in transmission lines-Crosstalk control in PCB design parts-planes-tracks-connectors-terminations-Minimization of crosstalk. Thermal issues: Thermal mapping of design	K2	12
V	**PCB Board Design using CAD Tools:** Introduction-Symbol Creation-Footprint Creation-Schematic Preparation-Board Design-Switching to Board: An Introduction to Board Design Environment-Board Shape Creation-Constraints Settings: DRC entry-Net class and Rules-Component Placements: Top and Bottom sides-PCB Routing: Complete Guidelines-Copper Plan Creation-Gerber Generation. *** Current Trends:** Study of Online PCB Design tools	K6	12
Course Outcome	**CO1**: Define and understand basic concepts of PCB, transmission line, crosstalk and thermal issues	K1	
	CO2: Understand and apply the steps involved in schematic, layout, fabrication and assembly process of PCB design.	K2	

	CO3: Analyse the fabrication process of printed circuit boards.	K3	
	CO4: Evaluate and test a PCB	K4	
	CO5: Design (schematic and layout) and fabricate PCB for simple circuits.	K5	

Learning Resources	
Text Books	1. C. Coombs, Printed Circuits Handbook, McGraw-Hill, 6 edition, 2007 2. V. Shukla, Signal Integrity for PCB Designers, Reference Designer, 2009 3. D. Brooks, Signal Integrity Issues and Printed Circuit Board Design, Prentice Hall, 2003 4. RS Khandpur, Printed Circuit Board, Tata McGraw Hill Education Pvt Ltd., New Delhi
Reference Books	1. Jon Varteresian, Fabricating Printed Circuit Boards, Newnes, 2002 2. R. Tummala, Fundamentals of Microsystems Packaging, McGraw-Hill 2001
Website Link	1. https://www.youtube.com/watch?v=98S3484bOZ8 2. https://www.youtube.com/watch?v=Su0PIw5OaYQ 3. https://www.youtube.com/watch?v=EHkixIgQN0k
***Self Study Material**	1. https://www.udemy.com/course/crash-course-electronics-and-pcb design/?couponCode=ST9MT71624

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M6UELC07	PCB DESIGN AND FABRICATION	DSC THEORY – VII	VI	5	3	2	-	4

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	S	S	S	S	S	S	S
CO2	L	M	S	M	S	S	M	S	S	M
CO3	M	S	M	M	S	S	M	M	S	M
CO4	M	L	M	M	M	S	S	M	S	S
CO5	S	M	M	M	M	S	S	S	S	M
Level of Correlation between CO and PO	L-LOW					M-MEDIUM			S-STRONG	

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
MR.S.SATHISHKUMAR	**MR.S.ARULMANI**	**Dr.S.SHAHITHA**

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M6UELC08	VLSI DESIGN AND VHDL PROGRAMMING	DSC THEORY –VII	VI	5	3	2	-	4
Objective	To make the Students to learn about the principle of HDL based design approach, model Digital circuits with HDL, simulate and synthesis.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Elements of VHDL:** History of VHDL – capabilities of VHDL – hardware abstraction – basic terminology – Entity declaration - architecture body declaration – Configuration Declaration - Package Declaration - Package Body - Model Analysis - Simulation - Basic language elements – identifiers – Data objects – Data types - operators.	K1	10
II	**Behavioral Modeling:** Entity declaration – architecture declaration – process statements - variable assignment statements – signal assignments statements – Wait statement – IF statement – Case statement – Null statement – Loop statement – Exit statement – Next statement – Assertion statement – Report statements – More on signal assignment statement – multiple process – postponed process	K4	14
III	**Data flow modeling**: Concurrent signal assignment statement versus signal assignment – Delta delay revisited – Multiple drivers – Conditional signal assignment statement – Selected signal assignment statement – The unaffected value – Block statement- Concurrent assertion statement – Value of the signal. **Structural modeling:** Component declaration – Component instantiation – Resolving signal value – Example programs.	K3	12
IV	**Advanced features in VHDL:** Generics – configuration – configuration specification – Configuration declaration – Default rules – Conversion functions – Direct instantiation – Incremental binding - Sub programs – Sub program overloading - operator overloading - signatures – default value of parameters – package declaration - package body – design file – design libraries – order of analysis – implicit visibility – explicit visibility – attributes in VHDL.	K3	12
V	**Programming Examples and Implementation: :** Basic gates – Half and Full adder – Half and Full subtractor – Encoder – decoders - Multiplexers – De multiplexers – Comparator – BCD Adder -Sequential logic design procedures – state Diagram – state table – finite state machine - Moor and Mealy Model- VHDL code for Flip-flops, Design of Modulo Counters.Implementation of combinational circuits with PAL and PLA (up to 4 variable)- Introduction to CPLDs - FPGAs and Custom chips . ***Current Trends:** Study of Xilinx Spartan FPGAs	K4	12

Course Outcome	**CO1:** Understand the basic elements of VHDL.	K1
	CO2: Illustrate the various modeling styles of VHDL	K2
	CO3: Apply the programming skills in developing code for logic designs.	K3
	CO4: Analyze the advanced features of VHLD for VLSI design process	K3
	CO5: Design a digital system using programmable logic devices such as EPROM, PAL, PLA	K4

Learning Resources

Text Books	1"Digital Design" M.Morris Mano Michael D Ciletti Pearson Education 2008 2."VHDL Primer" - Bhasker J - Prentice Hall India -2009
Reference Books	1."Digital Electronics with PLD Integration" Nigel P. Cook, Prentice Hall, 2000 2."Programmable Logic Handbook: PLD, CPLD, and FPGA" Ashok K.Sharma, TMH. 3."Digital Logic Simulation and CPLD Programming with VHDL" Steve Waterman Prentice Hall, 2002
Website Link	https://nptel.ac.in/courses/117101058 https://onlinecourses.nptel.ac.in/noc19_cs73/preview https://nptel.ac.in/courses/117108040
***Self Study Material**	https://www.xilinx.com/video/fpga/spartan-7-technical-overview.html

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M6UELC08	VLSI DESIGN AND VHDL PROGRAMMING	DSC THEORY –VII	VI	5	3	2	-	4

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	S	L	L	S	M	S	M	L
CO2	M	S	M	S	M	M	M	S	M	L
CO3	S	L	S	S	S	L	S	L	S	L
CO4	M	S	M	L	M	M	S	M	L	S
CO5	L	M	S	M	L	S	M	S	M	L

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
MRS. S. SANTHOSH	**MR.S.ARULMANI**	**Dr.S.SHAHITHA**

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M6UELP06	PRACTICAL : VHDL PROGRAMMING	DSC PRACTICAL - VI	VI	3	-	-	3	3
Objective	To equip students with the skills to design, simulate, and implement digital circuits using VHDL, and to provide a comprehensive understanding of VHDL syntax, methodologies, and industry practices							

S.No.	List of Experiments / Programs (Any 10)	Knowledge Levels	Sessions
1	Implementation of Universal Gates using VHDL code.	K3	4
2	Implementation of Boolean function using VHDL code	K3	4
3	Implementation of Halfadder / Full adder using VHDL code.	K3	4
4	Implementation of Half / Full Subtractor using VHDL code.	K3	4
5	Design of 4 Bit binary Adder using VHDL Code.	K3	4
6	Design of binary Comparator using VHDL Code.	K3	4
7	Implementation of Encoder / Decoder using VHDL Code.	K3	4
8	Implementation of MUX / DEMUX using VHDL Code.	K3	4
9	Design of RS / JK Flip flop using VHDL Code.	K3	4
10	Design of D / T Flip flop using VHDL Code.	K3	4
11	Design of JKMS Flip flop using VHDL Code.	K3	4
12	Design of universal shift register using VHDL code	K3	4
13	Design of Modulo 'n' Counter and implement using VHDL.	K4	4
Course Outcome	**CO1:** Understand the basic programming principles of VHDL		K1
	CO2: Analyze the error handling procedures in VHDL		K2
	CO3: Apply the knowledge of VHDL to develop logic circuits		K3

	CO4: Use the various data types and objects of VHDL	K4
	CO5: Design the digital logic circuits using VHDL	K5

Learning Resources	
Text Books	1. VHDL programming by Examples by Duklaas L Berry
Reference Books	1. IEEE Standard VHDL Language Reference Manual – University of Chicago
Website Link	https://www.tutorialspoint.com/vlsi_design/vlsi_design_vhdl_introduction.htm

L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M6UELP06	PRACTICAL : VHDL PROGRAMMING	DSC PRACTICAL - VI	VI	3	-	-	3	3

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	S	L	L	S	M	S	M	L
CO2	M	S	M	S	M	M	M	S	M	L
CO3	S	L	S	S	S	L	S	L	S	L
CO4	M	S	M	L	M	M	S	M	L	S
CO5	L	M	S	M	L	S	M	S	M	L

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
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Rasipuram - 637408.

List of Foundation Course (FC) offered by the B.Sc., Electronics and Communication SYLLABUS - LOCF-CBCS Pattern
EFFECTIVE FROM THE ACADEMIC YEAR 2023-2024 Onwards

S.No.	SEM	COURSE_CODE	TITLE OF THE COURSE
1	I	23M1UELFC1	APPLIED ELECTRIC CIRCUITS

B. Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M1UELFC1	APPLIED ELECTRIC CIRCUITS	FOUNDATION COURSE	I	2	2	-	-	2
Objective	To remember the students about various electronic components, DC and AC fundamentals, by which understand the various circuit analysis methods and theorems.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Circuit Components:** Resistors - Capacitors - Inductors – Types - Factors governing the Resistance- Capacitance - Inductance –Color Coding of Resistors - Energy Stored in a Capacitor - Energy Stored in an Inductor – Series and Parallel connections- Simple Problems.	K2	4
II	**DC Fundamentals:** Potential Difference-current-Power-Ohms Law-Kirchhoff's Laws-Voltage Source- Current Source-Series and Parallel combinations of Sources-Voltage Division Rule-Current Division Rule-Simple Problems.	K3	5
III	**Theorems:** Super Position Theorem – Thevenin's Theorem – Norton's Theorem – Millman's Theorem - Maximum Power Transfer Theorem – Star and Delta Connection- Conversion - Simple Problems.	K4	5
IV	**AC Fundamentals:** Representation of Sinusoidal and Non Sinusoidal Waveforms – Peak Value – Peak to Peak Value – Average Value – RMS Value – Period and Frequency Measurement - Power Factor - Real Power – Reactive Power – Capacitive Reactance – Inductive Reactance –Simple Problems.	K4	5
V	**Resonant Circuits:** AC through Resistor – Capacitor – Inductor - RL Series circuit - RC Series Circuit - RL Parallel Circuit – RC Parallel Circuit - RLC in Series Circuit – RLC Parallel Circuits – Series Resonance - Parallel Resonance - Simple Problems.	K3	5
Course Outcome	**CO1:** Recite and restate the basic electrical parameters and their units	K1	
	CO2: Summarize various Laws and theorems of circuit simplification.	K2	
	CO3: Perform the circuit simplification using various circuit theorems.	K3	
	CO4: Simplify the various problems and find the solutions to it.	K4	
	CO5: Categorize and analyze the different AC and DC Circuits.	K4	
Learning Resources			

Text Books	1. A. Sudhakar, Shyammohan, S.Palli – "Circuits and Networks: Analysis and Synthesis", 5th Edition - 2017. 2. R.S.Sedha - "A Text Book of Applied Electronics", S.Chand and Company Ltd., 2010. 3. S. Salivahanan,S. Praveen Kumar – "Circuit Theory" –S.Chand
Reference Books	1. B.L.Theraja, "Basic Electronics-Solid State Devices",S.Chand Company 2. Bernard Grob, "Basic Electronics" – McGraw Hill. 3. S. Salivahanan, N. Suresh Kumar, "Electronic Devices and Circuits" –4th Edition 2017
Website Link	https://onlinecourses.nptel.ac.in/noc22_ee93/preview https://nptel.ac.in/courses/108/104/108104139/ https://nptel.ac.in/courses/108/101/108101091/

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc.–Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M1UELFC1	APPLIED ELECTRIC CIRCUITS	FOUNDATION COURSE	I	2	2	-	-	2

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	L	M	M	M	S	M	L	M
CO2	S	M	L	M	M	M	S	S	L	M
CO3	S	M	L	M	M	M	S	S	L	M
CO4	S	M	L	M	M	M	S	S	L	M
CO5	S	M	L	M	M	M	S	S	L	M
Level of Correlation between CO and PO	L-LOW					M-MEDIUM			S-STRONG	

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, Poster Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
MR.S.SATHISHKUMAR	**MR.S.ARULMANI**	**Dr.S.SHAHITHA**

List of Elective Course (DSE) Details for B.Sc., Electronics and Communication
SYLLABUS - LOCF-CBCS Pattern
EFFECTIVE FROM THE ACADEMIC YEAR 2023-2024 Onwards

S.No.	SEM	COURSE_CODE	TITLE OF THE COURSE
1	V	23M5UELE01	NETWORK COMMUNICATION AND SECURITY
2	V	23M5UELE02	FUNDAMENTALS OF IOT AND APPLICATIONS
3	V	23M5UELE03	ARTIFICIAL INTELLIGENCE
4	VI	23M6UELE04	ADVANCED COMMUNICATION SYSTEMS
5	VI	23M6UELE05	ROBOTICS AND AUTOMATION
6	VI	23M6UELE06	MEDICAL ELECTRONICS

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M5UELE01	NETWORK COMMUNICATION AND SECURITY	DSE I	V	5	3	2	-	4

Objective	To provide students with an in-depth understanding of network communication security principles, protocols, and practices, and to equip them with the skills to design and implement secure network systems.

Unit	Course Content	Knowledge Levels	Sessions
I	**Transmission Methods:** Digital Signal Analog Transmission – Baud Rate - Analog Signal Digital Transmission – Parallel & Serial Communication – Asynchronous & Synchronous Communication – Simplex – Half Duplex - Full Duplex – Multiplexing - De-multiplexing - Types of Multiplexing.	K3	12
II	**Network Topologies:** Mesh Topology – Star Topology – Tree Topology – Ring – Bus – Hybrid – Basics of Switching – Router & Routing – Internet Topology – Architecture of an ISP – Logical Types of Topology.	K2	12
III	**Network Protocols:** OSI Model – Physical Layer – Data Link Layer – Network Layer – Transport Layer – Session Layer – Presentation Layer – Application Layer – Overview of Network Protocols.	K3	10
IV	**LAN Topologies:** Introduction – LAN Hardware – Implementing LAN – Fast LANS - Nonstandard LANS – Extending LANS – Virtual LANS – Token Passing Networks – FDDI – MAN – WAN.	K3	11
V	**Internet access & network security:** Introduction – Dial up Access – Leased lines – DSL - Cable Modems – DTE – DCE Interface – RS-232 & RS-449 Interface – SONET. Network Security: Introduction – Types of Computer Attacks – Firewall – Virtual Private Network-Cryptography. ***Current Trends:** Wireless Sensor Networking	K5	15
Course Outcome	**CO1:** Identify the components associated with Transmission methods.	K1	
	CO2: Understand the completenetwork architecture, Topology and switching and routing technologies.	K2	
	CO3: Illustrate the operations of various electronic circuits and their applications.	K3	
	CO4: Demonstrate the various networks protocols and network management skills	K4	
	CO5: Evaluate theissues in providing Quality-Of-Service for network multimedia applications and internet security	K5	

Learning Resources	
Text Books	1. Data communication and networking– 2nd Edition -Behrouza Forouzan. 2. Data Communication & Networks - Achyut .S. Godbole & Atul Kahate – TMH 2ED 3. Advanced Computer Networking (Concepts and Applications) - Satish Jain – BPB
Reference Books	1. Computer Networks-Andrews.Tanenbaum. 2. High speed networking and internets-William Stallings.
Website Link	https://onlinecourses.nptel.ac.in/noc19_cs84/preview https://archive.nptel.ac.in/courses/106/105/106105191/
***Self Study Material**	https://www.geeksforgeeks.org/wireless-sensor-network-wsn/

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M5UELE01	NETWORK COMMUNICATION AND SECURITY	DSE I	V	5	3	2	-	4

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	S	S	M	S	S	M	S
CO2	M	M	M	S	M	M	S	S	M	S
CO3	M	M	M	M	M	S	S	S	M	S
CO4	M	L	M	L	M	S	S	S	M	S
CO5	M	M	M	M	M	M	S	M	M	S

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, Poster Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
Mr. S. SATHISHKUMAR	**Mr. S. ARULMANI**	**DR.S.SHAHITHA**

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M5UELE02	FUNDAMENTALS OF IOT AND APPLICATIONS	DSE II	V	5	3	2	-	4
Objective	To acquire the basic knowledge of students in Internet of Things and design mini projects based on its application.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Fundamentals of IoT:** Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, About Things in IoT, The Identifiers in IoT, About the Internet in IoT, IoT frameworks, IoT and M2M.	K2	12
II	**Sensors Networks:** Definition, Types of Sensors, Types of Actuators, Examples and Working, IoT Development Boards: ArduinoIDE and Board Types, RaspberrPi Development Kit, RFID Principles and components, Wireless Sensor Networks: History and Context, The node, Connecting Nodes, Networking Nodes, WSN and IoT.	K3	12
III	**Wireless Technologies for IoT:** WPAN Technologies for IoT: IEEE802.15.4, Zigbee, HART, NFC, Z-Wave, BLE, Bacnet, Modbus. IP Based Protocols for IoT IPv6, 6LowPAN, RPL, REST, AMPQ, CoAP, MQTT-Edge connectivity and protocols	K3	12
IV	**Data Handling &Analytics:** Introduction, Bigdata, Types of data, Characteristics of Bigdata, Data handling Technologies, Flow of data, Data acquisition, Data Storage, Introduction to Hadoop. Introduction to data Analytics, Types of Data analytics, Local Analytics, Cloud analytics and applications.	K4	12
V	**Applications of IoT:** Home Automation, Smart Cities, Energy, Retail Management, Logistics, Agriculture, Health and Lifestyle, Industrial IoT, Legal challenges, IoT design Ethics, IoTin Environmental Protection. ***Current Trends:** LoRaWAN Technology	K3	12
Course Outcome	**CO1:** Recognize and understand the fundamentals of IoT Architecture And layer	K1	
	CO2: Understand the concept of sensor network	K2	
	CO3: Demonstrate the design procedures wireless access technologies	K3	
	CO4: Simplify the various data handling problems	K4	

	CO5: Categorize and analyze the applications of IOT	K4	
Learning Resources			
TextBooks	1. Vijay Madisetti and Arshdeep Bahga, — "Internet of Things (A Hands -on-Approach)",1stEdition,VPT,2014. 2. HakimaChaouchi,—"TheInternetofThingsConnectingObjectstotheWeb"ISBN:978-1- 84821-140-7, Wiley Publications 3. Olivier Hersent, David Boswarthick, and Omar Elloumi,—"The Internet of Things: Key Applications and Protocols", Wiley Publications		
Reference Books	1. Pethuru Raj and Anupama C.Raman, "The Internet of Things :Enabling Technologies, Platforms, and Use Cases", CRC Press		
Website Link	https://onlinecourses.nptel.ac.in/noc24_cs115/preview		
***Self Study Material**	https://www.youtube.com/watch?v=Bsue0PzNRDU		
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M5UELE02	FUNDAMENTALS OF IOT AND APPLICATIONS	DSE II	V	5	3	2	-	4	

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	L	S	S	M	S	S	M	S
CO2	S	M	L	S	M	M	S	S	M	S
CO3	S	M	M	M	M	S	S	S	M	S
CO4	S	L	L	L	M	S	S	S	M	S
CO5	S	M	L	M	M	M	S	M	M	S

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, Poster Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
MR. I. BALAKRISHNAN	**MR. S. ARULMANI**	**DR.S.SHAHITHA**

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M5UELE03	ARTIFICIAL INTELLIGENCE	DSE III	V	5	3	2	-	4
Objective	To introduce students to the foundational concepts and techniques of artificial intelligence, and to equip them with the skills to develop and apply AI algorithms and models to solve real-world problems.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Basics of Artificial Intelligence:** Introduction to AI – The History of AI– The foundation of AI- Risk and Benefits of AI - Agents and Environments - Concept of rationality - Nature of Environments - Structure of Agents.	K2	12
II	**Problem Solving:** Problem Solving Agents –Search Algorithms – Uninformed Search Strategies – Informed (Heuristic) Search Strategies – Heuristic Functions - Local Search and Optimization Problems - Local Search in Continuous Space – Search With Non-Deterministic Actions – Search in Partially Observable Environments – Online Search Agents and Unknown Environments.	K4	12
III	**Adversarial search and Games:** Game theory –Optimal Decisions in Games –Alpha-Beta Search – Monte-Carlo Tree Search –Stochastic Games –Partially Observable Games – Limitation of Game Search Algorithms	K3	12
IV	**Logical Agents:** Knowledge-based Agents - Propositional Logic - Propositional Theorem Proving -Effective Propositional Model Checking – Agents Based on Propositional Logic.	K5	12
V	**Knowledge Representation & Automated Planning:** Ontological engineering –Categories and Objects –Events –Mental Objects and Modal Logic –Reasoning Systems for Categories –Reasoning with Default Information Classical Planning –Algorithms for Classical Planning –Heuristics for Planning –Hierarchical Planning –Non-Deterministic Domains –Time, Schedule, and Resources –Analysis Of Planning Approaches. ***Current Trends:** Open Source AI Tools	K4	12
Course Outcome	**CO1:** Define the concept of Artificial Intelligence.	**K1**	
	CO2: Understand and solving the problems	**K2**	
	CO3: Apply AI techniques to real-world problems to develop intelligent systems.	**K3**	
	CO4: Illustrate the AI techniques	**K4**	

	CO5: Evaluate Using Predicate Logic.	**K5**	

Learning Resources	
Text Books	1. Stuart Russel and Peter Norvig, "Artificial Intelligence: A Modern Approach", Fourth Edition, Pearson Education, 2021.
Reference Books	1. 1. Dan W. Patterson, "Introduction to AI and ES", Pearson Education, 2007 2. 2Kevin Night, Elaine Rich, and Nair B., "Artificial Intelligence", McGraw Hill, 2008 3. Patrick H. Winston, "Artificial Intelligence", Third edition, Pearson Edition, 2006
Website Link	1. https://onlinecourses.nptel.ac.in/noc21_cs42/preview 2. https://onlinecourses.nptel.ac.in/noc21_cs79/preview
Text Books	2. Stuart Russel and Peter Norvig, "Artificial Intelligence: A Modern Approach", Fourth Edition, Pearson Education, 2021.

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M5UELE03	ARTIFICIAL INTELLIGENCE	DSE III	V	5	3	2	-	4

CO-PO Mapping

CO Number	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	S	S	L	S	S	M	S	S	S	S
CO2	S	S	L	S	M	S	M	S	S	M
CO3	S	M	M	M	L	S	S	S	S	S
CO4	S	L	L	M	M	S	S	S	M	M
CO5	S	M	L	M	S	S	S	M	S	S

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, Poster Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
MR. S. SANTHOSH	**MR. S. ARULMANI**	**DR.S.SHAHITHA**

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M6UELE04	ADVANCED COMMUNICATION SYSTEMS	DSE IV	VI	5	3	2	-	4
Objective	To understand principles of Radar, Navigation aids. Study basic Digital communication system and Digital codes and to learn Error detection and correction codes.							

Unit	Course Content	Knowledge Levels	Sessions
I	**RADAR and Navigational Aids:** Basic Radar System– Applications – Radar Range Equation – Factors Influencing Maximum Range – Basic Pulsed Radar System – Block Diagram – Display Methods- A - Scope, PPI Display - Instrument Landing System – Ground Controlled Approach System.	K3	12
II	**Basics of Digital Communication and Codes:** Basic Elements Of Digital Communication System - Block Diagram-Characteristics of Data Transmission Circuits -Bandwidth Requirement – Speed - Baud Rate - Noise - Crosstalk – Distortion. ASCII Code – EBCDIC Code - Error Detection Codes – Parity Check Codes – Redundant Codes - Error Correction Codes – Retransmission- Forward Error Correcting Code – Hamming Code.	K3	12
III	**Optical Communication:** Optical Communication System – Block Diagram – Advantages–Ray Theory – Single Mode Fibers, Multimode Fibers – Step Index Fibers, Graded Index Fibers (Basic Concepts Only) – Attenuation and Losses - Optical Sources – LED - Semiconductor LASER – Principles – Optical Detectors – PIN And APD Diodes - Connectors - Splices – Couplers – Optical Transmitter – Block Diagram – Optical Receiver – Block Diagram - Application Of Optical Fibers Applications of OFC.	K3	12
IV	**Satellite Communication:** Satellite system: Kepler's laws – orbits – launching orbits – types - Geostationary synchronous satellites - Advantages – Apogee – Perigee - Active and passive satellite - Earth eclipse of satellite - Parabolic reflector antenna –cassegrainantenna. Power supply- Attitude control- station keeping – Transponders – TT and C subsystem – Antenna subsystem. Block diagram of Transmit receive earth station - Satellite mobile services - Basics of GPS	K3	12
V	**Mobile Communication and Multiple Access techniques:** Cellular telephone– fundamental concepts – Simplified Cellular telephone system - frequency reuse – Interference – Co-channel Interference – Adjacent Channel Interference – Improving coverage and capacity in cellular systems - cell splitting – sectoring – Roaming and Handoff – Basics of blue tooth technology. TDMA, FDMA, CDMA. Digital cellular system –	K4	12

	GSM services - GSM System Architecture – Basics of GPRS. ***Current Trends:** LTE Architecture		
Course Outcome	**CO1:** Recall the communication systems.	K1	
	CO2: Discuss the digital communication principles and Codes.	K2	
	CO3: Calculate the various frequency ranges and analyze the performance of communication systems.	K3	
	CO4: Describe the Parameters and optical Fiber Communication system concepts.	K4	
	CO5: Evaluate the Mobile communication and satellite multiple access techniques.	K5	

Learning Resources	
Text Books	1. Radar and Navigation Aids ", Scholnik, Tata McGraw Hill.1st Edition. 2. Electronic communication systems, Kennedy - Davis -Fourth Edition - Tata McGraw Hill. 3. Optical fiber communication - Gerd Keiser - Third Edition - McGraw Hill – 2000 4. Satellite communication - Dr. D.C. Agarwal - Third Edition - Khanna publishers
Reference Books	1. Electronic Communications systems - Fundamentals through Advanced - Wayne Tomasi – Fifth Edition - Pearson Education – 2005 2. Satellite communication, Dr. D.C. Agarwal - Third Edition - Khanna publishers 3. Microwave and Radar Engineering", N. Kulkarni umesh publication, 2nd ed
Website Link	https://onlinecourses.nptel.ac.in/noc22_ee114/preview
***Self Study Material**	https://www.tutorialspoint.com/lte/lte_network_architecture.htm

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M6UELE04	ADVANCED COMMUNICATION SYSTEMS	DSE IV	VI	5	3	2	-	4

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	S	M	M	L	M	S	M	M
CO2	M	S	M	M	M	L	M	L	M	M
CO3	S	M	L	L	S	M	S	M	L	L
CO4	M	L	M	L	L	L	M	S	M	L
CO5	S	S	M	M	S	M	S	M	M	M

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, Poster Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
MRS. P. VIJAYALAKSHMI	**Mr. S. ARULMANI**	**DR.S.SHAHITHA**

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M6UELE05	ROBOTICS AND AUTOMATION	DSE V	VI	5	3	2	-	4
Objective	To acquire basic knowledge and skills by the student in the field of robotics and automation also enable them to understand the various components and process planning of robotics in various applications.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Basic Concepts of Robots:** Introduction to robotics - History, growth; Robot applications- Manufacturing industry, defense, rehabilitation, medical etc., Laws of Robotics , Robot classifications, Internal Grippers and External Grippers; Selection and Design Considerations, resolution, accuracy and repeatability of robot, specification	K3	12
II	**Power Sources and Sensors:** Hydraulic, pneumatic and electric drives - determination of HP of motor and gearing ratio - variable speed arrangements - path determination - machine vision - sensors, characteristics, sensor -Types-Touch, Potentiometer, Encoder, Force, Range and proximity -laser - acoustic - magnetic sensor	K3	12
III	**Manipulators, Actuators and Grippers:** Construction of manipulators - manipulator dynamics and force control - electronic and pneumatic manipulator control circuits - end effectors - Actuators and types, DC motors, BLDC servo motors - U various types of grippers - design considerations	K2	12
IV	**Kinematics and Path Planning:** Solution of inverse kinematics problem - multiple solution Jacobian work envelop - hill climbing techniques - robot programming languages	K3	12
V	**Automation and Industry Robotics:** Fundamental concepts in manufacturing and automation- definition of automation - CNC systems- Multiple robots - machine interface - robots in manufacturing and non- manufacturing applications- selection of robot. ***Current Trends:** Design of Fire Fighting Robot using Arduino	K4	12
Course Outcome	**CO1:** Understand the concepts of industrial robots and its Types, specifications and coordinate systems,	K1	
	CO2: Identify the different sensors and actuators for applications like maze solving and self-driving cars.	K2	
	CO3: Describe robot and an end-effectors and solve the kinematics and dynamics of motion for robots.	K3	
	CO4: Describe how to handle the User Events and various types of Exceptions and strategies.	K4	

	CO5: Analyze the navigation and path planning techniques along with the control architectures adopted for robot motion planning.	K5	

Learning Resources	
Text Books	1. M. P Groover, Automation Production Systems and Computer - Integrated Manufacturing (Pearson Education, New Delhi, 2001) 2. B. Ghosh, Control in Robotics and Automation: Sensor Based Integration (Allied Publishers, Chennai, 1998). 3. S. R. Deb, Robotics Technology and flexible Automation (John Wiley, 1992).
Reference Books	1. Asimov, Robot (Ballantine Books, New York, 1986). 2. B.L. Jones, Elements of industrial Robotics (Longman, 1987). 3. M. P. Groover, M. Weiss, R.N. Nagel N. G.Odrey, Industrial Robotics Technology, Programming and Applications (McGraw Hill Book Company, 1986).
Website Link	1. https://onlinecourses.nptel.ac.in/noc19_me74/preview
***Self-Study Material**	https://techatronic.com/fire-fighter-robot-using-arduino-fire-fighting-robot/

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M6UELE05	ROBOTICS AND AUTOMATION	DSE V	VI	5	3	2	-	4

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	L	S	S	M	S	S	S	S
CO2	S	M	L	S	M	M	M	S	M	M
CO3	M	M	L	M	L	S	S	S	S	S
CO4	S	L	L	L	M	S	S	S	M	M
CO5	M	M	L	M	S	M	S	M	S	S
Level of Correlation between CO and PO	L-LOW					M-MEDIUM			S-STRONG	

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, Poster Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
MR. I. BALAKRISHNAN	**Mr. S. ARULMANI**	**DR.S.SHAHITHA**

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M6UELE06	MEDICAL ELECTRONICS	DSE VI	VI	5	3	2	-	4
Objective	To acquire knowledge on Bio-Medical Instruments, their functions and applications and to understand the specialized medical equipments.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Physiological Systems and Bio-Electric Potentials**: Introduction - Cell, Tissues and organs - Various Physiological systems of human body - Half-Cell Potential-Resting and Action Potentials - Bio-Electric Potentials.	K2	12
II	**Introduction to Bio-Medical Instruments**: Components of Bio-Medical Instruments - Design of Medical Instruments - Electrodes - Types of Electrodes -Transducers - Types of Transducers - Transducers used for medical Applications - Bio-Signal Acquisition: Bridge and Medical Pre-Amplifiers - Filters	K2	12
III	**Bio-Potential Recorders :**Characteristics of Recording Systems - Electrocardiography (ECG) - Electromyography - Electroencephalography (EEG) -Electroretinography -Phonocardiography **Physiological Assisting Devices:** Pacemakers - Types of Pacemakers - Defibrillators -Electrotherapy - Nerve and muscle Stimulators	K1	12
IV	**Specialized Medical Equipment:**Concurrent Signal Assignment statement - concurrent verses sequential signalassignment - Multiple drivers - Block Statement - Concurrent Assertion statement - Value of a signal.Blood Cell Counter - Electron Microscope - Photometers - Digital – Thermometers - Audiometers - Angiography - X-Ray Machine - Magnetic Resonance Imaging	K1	12
V	**Bio-Telemetry**: Introduction - Elements of Bio-Telemetry System - Design of Bio- Telemetry System - Radio Telemetry Systems -Problems in implant telemetry - Uses of Bio-Telemetry ***Current Trends:** Measurement of Platelets in blood	K2	12
Course Outcome	**CO1:** Understand the basics of human Physiological Systems	K1	
	CO2: Acquire knowledge on different Bio-Medical Instruments	K2	
	CO3: Interpret various Human Assistive devices	K3	
	CO4: Analyze bio signals and recorders	K4	

	CO5: Evaluate the performances of specialized Bio-Medical Devices, Design Bio-Medical instruments for various Applications	K5	

Learning Resources	
Text Books	1. M. Arumugam, "Biomedical Instrumentation",2nd Edition, Anuradha Publications, Reprint 2011. 2. Leslie Cromwell, Biomedical Instrumentation and Measurement, 2nd Ed. (Prentice Hall of India, New Delhi, 2007) 3. R. S. Khandpur, Handbook of Biomedical Instrumentation, 2nd Ed. (Tata McGraw- Hill, New Delhi, 2011)
Reference Books	1. G. S. Sawhney , Biomedical Electronics and Instrumentation made easy (2011) 2. Gowri Nambi, Biomedical Engineering: A Quick Reference Guide (Notion Press, 2019)
Website Link	1. https://nptel.ac.in/courses/108108180 2. https://www.edx.org/course/biomedical-equipment-technician-trainingmaintenance-repair
*** Self Study Material**	https://www.ncbi.nlm.nih.gov/books/NBK262/

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M6UELE06	MEDICAL ELECTRONICS	DSE	VI	5	3	2	-	4

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	L	S	M	M	S	S	S	S
CO2	S	S	L	S	M	S	M	S	S	M
CO3	S	M	M	M	L	S	M	S	M	S
CO4	M	M	M	M	S	S	S	M	M	M
CO5	S	M	L	M	M	M	S	M	S	S

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, Poster Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
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MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE
(Autonomous)
Rasipuram - 637408

List of Skill Based Elective Course (SEC) for B.Sc., Electronics and Communication
SYLLABUS - LOCF-CBCS Pattern
EFFECTIVE FROM THE ACADEMIC YEAR 2023-2024 Onwards

S.No.	SEM	COURSE_CODE	TITLE OF THE COURSE
1	II	23M2UELS01	POWER ELECTRONICS
2	III	23M3UELS02	8051 MICROCONTROLLER AND ITS APPLICATIONS
3	IV	23M4UELS03	MODERN ELECTRONIC MEASUREMENTS AND INSTRUMENTS
4	V	23M5UELS04	COMPETITIVE SKILLS
5	VI	23M6UELS05	LIFE AND ENTERPRENURE DEVELOPMENT SKILLS

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M2UELS01	POWER ELECTRONICS	SEC-I	II	2	2	-	-	2
Objective	To equip students with the knowledge of power electronics principles, devices, and applications, and to develop their skills in designing and analyzing power electronic systems for efficient energy conversion and control.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Power Semiconductor Devices:** Thyristor family –Working principle ,VI characteristics, Applications of SCR – Definitions for holding current, latching current, dv/dt rating, di/dt rating– Symbol, principle of working ,VI characteristics ,applications of IGBT - MOSFET and GTO-SCR rating and their importance.	K2	4
II	**Triggering and Commutation Techniques:** Triggering of SCR - Gate triggering methods – Concepts of DC triggering, AC triggering, Pulse gate triggering – Pulse transformer in trigger circuit – Electrical isolation by opto isolator - Resistance firing circuit and waveform – RC firing circuit and waveform, Synchronized UJT triggering. Commutation – SCR Turn Off Methods – Natural Commutation – Forced Commutation – Class A, Class B, Class C, Class D, Class E and Class F.	K3	6
III	**Converters and Choppers:** Converters – Definition – 1Φ Half controlled bridge converter with R load and RL load- importance of flywheel diode – 1Φ fully controlled bridge converter with R load – voltage and current waveforms – 1Φ fully controlled bridge converter with RL load –voltage and current waveforms. **Choppers:** Introduction – applications -principle of chopper-control Methods - Types of chopper- Type A, B, C, D, and E- Step up chopper – Jones chopper – Morgan chopper-chopper using MOSFET – PWM control circuit for driving MOSFET in chopper.	K3	5
IV	**Inverter:** Definition Requirement of an inverter –1Φ inverter with resistive load – 1Φ inverter with RL load –Methods to obtain sine wave output from an inverter- output voltage control in inverters - McMurray inverter – Advantages-Through pass inverter – Parallel inverter using IGBT - UPS – Need for UPS –ON Line UPS -OFF Line UPS - Comparison of ON line and OFF line UPS -DC Transmission - principle – Advantages – Drawbacks.	K4	5
V	**AC Voltage Regulators:** Introduction to AC Voltage Controller – Principle of On-Off Control – Principle of Phase Control – 1Φ voltage Controller with Resistive Loads – Single Phase voltage Controller with RL load -Three Phase Full Wave Controller – Cyclo converters – Single Phase Cyclo converters – AC Voltage controllers with PWM Control.	K4	4

Course Outcome	**CO1:** Remember and Describe the construction and operation of Power Semiconductor devices.	K1
	CO2: Interpret the methods of triggering and commutation Techniques used in thyristor circuits.	K2
	CO3: Analyze and determine the operation ofcontrolled rectifier and Chopper circuits.	K3
	CO4: Demonstrate the operation of inverters in various applications.	K4
	CO5: Categorize the various DC and AC power supply based on Performance.	K4

Learning Resources

Text Books	1.Muhammed H. Rashid - " Power Electronics" PHI - 2nd Edition 2.Jaganathan, " Power Electronics"– PHI – 2nd Edition.
Reference Books	1.Singh M D and Khanchandani K B ,2007, Power electronics 2nd Ed, TMH, Delhi. 2.Mithal.G.K,2000 , Industrial electronics and control 8th Ed,TMH , Newdelhi 3.Theraja B.L, Theraja.A.K, 2003, "Electrical Technology" - Ist S.Chand, Newdelhi.
Website Link	1.https://onlinecourses.nptel.ac.in/noc22_ee127/preview 2.https://www.coursera.org/specializations/power-electronics

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M2UELS01	POWER ELECTRONICS	23M2UELS01	II	2	2	-	-	2

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	L	L	M	M	M	M	M	M	M
CO2	M	L	L	M	M	M	M	M	M	M
CO3	M	L	L	M	M	M	M	S	M	M
CO4	M	M	L	M	S	M	M	S	S	M
CO5	M	M	L	M	M	M	M	S	S	M
Level of Correlation between CO and PO	L-LOW					M-MEDIUM			S-STRONG	

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
MR.S. SANTHOSH	**MR.S. ARULMANI**	**DR.S.SHAHITHA**

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3UELS02	8051 MICROCONTROLLER AND ITS APPLICATIONS	SEC-II	III	2	2	-	-	2
Objective	To impart comprehensive understanding to the students about the 8051 microcontroller architecture, programming techniques, and its applications.							

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**8051 Architecture and Addressing modes:** introduction to Microcontrollers – Compression of microprocessors and microcontroller – 8051 Features - Pin details – Architecture - Memory Organization - Program Counter – PSW register – SFRs - Stack - I/O Ports – Timer / Counters – Interrupts – Serial Port – Oscillator and Clock - Clock Cycle – State - Machine Cycle –Instruction cycle – Reset – Power on Reset - Different addressing modes of 8051.	K3	6
II	**Instruction Set:** Instruction set of 8051 – Classification of 8051 Instructions - Data transfer instructions – Arithmetic Instructions – Logical instructions –Branching instructions – Bit Manipulation Instructions - Simple Programs.	K3	4
III	**I/O Programming and Timer:** Bit addresses for I/O and RAM – I/O programming – I/O bit manipulation programming. Programming 8051 Timers/Counter – Timer/counter Registers - Timer/counter modes of operation – Timer /Counter programming - Simple programs.	K4	4
IV	**Serial Port and Interrupts:** Serial Communication – Baud Rate - Serial Communication Modes - 8051 Interrupts – Interrupt structure and priority – Programming Timer Interrupts – Programming external hardware interrupts – Programming the serial port interrupt – Simple programs.	K4	5
V	**Interfacing Techniques:** Interfacing external memory to 8051 –Sensor interfacing – ADC interfacing – DAC interfacing - Keyboard interfacing – Seven segment LED Display Interfacing - Stepper Motor interfacing – DC motor interfacing using PWM. ***Current Trends:** Object counting system using 8051	K5	5
Course Outcome	**CO1:** Recall the concepts of microprocessors and assembly language programming.	K1	
	CO2: Interpret the various hardware features of 8051 Microcontroller.	K2	
	CO3: Experimenting the various instruction set to utilize the hardware features of 8051 microcontroller.	K3	

	CO4: Examine the hardware features using simple programming methods	K4	
	CO5: Classify and select the appropriate peripheral devices to design Microcontroller based systems.	K5	

Learning Resources	
Text Books	1. Mohamed Ali Maszidi & Janice Gillispie Maszidi, "The 8051 Microcontroller and Embedded System", Pearson Publishers 2. Intel 8031/8051 family Data Sheet – Intel corporation
Reference Books	1. Kenneth J. Ayala, "The 8051 Microcontroller Architecture, Programming and Application"2 nd Edition, Penram International Publications.
Website Link	https://onlinecourses.nptel.ac.in/noc24_ee46/preview
***Self Study Material**	https://www.circuitstoday.com/object-counter-using-8051#google_vignette

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M3UELS02	8051 MICROCONTROLLER AND ITS APPLICATIONS	SEC-II	III	2	2	-	-	2

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	L	M	S	S	M	S	M	S
CO2	S	M	L	S	S	M	M	S	M	S
CO3	M	S	L	S	L	M	M	S	S	S
CO4	M	S	L	M	M	L	M	S	S	M
CO5	S	M	L	S	S	M	M	S	S	S
Level of Correlation between CO and PO	L-LOW					M-MEDIUM			S-STRONG	

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
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B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4UELS03	MODERN ELECTRONIC MEASUREMENTS AND INSTRUMENTS	SEC - III	IV	4	1	3	-	2
Objective	To make the students learn about the principle of various transducers, measuring techniques and measuring instruments like meters and CRO.							

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Electromechanical indicating instruments:** DC Ammeter - DC Voltmeter - Voltmeter Sensitivity - AC Voltmeter - Considerations in Analog Voltmeter - Series & Shunt Type Ohmmeter - Calibration of DC Instruments – Study of a Typical Digital Multimeter.	K2	5
II	**Measuring Bridges:** Wheatstone Bridge - Balance Equation of General AC Bridges – Capacitance & Inductance Comparison Bridge - Maxwell – Hay - Schering - Wien - Kelvin & Kelvin's Double Bridge.	K3	5
III	**Cathode Ray Oscilloscope:** Block diagram - CRT - Vertical Deflection System - Horizontal Deflection System - CRT screens & Graticules - Oscilloscope Probes - Measurement of Frequency, Amplitude & Phase - Lissajous's Patterns.	K4	5
IV	**Signal Generators**: Sample and Hold Circuit - Instrumentation Amplifier - Function Generator – Pulse Generator - Q Meter - Vector Impedance Meter – Wave Analyzer - Harmonic Distortion Analyzer.	K3	3
V	**Transducers and sensors**: Resistive Transducers – Inductive Transducers - Capacitive Transducers – Piezo Electric Transducer - Thermo Electric Transducers – Temperature Transducers – Microphones & Loud Speakers Sensors and Actuators ***Current Trends:** Digital Storage Oscilloscope	K4	6
Course Outcome	**CO1:** Remember and understand the various measurement techniques and instruments.	K1	
	CO2: Determine the performance of various measuring bridges.	K2	
	CO3: Demonstrate and perform the various measurements using CRO.	K3	
	CO4: Analyze the functionality of signal generators.	K4	
	CO5: Analyze performance of various sensors and signal conditioning elements.	K4	

Learning Resources				
Text Books	1. Cooper, Modern Electronic Instrumentation and Measurements Techniques Pearson Education, India, First Edition (2008) 2. H.S. Kalsi, Modern Electronic Instrumentation, McGraw-Hill Education, Third Edition (2017)			
Reference Books	1. J.B. GUPTA, A Course in Electronic and Electrical Measurements and Instrumentation", S.K Kataria & Sons, First Edition (2013) 2. A.K. Sawhney, Electrical & Electronic Measurements and Instrumentation, Dhanpath Rai & Co (P) Ltd, Fourth Edition (1985)			
Website Link	1. https://onlinecourses.nptel.ac.in/noc22_ee112/preview 2. https://onlinecourses.nptel.ac.in/noc23_ee95/preview			
***Self-Study Material**	https://www.geeksforgeeks.org/digital-storage-oscilloscope/			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards										
Course Code	**Course Title**			**Course Type**		**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4UELS03	MODERN ELECTRONIC MEASUREMENTS AND INSTRUMENTS			SEC-III		IV	4	4	2	-	2
23M4UELC04											
CO Number	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	M	M	S	M	L	M	M	S	M	S	
CO2	M	L	L	M	L	M	M	M	S	M	
CO3	M	M	S	M	M	S	M	S	M	M	
CO4	M	M	L	M	M	M	M	M	S	M	
CO5	M	S	L	M	M	M	S	M	S	M	
Level of Correlation between CO and PO	L-LOW					M-MEDIUM			S-STRONG		
Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz										
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class PPT Presentation and Video presentation										
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE										
Designed By	**Verified By**							**Approved By Member Secretary**			
Mrs.P.VIJAYALAKSHMI	**Mr.S. ARULMANI**							**DR.S.SHAHITHA**			

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M5UELS04	COMPETITIVE SKILLS	SEC – IV	V	2	2	-	-	2

Objective	To enhance student's problem-solving, critical thinking, and teamwork abilities, and to prepare them for competitive environments through the development of technical and soft skills essential for career success.

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**VERBAL REASONING:** Analogy – Classification – Direction Sense Test –Coding Decoding – Logical Sequence of Words – Inserting the Missing Character – Situation Reaction Test –Venn Diagrams.	K2	5
II	**NONVERBAL REASONING:** Analytical Reasoning – Mirror Images – Water Images –Completion of Incomplete Pattern –Cubes and Dice – Paper Cutting and Folding	K3	5
III	**ARITHMATICAL ABILITY:** Percentage– Average– HCF & LCM – Ratio & Proportion – Profit &Loss – Time and Work–Problems on Age – Simple Interest– Compound Interest.	K4	5
IV	**TIME AND DISTANCE:** Chain Rule– Time & Distance – Problems on Trains –Logarithms –Calendar – Clocks – Probability	K4	5
V	**DATA INTERPRETATION:** Tabulation– Bar Graphs –Pie Charts– Line Graphs ***Current Trends:** Vedic Mathematics Tricks	K4	4
Course Outcome	**CO1:** Remember and understand the basic concept of verbal nonverbal reasoning methods	**K1**	
	CO2: Understand the Verbal and numerical aptitude concepts and shortcuts	**K2**	
	CO3: Analyze the Problems logically and approach the problems in a different manner.	**K3**	
	CO4: Apply the shortcuts and practice the various methods to solve the competitive exam questions.	**K4**	
	CO5: Draw conclusions or make decisions in quantitatively based situations that are dependent upon multiple factors.	**K5**	

Learning Resources	
Text Books	1. A Modern Approach To Verbal & Non Verbal Reasoning - Revised Edition – R.S. Aggarwal – S. Chand.(Units : I & II) 2. Quantitative Aptitude - Revised Edition - R.S. Aggarwal – S. Chand. Units : III , IV & V 3. An Advanced Approach To Data Interpretation - R.S. Aggarwal – S. Chand.

Reference Books	1. Advanced Objective General Knowledge - R.S. Aggarwal – S. Chand 2. Objective General English - R.S. Aggarwal – S. Chand.
Website Link	1. https://www.youtube.com/watch?v=HYZJopl7gCI 2. https://www.youtube.com/watch?v=x0WkptLF6oE&list=PLpyc33gOcbVADMKqylI__O_O_RMeHTyNK
***Self-Study Material**	https://www.geeksforgeeks.org/vedic-maths/

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M5UELS04	COMPETITIVE SKILLS	SEC – IV	V	2	2	-	-	2

CO-PO Mapping

CO Number	PO 1	PO 2	PO3	PO4	PO5	PSO1	PSO 2	PSO3	PSO 4	PSO5
CO1	M	S	S	M	S	M	L	L	L	M
CO2	M	S	S	M	S	M	L	L	L	S
CO3	S	S	S	S	M	S	L	L	L	M
CO4	S	M	S	S	S	S	L	L	L	M
CO5	M	S	M	S	M	L	L	L	L	S

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Poster Presentation, Demonstration and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
MR.S.SATHISHKUMAR	**MR.S.ARULMANI**	**DR.S.SHAHITHA**

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M6UELS05	LIFE AND ENTREPRENUER DEVELOPMENT SKILLS	SEC – V	VI	2	2	-	-	2

Objective	To equip students with essential life skills and entrepreneurial mindset, fostering personal growth, leadership, and the ability to innovate and succeed in entrepreneurial ventures.		
Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Self-development skills:** Introduction to personality – Self-Esteem and self-confidence–Thinking and problem-solving skills – Stress management–SWOT analysis and Goal setting	K2	5
II	**Inter personal skills:** Hard skills and Soft skills–Effective communication –Skills for successful Interview –Leadership – Knowledge – Skills – Attitude - Social Empathy – Johari Window Model	K3	5
III	**Group and Team dynamics:** Introduction to Groups–Composition–Formation–Cycle–Thinking–Clarifying expectations–Consensus–Dynamics techniques–Group Vs team–Team dynamics–Virtual team	K4	5
IV	**Introduction to Entrepreneurship:** Concept of Entrepreneur – Entrepreneurship and Enterprise–Objectives of Entrepreneurship development–Phase of Entrepreneurship development –Role of Entrepreneur–The Entrepreneurial mindset–Characteristics of Entrepreneurship – Business plan – Rural entrepreneurship and women entrepreneurship and its role – Role of MSME.	K4	5
V	**Over view of life skills:** Meaning and significance and types of life skills – WHO Categories Life Skills – Self- awareness–Empathy– Interpersonal relationship - Critical thinking– Creative thinking –Reasoning - Decision making – Coping with stress – Coping with emotion	K4	4
Course Outcome	**CO1:** Define and identify different life skills required in personal and professional life	**K1**	
	CO2: Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.	**K2**	
	CO3: Develop an Preparing for a Job Interview	**K3**	
	CO4: Understand the basics of teamwork and leadership	**K4**	
	CO5: Develop and awareness of the self and apply well-Defined techniques to cope with emotions and stress	**K5**	

Learning Resources				
Text Books	1. Entrepreneurial Development - Revised Edition – S.S. Khanka – S. Chand and company Limited. 2. Personality development and soft skills–Barun K.Mityra – Oxford publishers Third Edition.			
Reference Books	1.Entrepreneurship- Robert hisrich and Michael Peters- Tata Mc Graw-Hill 2.Personality Development and Soft skills –Barun K.Mityra – Oxford publishers			
Website Link	1.https://onlinecourses.swayam2.ac.in/cec20_ed20/preview 2.https://onlinecourses.nptel.ac.in/noc22_hs77/preview			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M6UELS05	LIFE AND ENTREPRENUER DEVELOPMENT SKILLS	SEC – V	VI	2	2	-	-	2

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	M	S	M	L	L	L	M
CO2	M	S	S	M	S	M	L	L	L	S
CO3	S	S	S	S	M	S	L	L	L	M
CO4	S	M	S	S	S	S	L	L	L	M
CO5	M	S	M	S	M	L	L	L	L	S

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
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(Autonomous)
Rasipuram - 637408.

List of Non-Major (NMEC) offered by the B.Sc., Electronics and Communication SYLLABUS - LOCF-CBCS Pattern
EFFECTIVE FROM THE ACADEMIC YEAR 2023-2024 Onwards

S.No.	SEM	COURSE_CODE	TITLE OF THE COURSE
1	I	23M1UELN01	PRINCIPLES OF CELLULAR COMMUNICATION AND SMARTPHONES
2	I	23M1UELN02	FUNDAMENTALS OF ELECTRONICS-I
3	II	23M2UELN03	PC AND LAPTOP MAINTENANCE
4	II	23M2UELN04	FUNDAMENTALS OF ELECTRONICS-II

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M1UELN01	PRINCIPLES OF CELLULAR COMMUNICATION AND SMARTPHONES	NMEC-1	I	2	2	-	-	2
Objective	To make students learn the fundamentals of electronics and accessing technologies of cellular communication and to Impart knowledge on troubleshooting and maintenance of Smartphones.							

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Basics Of Electronics:** Current & Voltage – Resistor – Capacitor –Diode – Transistor – Transformer – Inductors- Integrated Circuit -Multimeter Measurement Procedure	K2	4
II	**Accessing Technology:** Wireless communication – Architecture :GSM – GPRS – UMTS – LTE – Bluetooth -WiFi	K3	4
III	**Smart Phone Sensors Features:** Accelerometer- Rear Fingerprint Sensor- Light Sensor (Software Solution)- Proximity Sensor-Gyro Sensor- Geomagnetic Sensor- Face Recognition Sensor. **Battery:**Ni-Cd - Li-Ion – Li-poly	K3	6
IV	**Display:**LCD – OLED - AMOLED **Memory &Storage:** Primary camera & Features – Secondary Camera & Features-Internal Memory(ROM)-RAM-Memory card slot Types-SIM Slot types-Call Log Memory	K3	5
V	**OS &Processors**:Types of Mobile OS - Snapdragon Parameters – Mediatek Helio parameters Troubleshooting : Mobile repair with Miracle Box - Mobile repair with Z3X Box – Steps to remove VIRUS – SAR	K5	5
Course Outcome	**CO1:** Remember and recall fundamentals of Electronic Components.	K1	
	CO2: Understand the cellular communication techniques	K2	
	CO3: Illustrate the various sensors in Mobile phone and its features	K3	
	CO4: Analyze the various hardware parts of a Smartphone	K4	
	CO5: Classify and select the appropriate OS,Processors and trouble shooting techniques for smartphones.	K5	
Learning Resources			

Text Books	1. Jochen Schiller- "Mobile Communication", Person Education Ltd. 2. M.Lotia, Pradeep Nair, "Modern Mobile Phone Repair: Using Computer Software and Service Devices", BPB Publications.			
Reference Books	1. Manahar Lotia , "Modern Mobile Phone Introduction and Servicing", BPB. 2. Dr.D.C.Agarwal , "Satellite communication", 3rd Ed-Khanna publishers-1995.			
Website Link	https://www.youtube.com/watch?v=MYKZQ3SBOOw			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc–Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**		**L**	**T**	**P**	**C**
23M1UELN01	PRINCIPLES OF CELLULAR COMMUNICATION AND SMARTPHONES	NMEC-1	I	2		2	-	-	2

CO-PO Mapping

CO Number	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	M	M	L	M	M	M	M	S	S	S
CO2	M	M	L	M	M	M	M	S	M	M
CO3	M	M	L	M	M	M	M	S	S	S
CO4	M	M	L	S	S	S	M	S	M	S
CO5	S	M	L	M	S	M	S	S	S	S

Level of Correlation between CO and PO	**L-LOW**	**M-MEDIUM**	**S-STRONG**

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
MR. S. SANTHOSH	**MR.S. ARULMANI**	**DR.S.SHAHITHA**

B.Sc–Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M1UELN02	FUNDAMENTALS OF ELECTRONICS-I	NMEC - I	I	2	2	-	-	2
Objective	To impart knowledge on semiconductor physics and applications of basic semiconductor devices and their real time applications to students.							

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**DC and AC Fundamentals:** Voltage, Current, Power, Resistance, Capacitance, Frequency, Period, V_{pp}, - Energy stored in Capacitor - Inductance – Energy stored in Inductor - Series and Parallel Connections- Ohms Law – KVL – KCL.	**K2**	6
II	**Semiconductor Physics:** Semiconductors - Energy band Diagram - Bonding in Semiconductor – Doping – Types of Semiconductors – Formation of PN Junction Diode - Working and Characteristics, Applications of PN Junction Diode.	**K2**	5
III	**BJT:** Construction – Working – Common Emitter Configuration of BJT – Characteristics – Applications - Transistor as a Switch – Transistor as an Amplifier.	**K3**	5
IV	**Circuit Design:** Half Wave Rectifier-Full wave Bridge Rectifier-Capacitor Filter – Voltage Regulator – Design of Dual Regulated Power Supply – Battery Banks.	**K5**	4
V	**Application Circuits:** LED Flasher – Clap Operated Switch – Speed Control of DC motor – Water level Indicator – Burglar Alarm – Automatic Street Light Control.	**K5**	4
Course Outcome	**CO1:** Recall the basics of atomic structure and bonding in substances	**K1**	
	CO2: Understand the construction and working of semiconductor devices with their characteristics study.	**K2**	
	CO3: Analyze the basic circuits using diode and transistors	**K3**	
	CO4: Apply the knowledge on PN junction diode to construct a RPS.	**K4**	
	CO5: Develop simple application circuits using basic components	**K5**	
Learning Resources			

Text Books	1. V.K. Metha, Rohit Metha – Principles of Electronics-S.Chand 12th edition 2. R.S Sedha –A Textbook of Applied Electronics – Revised Edition – 2008.
Reference Books	1. S. Salivahanan, N. SureshKumar-Electronic Devices and Circuits –4th Edi -2017 2. Isaak D. Mayergoyz, W. Lawson – Basic Electric Circuit Theory
Website Link	https://www.electronics-tutorials.ws/ https://www.electronics-tutorials.ws/diode/diode_1.html https://www.allaboutcircuits.com/textbook/semiconductors/chpt-1/amplifiers/

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc–Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M1UELN02	FUNDAMENTALS OF ELECTRONICS-I	NMEC - I	I	2	2	-	-	2

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	L	L	L	M	M	M	M	L
CO2	M	L	L	L	L	M	S	M	S	L
CO3	M	M	L	M	L	L	M	L	L	M
CO4	S	S	L	M	S	M	L	L	M	M
CO5	S	S	L	M	S	S	S	L	M	M

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
MR. I. BALAKRISHNAN	**MR.S. ARULMANI**	**DR.S.SHAHITHA**

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M2UELN03	PC AND LAPTOP MAINTENANCE	NMEC-II	II	2	2	-	-	2
Objective	To make students learn the fundamentals of motherboard and accessing technologies to Impart knowledge about troubleshooting and also to understand the importance of different Operating systems and Laptop.							

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Fundamentals:**Basic Electronics Components – Basic Number System - Logic Gates - Boolean Algebra-Introduction to Computer-Desktop Block Diagram – Cabinet Form Factor	**K2**	6
II	**MotherBoard:** Components of Motherboard-ATX-EATX-BTX-ITX-Features of Intel core i3 – Intel core i5– Intel core i7-AMD Ryzen 5 Series- Basic troubleshooting and maintenance Trick	**K3**	6
III	**RAM:** Features Of DDRSDRAM: DDR1-DDR2-DDR3-DDR4-DDR5 - BIOS Setup- Block Diagram and Working of SMPS-Types of SMPS - Basic troubleshooting and maintenance Trick	**K4**	4
IV	**Hard disk:**Working & Principles of Hard disk - Hard disk partition and Formatting – Windows 7 OS installation Steps Windows 10 OS installation Steps-Windows 11 OS installation Steps- Basic troubleshooting and maintenance Trick	**K4**	4
V	**Laptop:**Introduction - Structure of Laptop-Components of Laptop Motherboard- Laptop Battery charging and discharging section - Laptop different screen section LCD and LED-Antivirus Installation.	**K5**	4
Course Outcome	**CO1:** Remember and recall the various basic electronic components.	K1	
	CO2: Understand the concept of motherboard and processor.	K2	
	CO3: Analyze the RAM and SMPS	K3	
	CO4: Apply the knowledge Hard disk and OS installation in Electronic Measurements.	K4	
	CO5: Develop structure of Laptop and components of laptop motherboard	K5	

Learning Resources	
Text Books	1. IBM PC Clones Hardware troubleshooting. 2nd Edition- B.Govindarajlu.2002 TMH. 2. Computer repair maintenance. Amit Kumar Gupta – Lakshmi publications.

	3. Laptop repairing maintenance-Vinay chopra –BPB Publications
Reference Books	1. The complete PC Upgrade and maintenance- Sanjay chugh –Dreamtech press 2. Computer hardware learning guide-Vikas Gupta-Wiley India
Website Link	1. https://nptel.ac.in/courses/106106092 2. https://nptel.ac.in/courses/106103068 3. https://archive.nptel.ac.in/courses/112/107/112107217/

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M2UELN03	PC AND LAPTOP MAINTENANCE	NMEC-II	II	2	2	-	-	2	

CO-PO Mapping

CO Number	**PO1**	**PO2**	**PO3**	**PO 4**	**PO 5**	**PSO 1**	**PSO2**	**PSO3**	**PSO4**	**PSO 5**
CO1	M	L	L	L	L	M	M	M	M	L
CO2	M	L	L	M	L	M	S	M	S	L
CO3	M	M	L	M	L	L	M	S	L	M
CO4	S	M	L	M	S	M	L	L	M	M
CO5	S	L	L	M	S	S	S	M	M	M

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
MR.S.ARULMANI	**MR.S.ARULMANI**	**DR.S.SHAHITHA**

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M2UELN04	FUNDAMENTALS OF ELECTRONICS-II	NMEC-II	II	2	2	-	-	2

Objective	To impart Students knowledge on digital logic circuits and sensors, and measuring instruments used in electronics.		
Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Number Systems:** Decimal – Binary – Octal – Hexadecimal – conversion of one number systems to another – 1's and 2's Complements, BCD Code – Gray Code – Excess3 Code.	**K2**	5
II	**Semiconductor Physics:** Logic gates – Universal Gates – Boolean Algebra – Demorgan's Theorem – Karnaugh Map (Up to 4 Variables) – Simple Problems	**K3**	5
III	**Combinational Circuits:** Half Adder – Full Adder – Half Subtractor – Full Subtractor – Encoder – Decoder –MUX – DEMUX.	**K4**	3
IV	**Sequential Circuits:** Flip Flop: RS – JK –D- T – Modulo Counters – UP Counter - Down Counter – Decade Counter	**K4**	5
V	**Sensors and Instruments:** Potentiometer – Thermistor – LDR – Condenser Mic – LVDT – Load Cell – Multimeter – CRO – CRT – Amplitude, Frequency and Phase measurements using CRO.	**K5**	6
Course Outcome	**CO1:** Remember and recall the various number systems and Logic Gates.	K1	
	CO2: Understand the concept of circuit simplification using Boolean Algebra and K-Map.	K2	
	CO3: Analyze the combinational and sequential logic circuits	K3	
	CO4: Apply the knowledge of measuring instruments in Electronic Measurements.	K4	
	CO5: Develop simple Digital logic circuits in using combinational and Sequential logics.	K5	

Learning Resources	
Text Books	1. Digital Principles and Applications. 8th Edition- Donald, P. Leach, Albert Paul Malvino and Goutam Saha. 2014 Tata Mc Graw Hill, New Delhi. 2. Digital Circuits and Design.4th Edition S. Salivahanan S. Chand- 2012. 3. S. Salivahanan, N. SureshKumar-Electronic Devices and Circuits –4th Edi -2017
Reference Books	1. Digital Technology Principles and Practice. 2nd Edition- Virendra Kumar. 2015. New Age International publications, New Delhi.

	2. Albert.D. Helfric, William. Cooper - Modern electronic Instrumentation and Measurement Techniques-2015
Website Link	1. https://onlinecourses.nptel.ac.in/noc22_ee110/preview 2. https://onlinecourses.swayam2.ac.in/cec21_cs16/preview 3. https://onlinecourses.swayam2.ac.in/cec22_cs17/preview

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M2UELN04	FUNDAMENTALS OF ELECTRONICS-II	NMEC-II	II	2	2	-	-	2	

CO-PO Mapping

CO Number	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	M	L	L	L	L	M	M	M	M	L
CO2	M	L	L	L	L	M	S	M	S	L
CO3	M	M	L	M	L	L	M	L	L	M
CO4	S	S	L	M	S	M	L	L	M	M
CO5	S	S	L	M	S	S	S	L	M	M
Level of Correlation between CO and PO	L-LOW					M-MEDIUM			S-STRONG	

Tutorial Schedule	Group discussion, Lab Visit, Problem Solving, Brain Storming & Quiz
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
MR. I. BALAKRISHNAN	**MR.S. ARULMANI**	**DR.S.SHAHITHA**

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M5UELIS1	INTERNSHIP	INTERNSHIP	V	-	-	-	-	2

Objective	To give some industrial work experiences during the period of study, by which improving the critical thinking and problem solving ability of the students, and also to make them to identify needs of industry in which they have to improve their knowledge and skills.		
Unit	**Course Content**	**Knowledge Levels**	**Sessions**
1	**Embedded Systems:** Definition and classification – Overview of microprocessor, Microcontroller, and DSP – exemplary high performance processors – CISC and RISC architecture – hardware unit in an embedded System- software embedded into a system – exemplary applications – embedded systems on a chip and in VLSI circuit **PIC 16F877 Architecture and Instruction Set:** Device Overview - Architecture - Memory Organization - Status Register - Option Register - INTCON Register - PCON Register - I/O Ports - Data EEPROM - Byte Oriented Operations - Bit Oriented Operations Literal and Control Operations. **Features of PIC:** TIMER 0 Module - TIMER 1 Module - TIMER 2 Module - Capture/Compare/ PWM Modules - I^2C transmission and reception - USART – SPI - ADC Module - Oscillator Selection - Power on Reset — Power up Timer — Oscillator Startup Timer — Brownout Reset— Interrupts — Watchdog Timer —Sleep. **Interfacing And Applications:** Interfacing of Switch and LEDs – Relay and Solenoid Interfacing – Hex Keyboard Interfacing - 7 Segment Display Interfacing - LCD interfacing – DAC interfacing – Stepper motor interfacing – DC motor interfacing -ADC application -PWM applications. (Use Embedded C Programming) **Embedded Software Architecture & Operating System:** Round Robin — Round Robin with Interrupts — Function Queue Scheduling Architecture— Real Time Operating Systems (RTOS) — Tasks and Data —Semaphores and Shared Data— Message Queues, Mail Box and Pipes — Timer Function — Events — Memory Management - Types of RTOS – Study of Micro C/OS-II - Vx Works. ***Current Trends:** RTOS for IoT Systems	K4-K5	-
Course Outcome	**CO1:** Recognize the suitable industry based on the skill set.	K1	
	CO2: Understand the work protocols and environmental nature of an industry / Company/institute.	K2	

	CO3: Apply their skill sets to the assignment given by the industry / Company/institute.	K3
	CO4: Analyze the problems in the given assignments and trying to resolve it using their skill set.	K4
	CO5: Evaluate the work done and prepare documentations for the work.	K5

Learning Resources	
Text Books	1. Aniket Singh-"The Complete Book Of Internships in India: Intern Abroad This Summer"
Reference Books	1. Aniket Singh – " The Complete Book Of International Internships"
Website Link	1. https://internshala.com/

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc –Electronics and Communication Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M5UELIN1	INTERNSHIP	INTERN	V	-	-	-	-	2

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	S	M	S	S	S
CO2	S	S	M	M	S	S	M	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	15 Days of training in a selected Industry/Company/Institute
Teaching and Learning Methods	Dairy of Work done and documentation
Assessment Methods	Evaluation of Report and Viva voce

Designed By	**Verified By**	**Approved By Member Secretary**
Mr.I. BALAKRISHNAN	**Mr.S. ARULMANI**	**DR.S.SHAHITHA**

B.Sc - Electronics and Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M6UELPR1	PROJECT WORK	PROJECT WORK	VI	4	-	-	4	3
Objective	To apply the knowledge of analog and digital electronic systems in the design to solve some real time problems of industrial and social needs. And to impart the experience to the students in the industrial Field work.							

Details	**Course Content**	**Knowledge Levels**	**Sessions**
Format for the preparation of Project Report:	The final stage of work consists of the 1. Title Page 2. Bonafide Certificate 3. Acknowledgement/Preface 4. Table of contents 5. List of table and charts 6. Abbreviation	K4	-
Text of the Project	The following structure of project work should be followed to maintain the uniformity in preparation and presentation. **Chapter 1 – Introduction:** In this chapter Selection and relevance problem, historical background of the problem, definitions of related aspects, characteristics, different concepts pertaining to the problem etc can be covered by the candidate. **Chapter 2 - Research Methodology**: This chapter will include Objectives, Hypothesis, Scope of the study, Selection of the problem, Sample size, Data collection, Tabulation of data, Techniques and tools to be used, limitations of the study, significance of the study etc. **Chapter 3 - Literature Review:** This chapter will provide information about studies done on the respective issue. This would assist students to undertake further study on the same issue. **Chapter 4 - Data Presentation and Data Analysis:** This chapter	K6	-

	is the core part of the study. The analysis pertaining to collect data will be done by the students. The application of selected tools or techniques will be used to arrive at findings. In this table of information, presentation of graph etc. should be provided by the students. **Chapter 5- Conclusion:** In this unit, findings of work will be covered by the candidate and suggestion will be mentioned by the candidate to validate the objectives and hypotheses. **If required, more chapters of data analysis could be added.** **6. Bibliography** **7. Appendix**		
Headings and Titles	1. Heading and Section headings should be capitalized and centered– 14 font sizes with Bold. 2. Subdivision headings should be typed from the left hand margin sentence case -12 font sizes with Bold. 3. Paragraphs should be indented seven space for pica type and nine for elite type.	K3	-
Typing Instruction	**Paper:** 8 ½ * 11 inches in size (A4).Only one side of the sheet should be typed. **Margin:** The left side margin should not be less than 1.5 inches (or 40 mm) the right, top and Bottom Margin one inch (or 25 mm). **Font:** Times New Roman, subject matter -12 font size in running format, Heading and Section headings should be capitalized – 14 font size.	K3	-
Tables, Graphs and Diagrams	1. The table number (Example: TABLE 1.5) typed in capitals, should be separated from the text by two or three spaces. 2. If an explanatory note to a time is necessary, an asterisk should be used. 3. The note should be placed immediately below the table.	K3	-
Numbering and Spacing	**Line Spacing:** The text of the thesis should be 1.5 lines spacing **Pagination:** Pages of the text are numbered continuously in Arabic numerals.	K3	-
Bibliography	The format for bibliographical listing for books, reports, articles are the same for footnote also. Books and articles can be arranged either chronological order or year wise. **For citing Books:** Mann, R.S Social Change and Social Research, New Delhi: Concept Publishing Company, 2018, p.27 **Publication of Government and Public Organization:** Government of India, India 2016: A Reference Annual, New Delhi: Publication Division, 201, p.127 **For Citing Journal:** Goel Ranjan, "Achievement through Human Engineering", Indian Management, 28, No.8, July, 2016, pp.14-16. **For Citing Thesis or Dissertation:** Ganapathy, A study of organizational and Individual Characteristics in R & D	K4	-

	Organizations, unpublished Ph.D Thesis, Bangalore: Indian Institute of Science, 2016. **For Citing Seminar Paper:** Krishnaswami O.R., "Towards Excellence in Cooperative Management" (Paper Presented at a Seminar on "Excellence in Management", Cooperative Training College, Bangalore, July 2019).		
Schedule	**VI Semester:** 1. December: Identification of problem &Selection of topic. 2. January: Review of Literature & Finalization of Questionnaire. 3. February: Data collection& Analysis and preparation of Project report. 4. March: First, Second draft and Final draft Correction. 5. April: Review Presentation & Submission of Project.	-	-
Course Outcome	CO1: Understand the Selection of the problem.		K2
	CO2: Interpret Hypothesis and Objectives.		K3
	CO3: Analyze the literature review based on the research problem.		K4
	CO4: Evaluate the data collection.		K5
	CO5: Create and conclude the Project report.		K6

L-Lecture	T-Tutorial	P-Practical	C-Credit

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UELPR1	PROJECT VIVA VOCE	PROJECT WORK	VI	4	-	-	4	3

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	S	M	S	S	S
CO2	S	S	M	M	S	S	M	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Level of Correlation between CO and PO: **L**-LOW, **M**-MEDIUM, **S**-STRONG	
Tutorial Schedule	-
Teaching and Learning Methods	-
Assessment Methods	**EA - 100%** 1. Project Report - 150 Marks 2. Viva-Voce - 50 Marks 3. Total - 200 Marks

Designed By	Verified By	Approved By Member Secretary
MR. I. BALAKRISHNAN	Mr.S. ARULMANI	DR.S.SHAHITHA

B.Sc- Electronics & Communication Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M6UELOE1	ELECTRONICS AND COMMUNICATION FOR COMPETITIVE EXAMINATION	ONLINE-COMPETITIVE	VI	2	2	-	-	2

Objective	To learn about the IC fabrication process and the fundamental building blocks of linear integrated circuits, as well as to become acquainted with linear integrated circuit applications.		
Unit	**Course Content**	**Knowledge Levels**	**Sessions**
-	Arrangement of different topics related to Semiconductor physics, Circuit Analysis and theorems, Electronic device,ICs and Instrumentation. Digital Principles, Communication Systems, Microcontroller like Advanced concepts etc., Major emphasis has been put forth to include recent developments in the subjects. This course aims to give a holistic view of all the topics which comprised of some factual text points, multiple choice questions (MCQ), it is extremely suitable for students pursuing their higher degree in University/institute for their entrance exams, students preparing for various national and state level competitive entrance exams such as UGC-JRF/SRF/NET, ISRO, DRDO, BSNL, SAIL, BHEL, SBI, IBPS, etc. to get admission in Ph.D. in Electronics. In addition, it is also useful for UPSC and states PSC. **Rules for creating MCQ pattern:** 1. Objective type online examination will be conducted at the end of 4th semester. 2. Questions must be taken from all previous question papers of UGC-NET, SET, DRDO, BSNL JTO, UPSC, IBPS and Common Entrance Test for Ph.D of various Universities. 3. Test critical thinking. ✓ Multiple choice questions to test the superficial knowledge. ✓ Learners to interpret facts, evaluate situations, explain cause	K5	

and effect, make inferences, and predict results.

4. Emphasize Higher-Level Thinking

- ✓ Use memory-plus application oriented questions. These questions require students to recall principles, rules or facts in a real life context.

Example 1:

Ability to analyze statements and justify it :

1. *Which of the following statement not suitable for semiconductors?*

a) *Semiconductors are having 4 valance electrons*
b) *At 0°C it behaves like an insulator.*
c) *The energy gap is large.*
d) *Si and Ge are the commonly used Semiconductors*

Eg.2

Ability to incorporate the facts with real time problems

2. *Which kind of power supplies are suitable for computer systems design.*

a) *Regulated power supply*
b) *Uninterrupted power supply*
c) *Variable regulated power supply*
d) *Switch mode Power supply*

5. Mix up the order of the correct answers:

- ✓ Keep correct answers in random positions and don't let them fall into a pattern that can be detected

6. Use a Question Format:

- ✓ Multiple-choice items to be prepared as questions (rather than incomplete statements)

Incomplete Statement Format:

*The Astable multivibrator is also known as*_____

: This in Direct Question Format and it will be Less effective.

Select another name of an Astable multivibrator.

a) *One shot Multivibrator*
b) *Two shot Multiibrator*
c) *Free running Multivibrator*
d) *No shot Multivibrator*

: This is Best format.

7. Keep Option Lengths Similar

	✓ Avoid making your correct answer the long or short answer 8. Avoid the "All the Above" and "None of the Above" Options ✓ Students merely need to recognize two correct options to get the answer correct 9. HOD's instruct to the faculty to prepare minimum 500 questions booklet (cumulatively for each Programme) with solutions and circulate among the students. 10. Each Department to prepare the Questions (MCQ pattern with four answers) and submit to ICT.	
Course Outcome	**CO1:** Recall and understand the various fundamentals of Electronics and communication.	K1
	CO2: Describe the various concepts and Methodologies of Analog and Digital electronic system design principles	K2
	CO3: Demonstrate the various applications and advantages of discrete components and ICs in the circuit design process.	K3
	CO4: Analyze and optimize the complex circuits using various theorems and principles.	K4
	CO5: Design and evaluate the different analog and digital circuits for controlling and communication process.	K5

Learning Resources			
Text Books	1. Objective Electronics with solutions for IMD,DRDO, ISRO etc. by **Rakesh Patel**and **Priyanka Kumari** – July 2022 2. Trueman's UGC-NET Electronic Sciences - **Danika Publication** –Jan 23 3. GATE 2023 : Electronics & Communication Engineering - 36 Years' Topic-wise Previous Solved Papersby G.K. Publications (P) Ltd.-March 2022		
Reference Books	1. Handbook Series of Electronics & Communication Engineering by **Experts Compilation**Jan 2013 2. Objective Electronics & Telecommunication Engineering by M.P.Sinha , Neetu Singh- Jan 2012		
Website Link	1. http://www.sanfoundry.com 2. https://www.geeksforgeeks.org		
L-Lecture	T- Tutorial	P-Practical	C-Credit

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
23M6UELOE1	ELECTRONICS AND COMMUNICATION FOR COMPETITIVE EXAM	ONLINE-COMPETITIVE	VI	2	2	-	-	2

CO-PO Mapping:

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	S	S	S	M	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	M	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Level of Correlation between CO and PO: L-LOW , M-MEDIUM, S-STRONG

Tutorial Schedule	NET/SET/GATE/CET/TRB Old question papers –solutions – online mock test
Teaching and Learning Methods	Self-study, Group discussion ,Chalk and Talk, Audio-Video Learning, learning through mock test
Assessment Methods	100 multiple choice questions through computer based online examinations passing minimum is 50%

Prepared By	Verified By	Approved By Member Secretary
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