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)
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DEGREE OF BACHELOR OF SCIENCE

Learning Outcomes – Based Curriculum Framework
– Choice Based Credit System

Syllabus for B.Sc., Electronics & Communication

(Semester Pattern)

(For Candidates admitted from the academic year
2021 -2022 and onwards)

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Syllabus for B.Sc., Electronics and Communication

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(For Candidates admitted from the academic year 2021-2022 and onwards)

MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

RASIPURAM- 637408

DEPARTMENT OF ELECTRONICS AND COMMUNICATION

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, thereby 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

PROGRAMME EDUCATIONAL OBJECTIVES (PEO):

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 Leadership skills to become a self-employed

PEO3: Graduates will be uphold the human values and environmental sustenance For the betterment of 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):

PSO1: Apply proficiency in use of software and hardware required to practice electronics and communication profession.

PSO2: Graduates will be able to apply fundamentals of electronics in various aspects of analog and digital systems.

PSO3: Design and analyze specific engineering problems of communication, electronic circuits, computer programming, embedded systems, VLSI design and semiconductor technology by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.

PSO4: Graduates will be able to communicate effectively with excellent interpersonal skills and demonstrate the practice of professional ethics for societal benefit.

PSO5: 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 applications.

Graduate Attributes:

GA1**:** Analytical Reasoning

GA2**:** Critical Thinking

GA3**:** Problem Solving Skills

GA4: Communication Skills

GA5**:** Leadership Quality

GA6**:** Team Work

GA7: Lifelong Learning

MUTHAYAMMAL COLLEGE OF ARTS & SCIENCE (Autonomous)

B.Sc., ELECTRONICS & COMMUNICATION abstract under LOCF-CBCS Pattern
With effect from 2021-2022 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 COURSE(DSC)-THEORY	III	2	8	2	8	1	4	1	4	2	8	2	7	10	39
4	DSC - PRACTICAL	III			1	2	1	2	1	2	2	4	1	2	6	12
5	GENERIC ELECTIVE COURSES(GEC)- THEORY	III	1	4	1	4	1	4	1	4					4	16
6	GEC PRACTICAL	III			1	2	1	2	1	2					3	6
7	DISCIPLINE SPECIFIC ELECTIVE COURSES(DSE)	III									2	8	2	8	4	16
8	PROJECT WORK	III											1	4	1	4
9	INTERNSHIP	III													0	0
10	ONLINE - COMPETITIVE EXAMINATION	III											1	2	1	2
11	SKILL ENHANCEMENT COURSES(SEC)-SBEC	IV					1	2	1	2	1	2	1	2	4	8
12	NON MAJOR ELECTIVE COURSES(NMEC)	IV					1	2	1	2					2	4
13	PROFESSIONAL ENGLISH	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	22	9	26	8	22	8	22	7	22	9	26	48	140

Total No.of Subjects	48
Marks	**4600**

PART	No.of Credits
PART - I	12
PART - II	12
PART - III	95
PART - IV	20
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

(for the Students Admitted from the Academic Year:2021-2022 Onwards)

Programme : B.Sc.ELECTRONICS & 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	21M1UFTA01	TAMIL-I	5	-	3	25	75	100
2	II	LANGUAGE-II	21M1UCEN01	COMMUNICATIVE ENGLISH-I	5	-	3	25	75	100
3	III	DSC THEORY-I	21M1UELC01	SEMICONDUCTOR DEVICES	4	-	4	25	75	100
4	III	DSC THEORY-II	21M1UELC02	APPLIED ELECTRIC CIRCUITS	4	-	4	25	75	100
5	III	GEC THEORY -I	21M1UMAA02	ALGEBRA AND DISCRETE MATHEMATICS	4	-	4	25	75	100
6	III	DSC PRACTICAL-I	21M2UELP01	PRACTICAL : BASIC ELECTRONICS	-	3	-	-	-	-
7	III	GEC PRACTICAL - I	21M2UMAAP1	PRACTICAL : ALLIED MATHEMATICS	-	2	-	-	-	-
8	IV	AECC - VALUE EDUCATION	21M1UVED01	YOGA	1	-	2	100	-	100
9	IV	PROFESSIONAL ENGLISH - I	21M1UPES01	PROFESSIONAL ENGLISH FOR PHYSICAL SCIENCE- I	2	-	2	25	75	100
				TOTAL	25	5	22	250	450	700
SEMESTER - II										
1	I	LANGUAGE - I	21M2UFTA02	TAMIL-II	5	-	3	25	75	100
2	II	LANGUAGE - II	21M2UCEN02	COMMUNICATIVE ENGLISH - II	5	-	3	25	75	100
3	III	DSC THEORY -III	21M2UELC03	APPLIED DIGITAL ELECTRONICS	4	-	4	25	75	100
4	III	DSC THEORY -IV	21M2UELC04	POWER ELECTRONICS	4	-	4	25	75	100
5	III	GEC THEORY -II	21M2UMAA04	DIFFERENTIAL EQUATIONS AND INTEGRATION	4	-	4	25	75	100
6	III	DSC PRACTICAL - I	21M2UELP01	PRACTICAL : BASIC ELECTRONICS	-	3	2	40	60	100
7	III	GEC PRACTICAL - I	21M2UMAAP1	PRACTICAL : ALLIED MATHEMATICS	-	2	2	40	60	100
8	IV	AECC - ENVIRONMENTAL STUDIES	21M2UEVS01	ENVIRONMENTAL STUDIES	1	-	2	100	-	100
9	IV	PROFESSIONAL ENGLISH - II	21M2UPES02	PROFESSIONAL ENGLISH FOR PHYSICAL SCIENCE- II	2	-	2	25	75	100
				TOTAL	25	5	26	330	570	900

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

Scheme of Examinations LOCF-CBCS Pattern

(for the Students Admitted from the Academic Year:2021-2022 Onwards)

Programme : B.Sc.ELECTRONICS & COMMUNICATION

S.No.	PART	STUDY COMPONENTS	COURSE_CODE	TITLE OF THE COURSE	Hrs./W		CREDIT POINTS	MAX.MARKS		
					Lect.	Lab.		CIA	ESE	TOTAL
SEMESTER - III										
1	I	LANGUAGE - I	21M3UFTA03	TAMIL-III	5	-	3	25	75	100
2	II	LANGUAGE - II	21M3UCEN03	COMMUNICATIVE ENGLISH - III	5	-	3	25	75	100
3	III	DSC THEORY -V	21M3UELC05	ELECTRONIC CIRCUITS	4	-	4	25	75	100
4	III	GEC THEORY -III	21M3UCSA02	ALLIED: C PROGRAMMING	4	-	4	25	75	100
5	III	DSC PRACTICAL - II	21M3UELP02	PRACTICAL : ELECTRONIC CIRCUITS	-	3	2	40	60	100
6	III	GEC PRACTICAL - II	21M3UCSAP2	PRACTICAL : C PROGRAMMING	-	3	2	40	60	100
6	IV	SEC - I	21M3UELS01	8051 MICROCONTROLLER AND ITS APPLICATIONS	4	-	2	25	75	100
7	IV	NMEC - I	21M3UPHN01	PHYSICS IN EVERYDAY LIFE	2	-	2	25	75	100
				TOTAL	24	6	22	230	570	800
SEMESTER - IV										
1	I	LANGUAGE - I	21M4UFTA04	TAMIL-IV	5	-	3	25	75	100
2	II	LANGUAGE - II	21M4UCEN04	COMMUNICATIVE ENGLISH - IV	5	-	3	25	75	100
3	III	DSC THEORY - VI	21M4UELC06	PRINCIPLES OF COMMUNICATION SYSTEMS	4	-	4	25	75	100
4	III	GEC THEORY - IV	21M4UCSA04	ALLIED: PYTHON PROGRAMMING	4	-	4	25	75	100
5	III	DSC PRACTICAL - III	21M4UELP03	PRACTICAL : COMMUNICATION SYSTEMS	-	3	2	40	60	100
6	III	GEC PRACTICAL - III	21M4UCSAP4	PRACTICAL : PYTHON PROGRAMMING	-	3	2	40	60	100
7	IV	SEC - II	21M4UELS02	MODERN ELECTRONIC MEASUREMENTS AND INSTRUMENTS	4	-	2	25	75	100
8	IV	NMEC - II	21M4UPHN04	ESSENTIALS OF ELECTRICITY	2	-	2	25	75	100
				TOTAL	24	6	22	230	570	800

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

Scheme of Examinations LOCF-CBCS Pattern

(for the Students Admitted from the Academic Year:2021-2022 Onwards)

Programme : B.Sc.ELECTRONICS & COMMUNICATION

S.No.	PART	STUDY COMPONENTS	COURSE_CODE	TITLE OF THE COURSE	Hrs./W		CREDIT POINTS	MAX.MARKS		
					Lect.	Lab.		CIA	ESE	TOTAL
SEMESTER - V										
1	III	DSC THEORY - VII	21M5UELC07	LINEAR INTEGRATED CIRCUITS AND ITS APPLICATIONS	5	-	4	25	75	100
2	III	DSC THEORY - VIII	21M5UELC08	EMBEDDED SYSTEMS AND PIC MICROCONTROLLER	5	-	4	25	75	100
3	III	DSC PRACTICAL - IV	21M5UELP04	PRACTICAL : LINEAR INTEGRATED CIRCUITS	-	4	2	40	60	100
4	III	DSC PRACTICAL - V	21M5UELP05	PRACTICAL : EMBEDDED SYSTEMS	-	4	2	40	60	100
5	III	DSE - I	21M5UELE01	NETWORK COMMUNICATION AND SECURITY	5	-	4	25	75	100
6	III	DSE - II	21M5UELE02	FUNDAMENTALS OF IOT AND APPLICATIONS	5	-	4	25	75	100
7	IV	SEC - III	21M5UELS03	COMPETITIVE SKILLS	2	-	2	25	75	100
8	IV	INTERN	21M5UELIN1	INTERNSHIP	-	-	-	-	-	-
				TOTAL	22	8	22	205	495	700
SEMESTER - VI										
1	III	DSC THEORY - IX	21M6UELC09	PCB DESIGN AND FABRICATION	5	-	4	25	75	100
2	III	DSC THEORY - X	21M6UELC10	VLSI DESIGN AND VHDL PROGRAMMING	5	-	4	25	75	100
3	III	DSE - III	21M6UELE04	ADVANCED COMMUNICATION SYSTEMS	5	-	4	25	75	100
4	III	DSE - IV	21M6UELE05	ROBOTICS AND AUTOMATION	5	-	4	25	75	100
5	III	DSC PRACTICAL - VI	21M6UELP06	PRACTICAL : VHDL PROGRAMMING	-	4	2	40	60	100
6	III	PROJECT	21M6UELPR1	PROJECT WORK	-	4	3	40	60	100
7	III	ONLINE - COMPETITIVE EXAMINATION	21M6UELOE1	ELECTRONICS AND COMMUNICATION FOR COMPETITIVE EXAM	-	-	2	100	-	100
8	IV	SEC - IV (Naan Muthalvan)	21M6UELS04	DATA ANALITICS AND VISUALIZATION	2	-	2	-	-	-
9	V	EXTENSION ACTIVITY	21M6UEXA01	EXTENSION ACTIVITY	-	-	1	-	-	-
				TOTAL	22	8	26	280	420	700
				OVERALL TOTAL	142	38	140	1525	3075	4600
10		EXTRA CREDIT COURSE	21M6UELEC1	MOOC Courses offered in SWAYAM / NPTEL	-	-	2	-	-	-
11		VALUE ADDED		VALUE ADDED COURSE	-	-	2	-	-	-

HEAD OF THE DEPARTMENT
ELECTRONICS & COMMUNICATION
Muthayammal College of Arts & Science
Rasipuram - 637 408. Namakkal Dt
Tamil Nadu

PRINCIPAL
MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE
(AUTONOMOUS)
RASIPURAM - 637 408,
NAMAKKAL DISTRICT.

UG - REGULATION

1. Internal Examination Marks- Theory

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

Attendance Percentage	Marks
96 %to 100%	5
91%to 95%	4
86%to 90%	3
81%to 85%	2
75%to 80%	1
Below 75%	0

2. Question Paper Pattern For CIA I, II and ESE (3hours), Maximum: 75Marks

SECTION-A (10 Marks) (Objective Type)
Answer ALL Questions
ALL Questions Carry EQUAL Marks (10 x1=10 marks)

SECTION-B(10 Marks) (Short Answer)
Answer ALL Questions
ALL Questions Carry EQUAL Marks (5 x 2 = 10 marks)

SECTION-C (25 Marks) (Either or Type)
Answer any FIVE questions
ALL Questions Carry EQUAL Marks (Either or Type) (5 x 5 = 25 marks)

SECTION-D (30 Marks) (Analytical Type)
Answer any THREE Questions out of FIVE questions
ALL Questions Carry EQUAL Marks (3 x 10 = 30 marks)

** (Syllabus for CIA-I 2.5 Units, Syllabus for CIA-II All 5 Units)*

2. a) Components for Practical CIA.

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

2. b) Components for Practical ESE.

Components	Marks
Completion of Experiments	50
Record	5
Viva	5
Total	**60**

3. **Guidelines for Value Education Yoga and Environmental Studies (Part IV)**
   - ✓ The Course Value Education Yoga is to be treated as 100% CIA course which is offered in Semester-I for Ist Year UG students.
   - ✓ The Course Environmental Studies is to be treated as 100% CIA course which is offered in Semester-II for Ist Year UG students.
   - ✓ Total Marks for the Course = 100

Components	Marks
Two Tests (2 X 30)	60
Field visit and report (10+10)	20
Two assignments (2 X10)	20
Total	100

   - ✓ The passing minimum for this course is 40%
   - ✓ In case, the candidate fails to secure 40% passing minimum, he/she may have to reappear for the same in the subsequent odd/even semesters.

4. **Guidelines for Extension Activity (Part V)**
   - ✓ At least two activities should be conducted within semester consisting of two days each.
   - ✓ The activities may be Educating Rural Children, Unemployed Graduates, Self Help Groups, etc.
   - ✓ The marks may be awarded as follows.

No. of Activities	Marks
2 X 50 (Each Activity for two days)	100

5. Internship/Industrial Training, Mini Project and Major Project Work

Internship/ Industrial Training		Mini Project	Major Project Work		
Components	**Marks**	**Marks**	**Components**		**Marks**
CIA*[2]			**CIA**		
Work Diary	-	-	a) Attendance	10Marks	40
Report	-	50	b) Review/ Work Diary*[1]	30 Marks	
Viva–Voce Examination	-	50	**ESE*[2]**		
			a) Final Report	40Marks	60
			Viva-voce	20Marks	
Total	**-**	**100**	**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. Guidelinesfor Competitive Exams- Online Mode (Part III) - Online Exam 3 hours

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

- ✓ Objective type Questions from Question Bank.
- ✓ The passing minimum for this paper is 40%
- ✓ In case, the candidate fails to secure 40% passing minimum, he/she may have to reappear for the same in the subsequent semesters.

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1UELC01	SEMICONDUCTOR DEVICES	DSC THEORY-I	I	4	4	-	-	4

Objective	To enable the students to understand and gain the knowledge on semiconductor devices and to acquaint the students with construction, theory and characteristics of the various kinds of electronic 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.	K1-K2	8
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.	K2-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.	K3-K4	8
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	10
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 - Opto couplers-LASER Diode	K3-K4	8

ourse Outcome	**CO1:** Recognize the various concepts of semiconductor Physics.	K1	45
	CO2: Understand the oeration and characteristics of various semiconductor devices.	K2	
	CO3: Apply the operation of the devices to various application design.	K3	
	CO4: Illustrate the functionality of different kinds of special diodes and opto electric devices.	K3	
	CO5: Analyse 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, 2006 . 3. R. S. Sedha, " A TextBook of Applied Electronics" , S.Chand and Company Ltd., 2010.
Reference Books	1. S.L. Kakani,K. C. BhanDai—A text book Of Electronics 2. BernardGrob"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/ https://nptel.ac.in/courses/115/102/115102103/

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1UELC01	SEMICONDUCTOR DEVICES	DSC THEORY - I	I	4	4	-	-	4

CO-PO Mapping:

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	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	Chalk and Talk,Visulaisation and Smart Class
Assessment Methods	Unit Test,Assignment,Internal & Semester Examinations

Designed By	Verified By	Approved By
MR.I. BALAKRISHNAN	MR.S.ARULMANI	

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M1UELC02	APPLIED ELECTRIC CIRCUITS	DSC THEORY - II	I	4	4	-	-	4
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.	K1-K2	10
II	**DC Fundamentals:** Potential Difference-current-Power-Ohms Law-Kirchoff's Laws-Voltage Source- Current Source-Series and Parallel combinations of Sources-Voltage Division Rule-Current Division Rule-Simple Problems.	K3	8
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.	K3-K4	10
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	8
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	9
Course Outcome	**CO1:** Recite and restate the basic electrical parameters and their units.	K1-K2	45
	CO2: Summarize the 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. Circuits and Networks: Analysis and Synthesis - 5th Edition by A. Sudhakar, ShyammohanS.Palli-2017 2. A Text Book of Applied Electronics, R.S.Sedha, S.Chand and Company Ltd., 2010. 3. Circuit Theory - S. Salivahanan,S. Praveen Kumar - S.Chand

Reference Books	1.B.L.Theraja, "Basic Electronics-Solid State Devices",S.Chand Company 2.Basic Electronics - Bernard Grob - Mcgraw Hill. 3. Electronic Devices and Circuits - S. Salivahanan, N. SureshKumar- 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/ https://www.youtube.com/playlist?list=PLFF553CED56CDE25D https://www.youtube.com/watch?v=w8Dq8blTmSA

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1UELC02	APPLIED ELECTRIC CIRCUITS	DSC THEORY - II	I	4	4			4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
MR. S. SATHISHKUMAR	MR.S.ARULMANI	

MUTHAYAMMAL COLLEGE OF ARTS & SCIENCE * RASIPURAM 637 408 Tamil Nadu

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M2UELC03	APPLIED DIGITAL ELECTRONICS	DSC THEORY - III	II	4	4	-	-	4
Objective	To acquire the basic knowledge of Number system, Digital logic circuits and its application and to outline the formal procedures for the analysis and design of combinational and sequential circuits, implementation and design of data conversion 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.	K1-K2	10
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	8
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	10
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	8
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	9

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. 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. Microprocessor Architecture, Programming and Applications With the 8085/8080A - Ramesh.S Gaonkar New Age International - 5th Edition.	
Reference Books	1. Digital Technology Principles and Practice. 2nd Edition- Virendra Kumar. 2015. New Age International publications, New Delhi. 2. Integrated Electronics Analog and Digital Circuits and Systems. [Second Edition].- Jacob Millman and Christos Halkias. 2011. Tata Mc Graw Hill Publishing Company Limited, New Delhi.	
Website Link	https://onlinecourses.nptel.ac.in/noc22_ee110/preview https://onlinecourses.swayam2.ac.in/cec21_cs16/preview https://onlinecourses.swayam2.ac.in/cec22_cs17/preview	

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2UELC03	APPLIED DIGITAL ELECTRONICS	DSC THEORY - III	II	4	4	-	-	4

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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Curriculum Development Cell MCAS (Autonomous) Rasipuram

Designed By	Verified By	Approved By
MR.S.ARULMANI	MR.S.ARULMANI	

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M2UELC04	POWER ELECTRONICS	DSC THEORY - IV	II	4	4	-	-	4
Objective	To acquire knowledge on various power semiconductor devices and their characteristics, and to study the principle of operation, design and synthesis of different types of power supplies and their applications.							

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.	K1-K2	8
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 - Resistance capacitor 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. SCR rating and their importance.	K2-K3	10
III	**Converters and Choppers:** Converters - Definition - Single phase Half controlled bridge converter with R load and RL load- importance of flywheel diode - Single phase fully controlled bridge converter with R load - voltage and current waveforms - Single phase fully controlled bridge converter with RL load -voltage and current waveforms. **Choppers:** Introduction - applications -principle of chopper-control strategies (time ratio and current limit control)-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.	K2-K3	10
IV	**Inverter:** Definition Requirement of an inverter -Single phase inverter with resistive load - Single phase inverter with RL load -Methods to obtain sine wave output from an inverter- output voltage control in inverters - McMurray inverter - advantages- Basic 3 phase bridge inverter with 120 conduction mode - circuit, trigger sequence, waveform - 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	9

V	**AC Voltage Regulators:** Introduction to AC Voltage Controller - Principle of On-Off Control - Principle of Phase Control - Single Phase 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.	K3-K4	8
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 of controlled 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[Second Edition],Tata Mcgraw hill, Delhi. 2. Mithal.G.K,2000 , Industrial electronics and control [Eighteenth Edition],Tata Mcgraw hill , Newdelhi 3. Theraja B.L, Theraja.A.K, 2003, Electrical Technology [First Edition], S.Chand, Newdelhi.
Website Link	https://onlinecourses.nptel.ac.in/noc22_ee127/preview https://www.coursera.org/specializations/power-electronics https://www.coursera.org/learn/power-electronics

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2UELC04	POWER ELECTRONICS	DSC THEORY - IV	II	4	4	-	-	4

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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Curriculum Development Cell MCAS Autonomous Rasipuram

Designed By	Verified By	Approved By
DR.M.KUTRALEESWARAN	MR.S.ARULMANI	

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2UELP01	PRACTICAL: BASIC ELECTRONICS	DSC PRACTICAL - I	II	3	-	1	2	2
Objective	To get familiarized with the various electronics instruments and components which basically equip them to construct complex circuits in near future.							

S. No.	List of Experiments / Programmes (Any 22)	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	Photo transistor Characteristics.	K3	3
10	Amplitude and Frequency Measurement Using CRO.	K4	3
11	Lissogious pattern for frequency and phase Measurement.	K4	3
12	Verification of Ohm's Law.	K4	3
13	Verification of KVL and KCL.	K4	3
14	Verification of Thevinin's theorem.	K4	3
15	Verification of Notorn's theorem.	K4	3
16	Verification of Super position theorem.	K4	3
17	Frequency response of RLC series and Parallel Circuits.	K4	3
18	Truth Table Verification of Basic Gates.	K4	3
19	NAND and NOR as a Universal Gate (Any 3 Logics)	K5	3
20	Verification of De Morgan's Theorem.	K5	3
21	Truth Table Verification of Half Adder & Full Adder.	K5	3
22	Truth Table Verification of Half Subtractor & Full Subtractor.	K5	3
23	Encoder Using 74147 IC	K6	3
24	Decoder Using 7442 IC	K6	3
25	Multiplexer Using 74153 IC	K6	3
26	Demultiplexer Using 74155 IC	K6	3
27	Parity Generator and Checker.	K6	3
28	MS JK Flip Flop Using 7476 IC	K6	3
29	Parallel In Parallel Out Shift Register Using 7495 IC	K6	3
30	Up Counter Using 7490 IC or 7493 IC.	K6	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	http://vlabs.iitkgp.ernet.in/be/# http://vlabs.iitkgp.ac.in/dec/#

L-Lecture, T-Tutorial, C-Credit

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2UELP01	PRACTICAL: BASIC ELECTRONICS	DSC PRACTICAL - I	II	3	-	1	3	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	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	Practical in Laboratory
Teaching and Learning Methods	Laboratory Equipments
Assessment Methods	Observation of Records, Model Practical

Designed By	Verified By	Approved By
MR.I. BALAKRISHNAN	Mr.S. ARULMANI	

Curriculum Development Cell MCAS (Autonomous) Rasipuram

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M3UELC05	ELECTRONIC CIRCUITS	DSC THEORY - V	III	4	4	-	-	4
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					K1-K3	8	
II	**Wave shaping circuits:** introduction to Wave Shaping Circuits - RC & RL Circuits - Basic Differentiator - Basic Integrator - Clipping Circuits - Clamping Circuits - Voltage Doublers - Tripler - Quadrupler.					K3	8	
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					K3-K5	10	
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.					K3-K5	11	
V	**Oscillators and Multivibrators:** Concept of sustained oscillation- Barkhausen Criterion- Classification of Oscillators - Hartley Oscillator - Colpitt' Oscillator - Clapp Oscillator - Phase Shift Oscillator - Wein Bridge - Crystal Oscillator - Frequency stability of Oscillators - Astable Multivibrator - Monostable Multivibrator - Bistable Multivibrator - Schmitt Trigger.					K4	8	
Course Outcome	**CO1:** Remember the applications of diodes and apply it over power supply design					**K1-K3**	**45**	
	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-K4**		
	CO4: Analyze the principles of feedback systems behind the design of amplifiers and oscillators.					**K3-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 edition. 2.V.K.Metha, Rohit Metha, –Principles of Electronics" S Chand, 2006 . 3. R. S. Sedha, " A TextBook 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&CompanyLtd. 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 NPTEL. https://nptel.ac.in/courses/108/102/108102097/#Introduction to Electronic circuits NPTEL.

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3UELC05	ELECTRONIC CIRCUITS	DSC THEORY - V	III	5	4	1	-	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
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MUTHAYAMMAL COLLEGE OF ARTS & SCIENCE RASIPURAM 637 408 Tamil Nadu

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M3UELS01	8051 MICROCONTROLLER AND ITS APPLICATIONS	SEC - I	III	4	2	2		2
Objective	To make students learn the architecture and addressing modes of 8051 and to Impart knowledge about assembly language programming of 8051 and also to understand the importance of different peripheral devices with their interfacing to 8051.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Architecture & Addressing modes of 8051:** Comparison of Microprocessor and Microcontroller - Block diagram of Microcontroller -Functions of each block - Pin details of 8051 - ALU -ROM- RAM - Memory Organization of 8051 - Special function registers -Program Counter - PSW register - Stack - I/O Ports - Timer - Interrupt - Serial Port - Oscillator and Clock - Clock Cycle - State - Machine Cycle - Instruction cycle - Reset - Power on Reset. Addressing Modes: Different addressing modes of 8051.	K1-K2	8
II	**Instruction Set and Programming Examples:** Instruction set of 8051 - Classification of 8051 Instructions - Data transfer instructions - Arithmetic Instructions - Logical instructions -Branching instructions - Bit Manipulation Instructions **Programming Examples:** Multibyte Addition - 8 Bit Multiplication and Division - Biggest Number / Smallest Number - Ascending order / Descending order BCD to ASCII Conversion - ASCII to Binary Conversion - Odd Parity Generator - Even Parity Generator -Time delay routines.	K2-K3	10
III	**I/O Programming and Timer:** Bit addresses for I/O and RAM - I/O programming - I/O bit manipulation programming. Programming 8051 Timers - Timer 0 and Timer 1 registers - Different modes of Timer - Mode 0 Programming - Mode 1 Programming - Mode 2Programming - Counter programming - Different modes of Counter - Mode 0 Programming - Mode 1 Programming -Mode 2 Programming (simple programs)	K3	8
IV	**Interrupt and serial Programming: Interrupt:** 8051 Interrupts - Programming Timer Interrupts - Programming external hardware interrupts - Programming the serial communication interrupt -Interrupt priority in 8051 (simple programs). **Serial Communication:** Basics of Serial programming - RS 232 Standards - 8051 connection to RS 232 - 8051 Serial Communication Programming - Programming 8051 to transmit data serially - Programming 8051 to Receive data serially.	K3	9

V	**Interfacing Techniques:** IC 8255 PPI - Block Diagram - Modes of 8255 - 8051 interfacing with the 8255 - Interfacing external memory to 8051-- ASM Programming Switch and LED Interfacing- Relays - Sensor interfacing - ADC interfacing - DAC interfacing - Keyboard interfacing - Seven segment LED Display Interfacing - Stepper Motor interfacing - DC motor interfacing using PWM.	K4-K5	10
Course Outcome	**CO1:** Identify and summarize the difference between microprocessors and microcontrollers.	K1-K2	45
	CO2: Interpret the various hardware features of 8051 microcontroller.	K2	
	CO3: Use the various instruction set of 8051 to learn basic assembly language programming.	K3	
	CO4: Illustrate the various hardware and interrupt programming of 8051	K4	
	CO5: Classify and select the appropriate peripheral devices to design microcontroller based systems.	K4-K5	
Learning Resources			
Text Books	1. Mohamed Ali Maszidi & Janice Gillispie Maszidi, "The 8051 Microcontroller and Embedded System", Pearson Publishers 2. Kenneth J. Ayala, "The 8051 Microcontroller Architecture, Programming and Application"2 nd Edition, Penram Int ernational Publications. 3. Intel 8031/8051 family Data Sheet - Intel corporation		
Reference Books	1. Myke predko, "Programming and Customizing the 8051 Microcontroller", Tata McGraw Hill, 2. Ajit pal- "Microcontrollers, Principles and Applications" - PHI Ltd.,		
Website Link	https://www.youtube.com/watch?v=84YUQu8tE4w https://www.youtube.com/watch?v=GPz_mR7Flas https://www.youtube.com/watch?v=uFhDGagZzjs		

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3UELS01	8051 MICROCONTROLLER AND ITS APPLICATIONS	SBEC-I	III	4	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	M	M
CO2	M	M	L	M	M	M	M	S	M	M
CO3	M	M	L	M	M	M	M	S	S	M
CO4	M	M	L	M	M	M	M	S	S	M
CO5	S	M	L	M	S	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
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MUTHAYAMMAL COLLEGE OF ARTS & SCIENCE * RASIPURAM 637 408 Tamil Nadu

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M3UELP02	PRACTICAL: ELECTRONIC CIRCUITS	DSC PRACTICAL - II	III	3	-	1	2	2
Objective	To prepare the students to design and analyze various electronic circuits using discrete active and passive components.							

S.No.	**List of Experiments / Programmes (Any 10)**	**Knowledge Levels**	**Sessions**
1	Half wave, Full wave and Bridge Rectifier with capacitor filter.	K1-K2	3
2	Basic Integrator and Differentiator.	K4	3
3	Clipper and Clapper Circuits (Positive and Negative)	K3-K4	3
4	Voltage Doubler and Tripler	K5	3
5	Hartley Oscillator, Colpitt's Oscillator Using Transistor.	K5	3
6	RC Phase shift Oscillator using transistor.	K5	3
7	Crystal Oscillator using Transistor	K5	3
8	UJT as relaxation Oscillator.	K5	3
9	Astable and Monostable Multivibrator Using Transistors.	K5	3
10	Bistable Multivibrator and Schmitt Trigger Using Transistors.	K5	3
11	Design of Dual Regulated Power supply using IC 78XX and 79XX.	K6	3
12	Frequency response of Two Stage RC Coupled Amplifier.	K5	3
13	Automatic Street light control using LDR.	K6	3
14	Lamp Dimmer using DIAC and TRIAC.	K6	3
15	Speed Control of DC motor using SCR.	K6	3

Course Outcome		
	CO1: Remember and Understand the applications of 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 a 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	http://vlabs.iitkgp.ac.in/ssd/#

L-Lecture T-Tutorial C-Credit

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3UELP02	PRACTICAL: ELECTRONIC CIRCUITS	DSC PRACTICAL - II	III	3	-	1	2	2

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	A	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	Practical in Laboratory
Teaching and Learning Methods	Laboratory Equipments
Assessment Methods	Observation of Records, Model Practical

Designed By	Verified By	Approved By
MR. I. BALAKRISHNAN	Mr.S.ARULMANI	

Curriculum Development Cell MCAS (Autonomous) Rasipuram

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M4UELC06	PRINCIPLES OF COMMUNICATION SYSTEMS	DSC THEORY - VI	IV	4	4	-	-	4
Objective	To understand the concept of wave propagation methods, acquire knowledge on modulation techniques and to inculcate the principle of radio Transmitters and receivers.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Wave propagations and Antennas:** EM frequency spectrum - Propagation of EM wave - Atmospheric structure - Ground wave propagation - Space wave propagation - Sky wave propagation - important terms related to sky wave propagation. Antennas: Definition-types of antenna- Mono pole and dipole antenna- directional and Omni directional antenna- Dipole arrays- Yagi antenna- parabolic antenna- directive gain- directivity- radiation pattern and polarization-applications.	K1-K3	8
II	**Amplitude modulation:** Modulation - Need for modulation- Types of modulation - Amplitude modulation - AM Signal, Expression for AM, Modulation index - Power relation - AM Spectrum - DSBFC - DSBSC - SSB and VSB systems - AM Modulators - High level AM transmitter - Low level AM transmitter - SSB transmitter.	K2-K4	10
III	**Angle Modulation:** Frequency modulation - FM Signal - Expression for FM - Modulation index - Effect of noise - Interferences - Narrow band and wide band FM - FM Modulators - FM transmitters- Direct and Indirect FM Transmitters -Stereophonic FM transmitter- Pre Emphasis - Phase Modulation: PM Signal - Phase modulator .	K2-K4	10
IV	**Receivers:** AM Receivers: AM Demodulators - TRF Receivers - Super heterodyne receivers - Choice of IF and Oscillator Frequencies - Image Rejection - Adjacent Channel Selectivity - Spurious Response - Tracking - SSB receivers -AGC and its Types - AFC. FM Receiver: FM Demodulators - Super heterodyne FM receiver - Stereophonic FM receiver - De emphasis.	K3	8
V	**Pulse Modulation:** Introduction - PAM Modulation and Detection - PWM Modulation and Detection - PPM Modulation and Detection - Sampling Theorem - Quantization - Quantization Error - Companding - PCM Modulation and Detection - ASK - FSK - BPSK - QPSK - DPSK.	K3	9

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: Demonstrate and analyze the stages of AM and FM Transmitters.	K3
	CO4: Predict and criticize the performance of different stages of communication receivers.	K3
	CO5: Analyze the performance of various Pulse modulation techniques	K4

Learning Resources	
Text Books	1.K.D. Prasad and Satya Prakahan. "Antenna Wave Propagation" 3rd edition, 2.George Kennedy. "Electronic Communication Systems" - TMH - IV Ed. 3.Electronic Communication Systems - Roddy & Collen - PHI - IV Ed
Reference Books	1. Communication Electronics - Principles and application - Louis E Frenzel, Third Edition, Tata McGraw hill publication 2. Electronic Communications - Sanjeev Gupta - Khanna Publications. 3. Principles of Communication Engineering - Anokh Singh - S. Chanda
Website Link	https://onlinecourses.nptel.ac.in/noc22_ee115/preview https://onlinecourses.nptel.ac.in/noc22_ee73/preview https://onlinecourses.nptel.ac.in/noc22_ee118/preview

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4UELC06	PRINCIPLES OF COMMUNICATION SYSTEMS	DSC THEORY - VI	IV	4	4	-	-	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	L	L	L	L	L	M	L	L
CO2	M	M	L	M	L	M	M	M	L	M
CO3	M	M	L	M	M	M	M	M	M	M
CO4	M	M	L	M	M	M	M	M	L	M
CO5	M	M	L	L	M	M	M	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
MRS. P. VIJAYALAKSHMI	MR.S.ARULMANI	

Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4UELS02	MODERN ELECTRONIC MEASUREMENTS AND INSTRUMENTS	SEC - II	IV	4	2	2	-	2
Objective	To make the Students to learn about the principle of various transducers, measuring techniques, and measuring instruments like meters, CRO.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Electro mechanical 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.	K1-K2	8
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	10
III	**Cathode Ray Oscilloscope:** Block diagram - CRT - Vertical Deflection System - Delay line - Horizontal Deflection System - CRT screens & Graticules - Oscilloscope Probes - Measurement of Frequency, Amplitude & Phase - Lissajou's Patterns. Protocols.	K3-K4	8
IV	**Signal Genetrators:** Sample & Hold Circuit - Instrumentation Amplifier - Function Generator - Pulse Generator - Q Meter - Vector Impedance Meter - Wave Analyzer - Harmonic Distortion Analyzer .	K3	10
V	**Transducers:** Resistive Transducers - Inductive Transducers - Capacitive Transducers - Piezo Electric Transducer - Thermo Electric Transducers - Temperature Transducers - Microphones & Loud Speakers.	K3-K4	9
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: Determine the functionality of signal generators.		K3
	CO5: Analyze performance of various sensors and signal conditioning elements.		K4

Learning Resources	
Text Books	1. Cooper, "Modern Electronic Instrumentation & Measurement Techniques" - PHI. 2. Electronic Instrumentation - H.S. Kalsi - TMH.
Reference Books	1. J.B.GUPTA, A Course In Electronic and Electrical Measurements and Instrumentation", 12th Edition, S.K Kataria & Sons. 2. A.K. Sawhney, ELECTRICAL & ELECTRONIC MEASUREMENTS AND INSTRUMENTATION:, Dhanpath Rai & Co (P) Ltd, 2004.
Website Link	https://onlinecourses.nptel.ac.in/noc22_ee112/preview

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4UELS02	Modern Electronic Measurements and Instruments	SBEC-II	IV	4	2	2	-	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	L	M	L	M	M	M	M	M
CO2	M	L	L	M	L	M	M	M	M	M
CO3	M	M	L	M	M	M	M	M	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
MRS. P. VIJAYALAKSHMI	MR.S.ARULMANI	

Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M4UELP03	PRACTICAL: COMMUNICATION SYSTEMS	DSC PRACTICAL-III	IV	3	-	1	3	2
Objective	To Impart the students in design and Analysis of a various Communication Circuits.							

S.No.	List of Experiments / Programmes (Any 10)	Knowledge Levels	Sessions
1	Design a K - Low Pass Filter	K5	3
2	Design a K - High Pass Filter	K5	3
3	Amplitude Modulation and Demodulation	K4	3
4	Frequency Modulation and Demodulation	K4	3
5	PAM generation and detection	K4	3
6	PWM generation and detection	K4	3
7	PPM generation and detection	K4	3
8	PCM Generation and Detection	K4	3
9	Pre-Emphasis and De-Emphasis	K4	3
10	Generation of ASK and FSK	K4	3
11	Study of transmission medium.	K1-K2	3
12	Study of AGC Circuits	K1-K2	3
13	Study of Radio receiver	K1-K2	3
14	Study of TV Receiver.	K1-K2	3
15	Installation and Alignment of DTH Receiver	K5	3

Course Outcome	**CO1:** Understand the radio and TV Receivers.	K1
	CO2: Design and analyze filter 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	S. Poorna Chandra, B. Sasikala, "Electronics Laboratory Primer", S. Chand and Company, 2005
Reference Books	K A Navas - " Electronics Lab Manual- Volume-II" - 6th Edition - PHI Learning Pvt.Ltd., New Delhi.
Website Link	https://www.youtube.com/watch?v=E5evBWUI9zI

L-Lecture, T-Tutorial, C-Credit

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4UELP03	PRACTICAL: COMMUNICATION SYSTEMS	DSC PRACTICAL-III	IV	3	-	1	2	2

CO-PO Mapping

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

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

Tutorial Schedule	Practical in Laboratory
Teaching and Learning Methods	Laboratory Equipments
Assessment Methods	Observation of Records, Model Practical

Designed By	Verified By	Approved By
MR. A.BALAKRISHNAN	Mr.S. ARULMANI	

Curriculum Development Cell MCAS (Autonomous) Rasipuram

Allied Course for any Degree offered by the B.Sc.,Electronics & Communication
LOCF-CBCS Pattern
EFFECTIVE FROM THE ACADEMIC YEAR 2021-2022 Onwards
LIST OF GEC - ALLIED COURSES

S.No.	Sem	COURSE_CODE	TITLE OF THE COURSE
1	III	21M3UELA01	PRINCIPLES OF ELECTRONICS - I
2	III	21M3UELA02	APPLIED ELECTRONICS - I
3	IV	21M4UELA03	PRINCIPLES OF ELECTRONICS - II
4	IV	21M4UELA04	APPLIED ELECTRONICS - II
5	IV	21M4UELAP01	PRACTICAL: PRINCIPLES OF ELECTRONICS
6	IV	21M4UELAP02	PRACTICAL: APPLIED ELECTRONICS

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3UELA01	PRINCIPLES OF ELECTRONICS - I	GEC THEORY- I	III	5	4	1	-	4
Objective	To know about basic principle of Semiconductor Components, Circuit laws and theorems and also to know the various electronic circuits and their design.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Semiconductor theory:** Atomic Structure - Energy band - Semiconductor - Classification of Semiconductor - Theory of PN Junction Diode - Zener Diode - Avalanche Breakdown - Zener Break Down - Zener diode as voltage regulator - Operation of PNP & NPN Transistor - CB, CE, CC Configuration and Characteristics - Transistor as an Amplifier.	K1-K2	12
II	**Active and Passive Components:** Passive components: Resistors - Capacitors - Inductors - Resistors in series, resistors in parallel - capacitors in series - capacitors in parallel - inductors in series and inductors in parallel - energy stored in a capacitor - energy stored in an inductor. Active Components: JFET, MOSFET, UJT, LED working and characteristics (Simple theory only)	K1	12
III	**Circuits Laws and Theorems:** Ohms Law - Kirchoff's Voltage Law, Kirchoff's Current Law -Voltage division - current division - series circuits - parallel circuits - open circuits - closed circuits - Thevenin's theorem - Norton's theorem - Super passion theorem - Maximum power transfer theorem.	K1-K2	12
IV	**Rectifiers and power supply:** Rectifier - Half wave rectifier - full wave rectifier - bridge rectifier - ripple factor - percentage of efficiency - form factor - peak factor - PIV - compression - filters - C, L, L section, π section filters - regulators - 78XX and 79XX IC regulators - Dual regulated power supply design using IC regulators.	K2	12
V	**Amplifier and Oscillators:** Amplifiers: Definition .- feedbacks - effect of negative feedback in amplifiers - Common emitter amplifier - Multistage amplifiers - RC Coupled amplifiers - Transformer coupled amplifier - Direct coupled amplifier - frequency response. Oscillator: Condition for Oscillation - Barkhausen criterion - Types of Oscillators - Hartley oscillator - Colpitt's oscillator - Crystal oscillator - RC phase shift oscillator - Astable Multivibrator - Mono stable Multivibrator - bistable multivibrator - Schimit trigger - UJT Relaxation oscillator.	K1-K2	12

Course Outcome	CO1: Recite and understand about semiconductors diodes and its applications.	K1
	CO2: Calculate the various parameters of a signal using different kinds of instruments.	K2
	CO3: Illustrate the operations of various electronic circuits and their applications.	K3
	CO4: Analyze the problems on circuits and troubleshoot.	K4
	CO5: Design power supplies, amplifier and Oscillator circuits.	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. 3. A. Sudhakar, Shyammohan S. Palli -Circuits and Networks: Analysis and Synthesis - 5th Edition 2017	
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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3UELA01	PRINCIPLES OF ELECTRONICS - I	GEC THEORY- I	III	5	4	1	-	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	S	S	M	M	S	M
CO2	S	S	M	M	L	M	L	L	L	L
CO3	M	S	M	S	L	L	L	S	M	S
CO4	S	M	S	L	M	M	S	M	L	M
CO5	M	M	M	L	M	M	M	L	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
MR. I. BALAKRISHNAN	MR.S.ARULMANI	

Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3UELA02	APPLIED ELECTRONICS - I	GEC THEORY- I	III	5	4	1	-	4

Objective	To give knowledge about semiconductor physics and discuss working and applications of basic devices and to learn about waveform generator circuits and its types.

Unit	Course Content	Knowledge Levels	Sessions
I	**Semiconductor Theory:** Introduction to Semiconductor - Intrinsic Semiconductor - Extrinsic Semiconductor - Theory of PN Junction diode - Zener Diode - Avalanche Breakdown - Zener Break down - Operation of PNP & NPN Transistor - CB , CE , CC Configuration and Characteristics - Transistor as an Amplifier.	K1	12
II	**Resistors, Capacitors, Inductors:** Resistors, Capacitors & Inductors in Series and Parallel - Colour Coding of Resistors - Energy Stored in a Capacitor - Energy Stored in an Inductor - Ohm's Law - Kirchoff's Current Law - Kirchoff's Voltage Law - Voltage Division - Current Division - Series Circuits - Parallel Circuits - Series & Parallel Circuits - Open Circuit - Short Circuit.	K1-K2	12
III	**Power Supply:** Half Wave Rectifier - Full Wave Rectifier - Bridge Rectifier - Capacitor Filter - Fixed IC Regulated Power Supply using 78XX - Dual IC Regulated Power Supply using 78XX & 79XX.	K1-K3	12
IV	**Waveforms:** Sinusoidal Waveform - Non-Sinusoidal Waveform - Peak Value - Peak to Peak Value - Average Value - RMS Value - Period & Frequency Measurement - Use of Digital Multimeter - Use of CRO.	K3	12
V	**Sinusoidal & Non Sinusoidal Oscillators:** Classification of Oscillators - Barkhausen Criterion - Hartley Oscillator - Colpitt Oscillator - RC Phase Shift Oscillator - Wein Bridge - Crystal Oscillator - Frequency stability of Oscillators - Astable Multivibrator - Monostable Multivibrator, Bi Stable Multivibrator - Schmit trigger.	K1-K3	12

Course Outcome		
	CO1: Recite and understand about semiconductors diodes and its applications.	K1
	CO2: Calculate the various parameters of a signal using different kinds of instruments.	K2
	CO3: Illustrate the operations of various electronic circuits and their applications.	K3
	CO4: Analyze the problems on circuits and troubleshoot.	K4
	CO5: Design power supplies, amplifier and Oscillator circuits.	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. 3. A. Sudhakar, Shyammohan S. Palli -Circuits and Networks: Analysis and Synthesis - 5th Edition 2017
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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3UELA02	APPLIED ELECTRONICS - I	GEC THEORY- I	III	5	4	1	-	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	S	S	M	M	S	M
CO2	S	S	S	M	M	M	L	L	L	L
CO3	S	M	S	M	M	L	L	S	M	S
CO4	S	M	M	M	M	M	S	M	L	M
CO5	M	M	M	L	L	M	M	L	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
MR. S. SATHISHKUMAR	MR.S.ARULMANI	For

Curriculum Development Cell MCAS Autonomous Pasipuram

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M4UELA03	PRINCIPLES OF ELECTRONICS - II	GEC THEORY- II	IV	5	4	1	-	4
Objective	To provide the fundamental concepts associated with the digital logic and circuit design and to introduce the basic concepts and laws involved in the Boolean algebra, logic families and digital circuits. Students to study circuits and make the practical possible application of circuits in day to day life.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Digital Principles:** Number systems - conversion of number from one base to another - Boolean Algebra - Demorgan's theorem - Simplification of Boolean function - K-Map (up to 4 variables) - Logic gates - Universal gates - BCD - Excess 3 code - gray Code - ASCII code - 1's Compliment - 2's Compliment - Design of Logic circuits.	K1-K2	12
II	**Combinational and Sequential Circuits:** Combinational Circuits: Half adder - Full adder - half subtractor - Full subtractor - binary comparator - encoder - decoder - multiplexer - de multiplexer - parity generator checker. Sequential Circuits: Flip Flops - RS - JK - D - T flip flops - shift registers - SISO -SIPO -PIPO -PISO - Design of Modulo Counter.	K1-K2	12
III	**Linear ICs and their applications:** OpAmp: pin details of 741 - Ideal OpAmp - OpAmp Stages - OpAmp parameters - inverting and non inverting amplifiers - Adder and Subtractor - Multiplier and Divider - Differentiator - integrator - V to I and I to V converter - sample and hold circuit - Instrumentation amplifier. IC555 Timer: Pin details of IC 555 - Block Diagram - Astable multivibrator - Mono stable multivibrator - Bistable Multivibrator.	K1-K2	12
IV	**Transducers and Measuring instruments:** Transducers: Resistive transducer - Capacitive transducer - Inductive transducers - Piezo electric transducer - Thermoelectric transducers - LM35 - LVDT - Strain gauge - Selection of transducers. Measuring Instruments: Introduction to PMMC instruments - DC Voltmeter - DC Ammeter - DMM - Wheatstone Bridge - Maxwell - Wien - Kelvin Bridge - CRO - Block diagram - CRT - Applications.	K2	12
V	**Communication Systems:** Modulation -- Need For Modulation - Amplitude Modulation and Detection - Frequency Modulation and Detection - AM Transmitters - AM Receivers - FM Transmitter - FM Receiver - Modulation and Detection of : PAM - PWM- PPM - PCM -sampling - sampling theorem - quantization - Companding.	K1-K2	12

Course Outcome	**CO1:** Recognize and summarize the various digital system design principles.	K1
	CO2: Illustrate the operation and uses of linear ICs.	K3
	CO3: Classify the various kinds of transducers and their applications.	K4
	CO4: Analyze the circuits and measure various electrical parameters using basic instruments.	K4
	CO5: Categorize the principles of electronic communications Systems	K4
Learning Resources		
Text Books	1. S. Salivahanan, N. SureshKumar -Electronic Devices and Circuits - 4th Edi -2017 2. V.K. Mehta -Principles of Electronics- S. Chand. 3. Roy Choudhury -Linear Integrated Circuits- 5th Edition -NAI Piblishers - 2018. 4. George Kennedy - Electronic Communication Systems - TMH - IV Edition.	
Reference Books	1. S.L. Kakani, K.C. BhanDai - A Text Book of Electronics 2. Albert.D.Helfric, William.D. Cooper - Modern electronic Instrumentation and Measurement Techniques-2015	
Website Link	https://www.electronics-tutorials.ws/logic/logic_1.html https://www.tutorialspoint.com/electronic_measuring_instruments/electronic_measuring_instruments_passive_transducers.htm	

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4UELA03	PRINCIPLES OF ELECTRONICS - II	GEC THEORY- II	IV	5	4	1	-	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	S	S	M	M	S	M
CO2	S	S	M	M	M	M	L	L	L	L
CO3	S	M	M	M	M	L	L	S	M	S
CO4	S	M	S	M	M	M	S	M	L	M
CO5	M	M	M	L	L	M	M	L	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Curriculum Development Cell MCAS (Autonomous) Rasipuram

Designed By	Verified By	Approved By
MR.I. BALAKRISHNAN	MR.S.ARULMANI	

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M4UELA04	APPLIED ELECTRONICS - II	GEC THEORY- II	IV	5	4	1	-	4
Objective	Students can understand, how a silicon wafer is turned into an operating integrated circuit, Mathematical operations of op-amp 741,Digital Logic gates functions with truth tables, transducers types and operations, fundamentals of electronics communication systems							
Unit	**Course Content**				**Knowledge Levels**		**Sessions**	
I	**IC Fabrication :** Introduction of IC and its Types -IC Integration Density & Its Types -Fundamentals of Monolithic IC technology-Basic Planar Process - Fabrication of Active and passive components - Fabrication of FET, MOSFET - CMOS - Thin and Thick film technology.				K1-K2		12	
II	**OP-Amp:** Introduction to Operational Amplifier - Op Amp Parameters - Op Amp Stages - 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.				K1-K2		12	
III	**Digital logics:** Basic Gates: AND - OR - NOT - NAND as Universal Gates - NOR as Universal Gates - Half and Full Adder - Half and Full Subtractor - Encoder - Decoder - Multiplexer -Demultiplexer.				K1		12	
IV	**Transducers:** Piezo Electric Transducer - Resistive Transducer Capacitive Transducer-Inductive Transducer-Thermocouples Transducer - LVDT- Strain Gauge Transducer - Temperature Transducer- Microphone & Loud Speaker.				K1		12	
V	**Communication Systems:** Need for Modulation -Amplitude Modulation-Frequency Modulation-AM Transmitter-FM Transmitter-AM Receiver-FM Receiver-Sampling Theorem-Pulse Code Modulation & Detection - PAM-PPM - PWM.				K1-K2		12	
Course Outcome	**CO1:** Recognize and summarize the various IC fabrication techniques.						K1	
	CO2: Understand and Illustrate the operation and uses of digital and linear Integrated circuits.						K2	
	CO3: Classify the various kinds of transducers and their applications.						K3	
	CO4: Analyze the circuits and measure various electrical parameters using basic instruments.						K4	
	CO5: Categorize the principles of electronic communications Systems.						K4	

Learning Resources	
Text Books	1. S. Salivahanan, N. SureshKumar -Electronic Devices and Circuits - 4th Edi -2017 2. V.K. Mehta -Principles of Electronics- S. Chand. 3. Roy Choudhury -Linear Integrated Circuits- 5th Edition -NAI Piblishers - 2018. 4. George Kennedy - Electronic Communication Systems - TMH - IV Edition.
Reference Books	1. S.L. Kakani, K.C. BhanDai - A Text Book of Electronics 2. Albert.D.Helfric, William.D. Cooper - Modern electronic Instrumentation and Measurement Techniques-2015
Website Link	https://www.electronics-tutorials.ws/logic/logic_1.html https://www.tutorialspoint.com/electronic_measuring_instruments/electronic_measuring_instruments_passive_transducers.htm https://electronicspost.com/block-diagram-of-communication-system-with-detailed-explanation/

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4UELA04	APPLIED ELECTRONICS - II	GEC THEORY- II	IV	5	4	1	-	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	S	S	M	M	S	M
CO2	S	S	M	M	M	M	L	L	L	L
CO3	S	M	S	L	M	L	L	S	M	S
CO4	M	M	M	M	M	M	S	M	L	M
CO5	M	M	M	L	L	M	M	L	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Curriculum Development Cell MCAS Autonomous Rasipuram

Designed By	Verified By	Approved By
MR. SATHISHKUMAR	MR.S.ARULMANI	

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4UELAP01	PRACTICAL: PRINCIPLES OF ELECTRONICS	GEC PRACTICAL - I	IV	3	-	1	2	2
Objective	To Impart the students in analysis and design of various Laws, Analog and Digital Circuits.							

S.No.	List of Experiments (Any 22)	Knowledge Levels	Sessions
1	Colour Coding of Resistors.	K1-K2	3
2	Verification of Ohm's Law.	K4	3
3	Verification of Kirchoff's Current Law.	K4	3
4	Verification of Kirchoff's Voltage Law.	K4	3
5	Amplitude and Frequency and measurement using CRO.	K2	3
6	VI Characteristics of PN Junction Diode.	K3	3
7	Verification of Input characteristics of CE Transistor.	K3	3
8	Verification of Output Characteristics of CE Transistor.	K3	3
9	Half wave rectifier with and without capacitor filter.	K4	3
10	Full wave rectifier with and without capacitor filter.	K4	3
11	Bridge rectifier with and without capacitor filter.	K4	3
12	Design of Dual IC RPS using 78XX and 79XX ICs	K6	3
13	Truth Table Verification of Logic Gates.	K4	3
14	Implementation of NAND gate as universal gate.	K4	3
15	Implementation of NOR gate as universal gate.	K4	3
16	Verification of De-Morgan's Theorem.	K4	3
17	Boolean function simplification and verification using K-Map	K4	3
18	Verification of Half Adder & Full Adder.	K3	3
19	Verification of Half Subtractor & Full Subtractor.	K3	3
20	Encoder Using 74147 IC.	K5	3
21	Decoder Using 7442 IC.	K5	3
22	Multiplexer Using 74153 IC.	K5	3
23	De-multiplexer Using 74155 IC.	K5	3
24	JK-MS Flip Flop Using 7476 IC.	K5	3
25	Inverting amplifier using IC741.	K5	3
26	Non inverting amplifier using IC 741	K5	3
27	Design of Differentiator using IC 741.	K5	3
28	Design of Integrator using IC 741.	K5	3
29	Astable Multivibrator using IC 555 Timer.	K5	3
30	Mono stable Multivibrator using IC 555 Timer.	K5	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 Various linear and 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	1. A. M. Zungeru, J. M. Chuma, M. Mangwala, H. U. Ezea," Handbook of Laboratory Experiments in Electronics Engineering Volume 1" Notion Press, Incorporated, 2016	
Website Link	http://vlabs.iitkgp.ernet.in/be/# http://vlabs.iitkgp.ac.in/dec/#	

L-Lecture, T-Tutorial, C-Credit

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4UELAP01	PRACTICAL: PRINCIPLES OF ELECTRONICS	GEC PRACTICAL - I	IV	3	-	1	2	2

CO-PO Mapping

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

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

Tutorial Schedule	Practical in Laboratory
Teaching and Learning Methods	Laboratory Equipments
Assessment Methods	Observation of Records, Model Practical

Curriculum Development Cell MCAS Autonomous Pasipuram

Designed By	Verified By	Approved By
MR.I. BALAKRISHNAN	Mr.S. ARULMANI	

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4UELAP02	PRACTICAL: APPLIED ELECTRONICS	GEC PRACTICAL - I	IV	3	-	1	2	2
Objective	To Impart the students in analysis and design of various Laws, Analog and Digital Circuits.							

S.No.	List of Experiments (Any 22)	Knowledge Levels	Sessions
1	Colour Coding of Resistors.	K1-K2	3
2	PN Junction Diode Characteristics	K4	3
3	CE Input Characteristics	K4	3
4	CE Output Characteristics	K4	3
5	Verification of Ohm's Law	K2	3
6	Verification of KVL and KCL	K3	3
7	Measurement of Amplitude & Frequency Using CRO.	K3	3
8	Truth Table Verification of BASIC Gates	K3	3
9	NAND as a UNIVERSAL GATE (AND / OR /NOT)	K4	3
10	NOR as a UNIVERSAL GATE (AND /OR /NOT)	K4	3
11	Verification of De Morgan's Theorem.	K4	3
12	Half Adder / Full Adder	K6	3
13	Half Subtractor / Full Subtractor.	K4	3
14	Encoder Using 74147 IC	K4	3
15	Decoder Using 7442 IC	K4	3
16	Multiplexer Using 74153 IC	K4	3
17	Demultiplexer Using 74155 IC	K4	3
18	Half Wave Rectifier with Capacitor Filter	K3	3
19	Full Wave Rectifier with Capacitor Filter	K3	3
20	Bridge Rectifier with Capacitor Filter	K5	3
21	+5V Regulated Power Supply Uning 7805 IC	K5	3
22	Dual IC Regulated Power Supply (78XX & 79XX).	K5	3
23	Inverting Amplifier using 741	K5	3
24	Non Inverting Amplifier using 741	K5	3
25	Inverting Adder Using Op-Amp	K5	3
26	Non-Inverting Adder Using Op-Amp	K5	3
27	Differentiator using Op-Amp	K5	3
28	Integrator using Op-Amp	K5	3
29	Subtractor Using Op-Amp	K5	3
30	Wave form generator using Op-Amp	K5	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 Various linear and 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	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	http://vlabs.iitkgp.ernet.in/be/# http://vlabs.iitkgp.ac.in/dec/#	

L-Lecture, T-Tutorial, C-Credit

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4UELAP02	PRACTICAL: APPLIED ELECTRONICS	GEC PRACTICAL - I	IV	3	-	1	2	2

CO-PO Mapping

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

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

Tutorial Schedule	Practical in Laboratory
Teaching and Learning Methods	Laboratory Equipments
Assessment Methods	Observation of Records, Model Practical

Designed By	Verified By	Approved By
MR. S.SATHISHKUMAR	Mr.S. ARULMANI	

Curriculum Development Cell MCAS Autonomous Pasipuram

List of Non Major Elective Course (NMEC) offered by the
B.Sc.,Electronics & Communication
SYLLABUS - LOCF-CBCS Pattern
EFFECTIVE FROM THE ACADEMIC YEAR 2021-2022 Onwards

S.No.	SEM	COURSE_CODE	TITLE OF THE COURSE
1	III	21M3UELN01	CELLULAR PHONES
2	III	21M3UELN02	BIO MEDICAL INSTRUMENTATION
3	III	21M3UELN03	ELECTRICAL AND ELECTRONIC APPLIANCES MAINTENANCE AND SERVICING
4	III	21M3UELN04	ROBOTICS
5	IV	21M4UELN05	SATILLITE AND CABLE TV
6	IV	21M4UELN06	IOT AND ARDUINO
7	IV	21M4UELN07	ARTIFICIAL INTELLIGENCE

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3UELN01	CELLULAR PHONES	NMEC - I	III	2	2	-	-	2

Objective	To make the students understand the Cellular phone concept with various accessing technology and also to know the flashing software, various parts of Cellular phone.

Unit	Course Content	Knowledge Levels	Sessions
I	**Basics of Communication:** Overview of Analog, Digital, and Data Communications: History- Generation of cell phones - Mobile Frequencies - Cellular frequency band system - Frequency for Radio Transmission -Signals - Wave Propagation - Antennas.	K1-K2	3
II	**Cellular System:** 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.	K2	3
III	**Multiple Access Techniques:** TDMA, FDMA, CDMA. Digital cellular system - Global system for mobile communications (GSM) -GSM services - GSM System Architecture - Basics of GPRS.	K2-K3	3
IV	**Cell phone Hardware and Software:** Hardware/Software Repairing - Various Locks - Ultrasonic Cleaner - Computer Connectors - SIM Card Reader - Memory Card Reader - Mobile Virus - Virus Prevention - Removing Virus - Health Hazards with Mobiles - SAR	K4-K5	3
V	**Drivers and security:** Installation of UFS Driver, UFS Suite & Flashing Files - IMEI Number Detection - Mobile GSM Utility Codes (Any Five of Nokia Set)	K3-K4	3

Course Outcome	**CO1:** Identify the various wireless communication principles and cellular concepts.	K1
	CO2: Restate the multiplexing techniques over cellular communication.	K2
	CO3: Illustrate and use the various mobile security protocols.	K3
	CO4: Categorize the different parts cell phone and their Performances.	K4
	CO5: Analyze and troubleshoot the problems on both software and hardware.	K5

Learning Resources

Text Books	1. Mobile Communication- Jochen Schiller- Person Education Ltd. 2. Modern Mobile Phone Repair: Using Computer Software and Service Devices- M.Lotia,Pradeep Nair- BPB Publications.
Reference Books	1. Modern Mobile Phone Introduction & Servicing- Manahar Lotia - BPB Publications. 2. Satellite communication- Dr.D.C.Agarwal -Third Edition-Khanna publishers 95. 3. Electronic Communications systems - Fundamentals through Advanced - Wayne Tomasi - Fifth Edition - Pearson Education - 2005
Website Link	https://onlinecourses.nptel.ac.in/noc22_ee85/preview

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3UELN01	CELLULAR PHONES	NMEC-I	III	2	2	-	-	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	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	M	S	L	M	S	M	L	L	M	M
CO5	M	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
MR. S.SATHISHKUMAR	MR.S.ARULMANI	

Curriculum Development Cell
MCAS
Autonomous
Rasipuram

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3UELN02	BIOMEDICAL INSTRUMENTATION	NMEC - I	III	2	2	-	-	2

Objective	To enable the students to learn about the various kinds bio-potentials generated by the human organs and the working principles of medical instruments.

Unit	Course Content	Knowledge Levels	Sessions
I	**Human physiological systems:** Introduction - Cells and their structure- Nature of cancer cells - Transport of Ions through the cell membrane-Resting and Action potentials - Characteristics of Resting potential- Bio electric potentials- Nerve tissues and organs- Different systems of human body.	K1-K2	3
II	**Bio potential measurements:** Bio signal characteristics-Frequency and Amplitude ranges -ECG - EMG - EEG-ERG - EOG	K3	3
III	**Physiological assist Devices:** Introduction-Pacemakers - Energy requirements to excite heart muscle-Methods of simulation -Different modes of operation-Pacemaker Batteries -Artificial Heart valves-Defibrillators-Different types of Defibrillators-Heart-Lung machine.	K2-K3	3
IV	**Specialized medical Equipment:** Blood cell counter-Electron microscope - Scanning Electron Microscope (SEM)-Radiation Detectors-Photometers and Colorimeters-Filter photometer-Spectrophotometer-Flame photometer-Filter fluoro meter - Chromatography - Digital Thermometer.	K4	3
V	**Signal conditioning circuits:** Need for Bio- amplifier-Single ended Bio-amplifier - Differential Bio-amplifier-Impedance matching circuit-Isolation amplifiers- Transformer and optical isolation Isolated DC amplifier and AC carrier amplifier	K3	3

Course Outcome	CO1: Remember the human physiological systems and bio potentials.	K1
	CO2: Understand the various sensors used for measuring the bio potential by which identify the problems.	K2
	CO3: Calculate the temperature, pH level, blood cell counts, BP, Heart rate, using instruments	K3
	CO4: Categorize and understand the various handouts of ECG,EEG output charts	K4
	CO5: Analyze the medical reports using the knowledge gained	K4

Learning Resources

Text Books	1. R.S.KHANDPUR- Handbook of Biomedical Instrumentation - TATA McGraw Hill publishing company Limited 2. M.ARUMUGAM-Bio Medical Instrumentation- Anuradha Agencies-2003
Reference Books	1. LESLIE CROMWELL, FRED J.WEIBELL and ERICH A.PFEIFFER- Bio medical Instrumentation and Measurements-Second Edition - Prentice-Hall of India 2. Bhuvaneshwari-Bio medical Instrumentations- Anuradha Publications.
Website Link	https://www.edx.org/course/biomedical-equipment-technician-training-maintenance-repair?index=product&queryID=c4235433df825a23a8813ac5bdfdbe41&position=1&linked_from=autocomplete

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3UELN02	BIOMEDICAL INSTRUMENTATION	NMEC-I	III	2	2	-	-	2

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	L	L	L	L	L	M	M	M	M
CO2	L	S	L	M	M	M	M	L	S	M
CO3	M	M	L	M	M	M	S	M	M	S
CO4	M	M	L	M	M	L	M	M	M	M
CO5	M	M	L	M	M	S	M	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
MRS.P.VIJAYALAKSHMI	MR.S.ARULMANI	

Curriculum Development Cell MCAS (Autonomous) Rasipuram

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3UELN03	ELECTRICAL AND ELECTRONIC APPLIANCES MAINTENANCE AND SERVICING	NMEC - I	III	2	2	-	-	2

Objective	To make the students learn the key elements of electrical and electronics appliances and to understand domestic wiring and layout with safety precautions.		
Unit	Course Content	Knowledge Levels	Sessions
I	**Electronic Components:** Components - Resistors - Condensers - Resistance Value - Capacitor Value - Diodes - transistors - IC's - Transformers and their classification.	K1	3
II	**Electrical Appliances:** Electrical Bulbs - Florescent Lamps - Inverter - Basic of UPS - Stabilizers - Voltage regulators - Iron Box - Heaters - Electrical Oven - Wet Grinder - Mixer - Refrigerators - Air Conditioners - Freezers - Washing Machines.	K2-K3	3
III	**Electronic Appliances:** Basics of Radio - TV - CD Players - LCD Projectors - Digital Camera - Scanners - Video Conferencing.	K3	3
IV	**Computers:** Block diagram of a Computer - Input Device - Memory Device - Control Unit - Arithmetic logic unit - Output device - Microprocessor - RAM - ROM.	K4	3
V	**Communication Electronics:** Basics of Telephones - Mobile Phones - Wireless Phones - Antenna - Internet - Satellites.	K3	3
Course Outcome	**CO1:** Recognize the performance of various basic electrical and Electronic Components.		K1
	CO2: Familiarize the principle behind the electrical and electronic appliance's operation.		K2
	CO3: Predict the problems in the home appliances.		K3
	CO4: Illustrate and Demonstrate the hardware and software installation of computers.		K3
	CO5: Analyze and troubleshoot the appliances using basic instruments.		K4

Learning Resources

Text Books	1. Handbook of Repair and Maintenance Of Domestic Electronics Appliances handbook- Sinha Shashi Bhushan-BPB
Reference Books	1. Electrical Appliances: The Complete Guide to the Maintenance and Repair of Domestic Electrical Appliances-Graham Dixom - Haynes Manuals Inc
Website Link	https://onlinecourses.swayam2.ac.in/nou22_ec03/preview

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3UELN03	ELECTRICAL AND ELECTRONIC APPLIANCES MAINTENANCE AND SERVICING	NMEC-I	III	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	L
CO2	M	M	L	M	S	M	S	M	S	L
CO3	M	M	L	M	S	L	M	L	L	M
CO4	M	M	L	M	S	M	L	L	M	M
CO5	M	M	L	M	M	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
DR.M. KUTRALEESWARAN	MR.S.ARULMANI	

Curriculum Development Cell MCAS (Autonomous) Rasipuram

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3UELN04	ROBOTICS	NMEC - I	III	2	2	-	-	2
Objective	To familiarize the students with the applications of Robots and to know about the sensors, actuators used in Robot designing.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Introduction to Robotics:** Robotics: Classification - Components - Characteristics - Applications	K1-K2	3
II	**Robotics Kinematics:** Position Analysis - Robots as Mechanisms - Matrix Representation - Transformation Matrices - Forward and Inverse Kinematics	K3	3
III	**Actuators:** Characteristics of Actuating Systems - Actuating Devices and Control	K2-K3	3
IV	**Sensors:** Sensor Characteristics, Description of Different Sensors, Vision Sensors, Force Sensors, Proximity Sensors, Tilt Sensors	K3-K4	3
V	**Robot controls:** Point to Point control - Continuous Path Control - Intelligent Robot - Control System for Robot Joint - Control Actions - Feedback Devices	K4	3

Course Outcome		
	CO1: Recall the principles of sensors and actuators.	K1
	CO2: Contrast the problems and requirements of industries.	K2
	CO3: Solve the problems both theoretically and practically using necessary mechanisms.	K3
	CO4: Illustrate the various control methods and devices used in robotics.	K4
	CO5: Analyze and represent the data used to solve a problem by robotic design.	K4

Learning Resources

Text Books	1. Saeed B. Niku, Introduction to Robotics Analysis, Application, Pearson Education Asia, 2001 2. Mikell P Groover & Nicholas G Odrey, Mitchel Weiss, Roger N Nagel, Ashish Dutta, Industrial Robotics, "Technology Programming and Applications", McGraw Hill, 2012. 3. Richard D. Klafter, Thomas .A, Chri Elewski, Michael Negin, "Robotics Engineering an Integrated Approach", Phi Learning., 2009. 4. Vijay Madisetti and Arshdeep Bahga, Internet of Things - A Hands-on Approach, First Edition, University Press, 2015.
Reference Books	1. R.K.Mittal and I J Nagrath, Robotics and Control, TMH, 2003. 2. Computational Intelligence, Davis Poole, Alan Mackwath, Randy Coehel, Oxford University Press 1998. 3. Industrial Robotics / Groover M P /McGraw Hill 4. Introduction to Robotics / John J. Craig/ Pearson
Website Link	https://www.edx.org/course/robotics-foundations-i-robot-modeling?index=product&queryID=556ac1a113d5bbd079a0ac458f69ec69&position=3&linked_from=autocomplete https://onlinecourses.nptel.ac.in/noc22_de11/preview

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3UELN04	ROBOTICS	NMEC-I	III	2	2	-	-	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	L	L	L	L	M	M	L	M	M
CO2	L	M	L	M	L	M	S	L	M	S
CO3	M	L	L	M	M	L	L	M	L	M
CO4	M	M	L	L	M	L	M	M	M	L
CO5	M	M	L	M	M	L	M	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
for DR.M.KUTRALEESWARAN	for MR.S.ARULMANI	for

Curriculum Development Cell
MCAS
(Autonomous)
Rasipuram

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M4UELN05	SATELLITE AND CABLE TV	NMEC - II	IV	2	2	-	-	2
Objective	To know basics of satellite communication and expose the learners to the basics of Cable and DTH process.							
Unit	**Course Content**				**Knowledge Levels**		**Sessions**	
I	**Satellite Communication:** Introduction- Geostationary Satellites- Communication Satellites - Satellite Sub Systems- Earth Stations - International and Regional Satellites - Domestic Satellites				K1-K2		3	
II	**Cable TV Channels and Signal Processing:** Introduction - Cable Channels - Cable Channel Allocations - Preferred Cable Channels ¬- Low Noise Block Converter - Power Divider (Splitter) - Video Cassette Recorder (VCR) - Combining Networks.				K2-K3		3	
III	**Cable Signal Distribution:** Introduction - Signal Distribution Network - Cable Losses and Signal Distortion - Trunk and Distribution Amplifiers - Signal Splitters and Line Taps - Cable Signal Converters.				K3		3	
IV	**Signal Encoding and Compression:** Introduction - Digital Television Signal Bandwidth - Video and Audio Signal Encoding -Data Compression Techniques - Data Stream Regulation - Video Compression Formats - Audio Compression Formats.				K4		3	
V	**Direct-To-Home (DTH) Satellite Television:** Introduction - MAC Encoding of Television Signals - Program Material - Data Processing and Packetizing - Signal Up linking and Satellites - DTH Satellite Receiver - DTH Receiving Equipment -Consumer Guide to DTH Satellite system.				K3-K4		3	
Course Outcome	**CO1:** Recite the knowledge about history and basics of satellites							K1
	CO2: Contrast the principles of digital and satellite TV Network's transmission techniques.							K2
	CO3: Interpret the various video processing techniques.							K2
	CO4: Determine the concepts of signal encoding and Compression of digital data over TV transmission.							K3
	CO5: Perform the DTH receiver installation.							K4
Learning Resources								
Text Books	1. R.R. Gulati - " Composite Satellite and Cable TV" -NAI. 2. Dennis Roddy - "Satellite Communication" -TMH							
Reference Books	1. R.R. Gulati "Modern TV Practice" - NAI 2. Manohar Lotia- " Modern DTH Digital Satellite Receivers" - BPB							
Website Link	https://www.coursera.org/learn/satellite-communications https://www.classcentral.com/course/satellitecommunications-6313							

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4UELN05	SATELLITE AND CABLE TV	NMEC-II	IV	2	2	-	-	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	L	L	L	M	M	L	M	M
CO2	M	M	L	M	M	S	M	M	M	L
CO3	M	M	L	L	M	M	S	M	S	M
CO4	M	L	L	M	M	M	M	L	M	M
CO5	M	M	L	M	M	S	S	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
MR. S.SATHISHKUMAR	MR.S.ARULMANI	

Curriculum Development Cell MCAS Autonomous Rasipuram

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4UELN06	IOT AND ARDUINO	NMEC - II	IV	2	2	-	-	2

Objective	To enhance the student's knowledge among the new technology by learning about IoT technology by its architecture and protocols.		
Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Basics of IoT:** Introduction to IoT - Elements of an IoT eco system - Technology drivers - Business drivers - Trends and implications - Over view of Governance, privacy and security issues.	K1-K2	3
II	**IoT Architecture:**M2M high level ETSI architecture - IETF architecture for IoT - OGC architecture - IoT reference model - Domain model - Information model - Functional model - Communication model- IoT Reference architecture.	K3	3
III	**Arduino Basics:** Hardware requirements - Software requirements - Arduino programming language reference - Arduino code execution.	K2	3
IV	**Internet connectivity:** Arduino Uno wired connectivity - Software required - External libraries -Internet connectivity (Ethernet) - Standard functions - Arduino Uno Wireless connectivity - Hardware required - Software required - External libraries - Internet connectivity (Wireless) - Standard functions.	K4	3
V	**IoT Applications:** The semantic model - Software UX Design considerations - Machine learning and predictive analytics - Rapid application development.	K4	3
Course Outcome	**CO1:** Remember Web technology by which understands the principles of IoT technology.		K1
	CO2: Understand and Illustrate the principles of various sensors and actuators.		K2
	CO3: Demonstrate the usage of Arduino boards.		K3
	CO4: Categorize the problems and based on it choose the IoT architecture		K4
	CO5: Associate the IoT Security and Governance.		K4

Learning Resources

Text Books	1. Joe Biron and Jonathan follett - Foundational elements of an IoT Solution-O'Relly media Inc. 2. Adeel Javed - Building Arduino project for the Internet of Things -APress. 3. The internet of things in the cloud A middleware perspective - Honbo Zhou-CRC Press, 2012
Reference Books	1. Internet of things hands on approach Arshdeep bahga, Vijay madisetti - University press, 2015. 2. Architecting the internet of things Dieter Uckelmann, Mark Harrison, Michahelles, Florian Eds), - Springer-2011
Website Link	https://www.edx.org/course/introduction-to-the-internet-of-things-iot?index=product&queryID=c062292374c7a4d712c51aa5cf2fff77&position=3&linked_from=autocomplete

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4UELN06	IOT WITH ARDUINO	NMEC-II	IV	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	L	M	M
CO2	M	M	L	M	M	M	S	L	M	S
CO3	M	M	L	M	S	L	L	M	L	M
CO4	M	S	L	M	S	L	M	M	M	L
CO5	M	S	L	M	S	L	M	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
MR. S. SANTHOSH	MR.S.ARULMANI	

Curriculum Development Cell MCAS Autonomous Srirangam

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M4UELN07	ARTIFICIAL INTELLIGENCE	NMEC - II	IV	2	2	-	-	2
Objective	To familiarize the fundamental concepts of Artificial Intelligence and to familiarize with various AI Techniques and Expert Systems.							

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Basics of Artificial Intelligence:** Introduction to AI -The foundation of AI- Risk and Benefits of AI - Agents and Environments - Concept of rationality - Nature of Environments - Structure of Agents.	K1-K2	3
II	**Heuristic Search Technique:** Generate and Test - Hill Climbing - Best first Search - Problem Reduction - Constraint Satisfaction - Means end Analysis.	K3-K4	3
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.	K2-K3	3
IV	**Logical Agents:** Knowledge-based Agents - Propositional Logic - Propositional Theorem Proving -Effective Propositional Model Checking - Agents Based on Propositional Logic.	K2-K3	3
V	**Knowledge Representation & Automated Planning:** Ontological engineering - Categories and Objects - Events - Mental Objects and Modal Logic - Reasoning Systems for Categories - Reasoning with Default Information.	K3-K4	3

Course Outcome		
	CO1: Remember and Describe the basic concepts of Artificial Intelligence.	K1
	CO2: Identify the problems and problem solving techniques.	K2
	CO3: Perform the Heuristic Search techniques.	K3
	CO4: Classify the solutions Using Predicate Logic.	K4
	CO5: Illustrate the Knowledge representations in IoT	K4

Learning Resources

Text Books	1. Stuart Russel and Peter Norvig - "Artificial Intelligence: A Modern Approach- 4th Edition, Pearson Education, 2021. 2. Kevin Night,Elaine Rich, and Nair B, "Artificial Intelligence" McGraw Hill,2008
Reference Books	1. Dan W. Patterson "Introduction to AI and ES", Pearson Education, 2007 2. Patrick H. Winston"Artificial Intelligence" Third edition, Pearson Edition, 2006
Website Link	https://onlinecourses.swayam2.ac.in/cec21_cs08/preview https://www.edx.org/course/artificial-intelligence-foreveryone?index=product&queryID=a53fab2733b55e414f508dc003ddb3c7&position=6&linked_from=autocomplete

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4UELN07	ARTIFICIAL INTELLIGENCE	NMEC-II	IV	2	2	-	-	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	L	L	L	M	M	M	M	L
CO2	M	M	L	M	M	M	S	M	S	L
CO3	M	M	L	M	M	L	M	L	L	M
CO4	M	M	L	S	M	M	L	L	M	M
CO5	M	M	L	S	M	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
DR. M. KUTRALEESWARAN	MR.S.ARULMANI	

Curriculum Development Cell MCAS (Autonomous) Rasipuram

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**
21M5UELC07	LINEAR INTEGRATED CIRCUITS AND ITS APPLICATIONS	DSC THEORY - VII	V	5	5	-	-	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:** Introduction of IC and its Types - IC Integration Density & Its Types -Fundamentals of Monolithic IC technology-Basic Planar Process - Fabrication of FET,MOSFET & CMOS. **Logic Families:** Characteristics of logic families-DL-RTL-DTL-TTL-ECL-IIL-CMOS-Comparison of logic families.	K1-K2	9
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	9
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.	K3-K4	8
IV	**Filters & Waveform Generators:** **Filters:** Active filter - First order Low Pass Butter worth filter - First order High-Pass Butter worth filter - Band pass filters - Band reject filter. **Waveform Generators:** Square wave generator - Triangular wave - Saw tooth waveform generator	K4	9
V	**Timer & PLL:** **Timer:** Introduction to IC 555 timer-Description of Functional diagram: Monostable Operation - Astable operations -Schmitt trigger. **PLL:** Introduction- PLL basic principle and operation-phase detector/comparator-voltage controlled oscillator (IC 566)-Monolithic PLL (IC 565)- Applications of PLL.	K5	10

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 like Timers, PLL circuits.	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. S.Salivahanan& V.S. Kanchana Bhaskaran, "Linear Integrated Circuits", TMH, 2008.
Website Link	1. https://nptel.ac.in/courses/108108111 2. https://archive.nptel.ac.in/courses/108/108/108108111/ 3. https://nptel.ac.in/courses/117107094
L-Lecture, T-Tutorial, C-Credit	

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5UELC07	LINEAR INTEGRATED CIRCUITS AND ITS APPLICATIONS	DSC THEORY - VII	V	5	5	-	-	4

CO-PO Mapping:

CO Number	P01	P02	P03	P04	P05	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
MR.S. ARULMANI	MR.S. ARULMANI	

Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M5UELC08	EMBEDDED SYSTEMS AND PIC MICROCONTROLLER	DSC THEORY - VIII	V	5	5	-	-	4

Objective	To give knowledge about various instruction architecture of PIC microcontroller working and applications, develop the programming skills in PIC16F877 and microcontroller concept the RTOS.

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	K1	9
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 **Instruction Set:** Byte Oriented Operations - Bit Oriented Operations Literal and Control Operations.	K2	9
III	**PIC Peripheral Features:** TIMER 0 Module - TIMER 1 Module - TIMER 2 Module - Capture/Compare/ PWM Modules - I^2C transmission and reception - USART - SPI - ADC Module. **Special features of the CPU:** Oscillator Selection – Power on Reset – Power up Timer – Oscillator Startup Timer – Brownout Reset– Interrupts – Watchdog Timer –Sleep.	K2-K3	9
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	9
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.	K4	9

Course Outcome	**CO1:** Understand the core concepts of Embedded systems and their applications	K1
	CO2: Describe the hardware details of PIC16F87X microcontroller family.	K2
	CO3: Identify and practice the various instruction set, programming techniques of PIC microcontroller.	K3
	CO4: Illustrate the concept of software architecture for embedded systems.	K4
	CO5: Demonstrate the design and development tools of RTOS.	K4

Learning Resources	
Text Books	1. Embedded Systems Architecture, Programming and Design-3rd Edission Rajkamal, TATA McGraw- Hill -2017. 2. PIC 16F87X data book, Microchip Technology Inc.,
Reference Books	1. Programming 8 bit PIC microcontroller in C- Martin P. Bates 2. Embedded Controller Hardware Design - Ken Arnold 3. Designing Embedded Systems with PIC Microcontrollers Principles and applications - Tim Wilmshurst. 4. Programming and customizing PIC micro controllers- by Mykepredrco - 2nd edition -Tata McGraw Hill .
Website Link	https://embeddedschool.in/architecture-and-applications-of-pic-microcontroller/ https://www.sciencedirect.com/book/9781856177504/designing-embedded- https://www.amazon.in/Designing-Embedded-Systems-PIC-Microcontrollers/dp/0750667559

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5UELC08	EMBEDDED SYSTEMS AND PIC MICROCONTROLLER	DSC THEORY - VIII	V	5	4	1		4

CO-PO Mapping:

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	L	M	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	M	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
MR. I. BALAKRISHNAN	MR.S.ARULMANI	

Curriculum Development Cell MCAS (Autonomous) Rasipuram

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M5UELP04	PRACTICAL: LINEAR INTEGRATED CIRCUITS	DSC PRACTICAL - IV	V	4	-	1	3	2
Objective	To give a practice to the students for handling various linear integrated circuits and their applications.							

S. No.	**List of Experiments (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 and Develop 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://elearn.nptel.ac.in/shop/nptel/microprocessors-and-microcontrollers/ http://nptel.ac.in/courses/108102045 http://nptel.ac.in/courses/108102045/3 http://nptel.ac.in/courses/108102045/4 http://nptel.ac.in/courses/108102045/4

L-Lecture, T-Tutorial, C-Credit

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5UELP04	PRACTICAL: LINEAR INTEGRATED CIRCUITS	DSC PRACTICAL - IV	V	4	-	1	3	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	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	Practical in Laboratory
Teaching and Learning Methods	Laboratory Equipments
Assessment Methods	Observation of Records, Model Practical

Designed By	Verified By	Approved By
MR. I.BALAKRISHNAN	MR.S.ARULMANI	

Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5UELP05	PRACTICAL: EMBEDDED SYSTEMS	DSC PRACTICAL - V	V	4	-	1	3	2

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 (Any 10) - Using Embedded 'C'	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 and Develop 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, C-Credit

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5UELP05	PRACTICAL: EMBEDDED SYSTEMS	DSC PRACTICAL - V	V	4	-	1	3	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	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	Practical in Laboratory
Teaching and Learning Methods	Laboratory Equipments
Assessment Methods	Observation of Records, Model Practical

Designed By	Verified By	Approved By
MR. I.BALAKRISHNAN	MR.S.ARULMANI	

Curriculum Development Cell MCAS (Autonomous) Rasipuram

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M5UELS03	**Competitive Skills**	**SEC - III**	**V**	**2**	**2**	**-**	**-**	**2**
Objective	The main aim of introducing "Quantitative Aptitude" is to develop skills to meet the competitive examinations for better job opportunity.							

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.	K1-K2	5
II	**NONVERBAL REASONING:** Analytical Reasoning - Mirror Images - Water Images -Completion of Incomplete Pattern -Cubes and Dice - Paper Cutting And Folding	K2-K3	5
III	**ARITHMATICAL ABILITY:** Percentage- Average- HCF & LCM - Ratio & Proportion - Profit &Loss - Time and Work- Problems On Age - Simple Interest- Compound Interest.	K4	8
IV	**TIME AND DISTANCE:** Chain Rule- Time & Distance - Problems On Trains -Logarithms -Calendar - Clocks - Probability	K4	7
V	**DATA INTERPRETATION:** Tabulation- Bar Graphs -Pie Charts-Line Graphs	K4	5
Course Outcome	**CO1:** Remember and understand the basic concept of verbal non verbal 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) - Rs.750/- 2. Quantitative Aptitude - Revised Edition - R.S. Aggarwal - S. Chand. Units : III , IV & V) - Rs.440/- 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=PLpyc33gOcbVADMKqyll__O_O_RMeHTyNK

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

	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5UELS03	Competitive Skills	SEC - III	V	2	2	-	-	2

CO-PO Mapping:

CO Number	P01	P02	P03	P04	P05	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
MR.S.SATHISHKUMAR	MR.S.ARULMANI	

Curriculum Development Cell MCAS Autonomous Rasipuram

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
21M5UELIN1	INTERNSHIP	INTERN	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.							

S.No.	List of Experiments / Programmes (Any 10)	Knowledge Levels	Sessions
1	1. Duration of the internship training is 15 days during the Vacation which falls at the end of the 4nd Semester. 2. The departments concerned will prepare on exhaustive panel of Institutions, Industries and practitioners. 3. The individual student has to identify the institution / industry / practitioners of their choice and inform the same to the HOD / Staff-in-charge. 4. The students hereafter will be called Trainees should maintain a work diary in which the daily work done should be entered and the same should be attested by the Section in-charge. 5. The departments should prepare an outline of the job to be done, Sections in which they have to be attached both in the office as well as in the field. 6. The trainees should strictly adhere to the rules and regulations and office timings of the institutions to which they are attached. 7. The trainees have to obtain a certificate on successful completion of the internship from the Chief Executive of the organization. 8. A Staff member of a Department (Guide) will be monitoring the performance of the Candidate. 9. Report writing manual and format should be prepared by the respective departments and the Report evaluation is done by external Viva-Voce examination will be conducted and the maximum mark is 100 at the end of 5rd Semester. 10. Report should be properly submitted in the beginning of the 5rd Semester.	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, C-Credit

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5UELIS1	INTERNSHIP	INTERNSHIP	V	-	-	-	-	

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	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
MR. I. BALAKRISHNAN	Mr. S. ARULMANI	

Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M6UELC09	PCB DESIGN AND FABRICATION	DSC THEORY - IX	VI	5		-	-	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.	K1-K2	9
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.	K3-K4	10
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	8
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	9
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.	K5-K6	9

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. B. Archambeault, J. Dreuiawniak, PCB Design for Real-World EMI Control, Springer, 5. 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 3. Mark Madou, Fundamentals of Microfabrication, CRC Press, ISBN: 0-8493-9451-1
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 4. https://www.youtube.com/watch?v=-33H33j67wA

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UELC09	PCB DESIGN AND FABRICATION	DSC THEORY - IX	VI	5		-	-	4

CO-PO Mapping:

CO Number	P01	P02	P03	P04	P05	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
MR.S.SATHISHKUMAR	MR.S.ARULMANI	

Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M6UELC10	VLSI DESIGN AND VHDL PROGRAMMING	DSC THEORY - X	VI	5	4	1	-	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 .	K2-K4	8
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.	K2-K3	10
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	9
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:** Implementation of combinational circuits with PAL and PLA (up to 4 variable)- Introduction to CPLDs - FPGAs and Custom chips .	K4	8

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	

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UELC10	VLSI DESIGN AND VHDL PROGRAMMING	DSC THEORY - X	VI	5	4	1		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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Curriculum Development Cell MCAS Autonomous Rasipuram

Designed By	Verified By	Approved By
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B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M6UELP06	PRACTICAL : VHDL PROGRAMMING	DSC PRACTICAL - VI	VI	4	-	1	3	2
Objective	To impart the fundamental knowledge on VHDL programming and design the digital logic circuits and implement in hardware.							

S. No.	**List of Experiments / Programmes (Any 10)**	**Knowledge Levels**	**Sessions**
1	Implementation Universal Gates using VHDL code.	K3	4
2	Implementation Boolean function using K-Map & VHDL code	K3	4
3	Implementation Half adder / Full adder using VHDL code.	K3	4
4	Implementation 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
14	Design of Decade 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	VHDL programming by Examples by Duklaas L Berry
Reference Books	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, C-Credit

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UELP06	PRACTICAL : VHDL PROGRAMMING	DSC PRACTICAL - VI	VI	4	-	1	3	2

CO-PO Mapping:

CO Number	P01	P02	P03	P04	P05	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
MRS. P. VIJAYALAKSHMI	MR.S.ARULMANI	

Curriculum Development Cell MCAS (Autonomous) Rasipuram

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**
21M6UELOE1	ELECTRONICS AND COMMUNICATION FOR COMPETITIVE EXAM	ONLINE - COMPETITIVE	VI	-	-	-	-	2
Objective	To develop competitive skills through various types of objective tests. And to train them by conducting aptitude test based on verbal and quantitative skills.							

Unit	Course Content	Knowledge Levels	Sessions
-	Arrangement of different topics related to Semiconductor physics, Circuit Analysis and theorems, Electronic devices, 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 BUCET, CUET, ISRO, BSNL, SAIL, BHEL, SBI, IBPS, GATE EXAM etc. to get admission in M.SC/M.C.A/M.TECH. 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 6th 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 M.SC /M.C.A of various Universities. 3. Test critical thinking. ✓ Multiple choice questions to test the superficial knowledge. ✓ Learners to interpret facts, evaluate situations, explain cause 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: <u>Ability to analyze statements and justify it :</u> *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.*	K1-K6	-

	c) *The energy gap is large.* d) *Si and Ge are the commonly used Semiconductors* Eg.2 <u>Ability to incorporate the facts with real time problems</u> 2. *Which kinds 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**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UELOE1	COMPETITIVE EXAM FOR ELECTRONICS AND COMMUNICATION	ONLINE - COMPETITIVE	VI	-	-	-	-	2

CO-PO Mapping

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

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%

Designed By	Verified By	Approved By
Mr. S.SANTHOSH	Mr.S.ARULMANI	Dr. S. SHANTHI

Curriculum Development Cell MCAS Autonomous Rasipuram

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
21M6UELPR1	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 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**	K3- K6	-
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	-

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	-
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:** GoelRanjan, "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 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).	K3 - K4	-
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

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

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	Data collection and training under a recognized organization
Teaching and Learning Methods	Work dairy and Documentation, Design and Preparation
Assessment Methods	Report = 40%, Demonstration and Viva Voce = 60%

Designed By	Verified By	Approved By
MR. I.BALAKRISHNAN	Mr.S. ARULMANI	

Curriculum Development Cell MCAS (Autonomous) Rasipuram

List of Elective Course(DSE) Details for B.Sc.,Electronics & Communication
SYLLABUS - LOCF-CBCS Pattern
EFFECTIVE FROM THE ACADEMIC YEAR 2021-2022 Onwards

S.No.	COURSE_CODE	TITLE OF THE COURSE
1	21M5UELE01	NETWORK COMMUNICATION AND SECURITY
2	21M5UELE02	FUNDAMENTALS OF IOT AND APPLICATIONS
3	21M5UELE03	ARTIFICIAL INTELLIGENCE
4	21M6UELE04	ADVANCED COMMUNICATION SYSTEMS
5	21M6UELE05	ROBOTICS AND AUTOMATION
6	21M6UELE06	MEDICAL ELECTRONICS

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
21M5UELE01	NETWORK COMMUNICATION AND SECURITY	DSE	V	5	4	1	-	4
Objective	To Describe various communications networks and their components, and to Identify the function of a firewall, and how it keeps a computer secure and safe from viruses. Prepare a plan for anti-virus protection.							

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.	K1-K3	8
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	10
III	**Network Protocols:** OSI Model - Physical Layer - Data Link Layer - Network Layer - Transport Layer - Session Layer - Presentation Layer - Application Layer - Overview of Network Protocols.	K2-K3	8
IV	**LAN Topologies:** Introduction - LAN Hardware - Implementing LAN - Fast LANS - Nonstandard LANS - Extending LANS - Virtual LANS - Token Passing Networks - FDDI - MAN - WAN.	K3	9
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.	K3-K5	10

Course Outcome		
	CO1: Identify the components associated with Transmission methods.	K1
	CO2: Understand the complete network 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 the issues in providing Quality-Of-Service for network multimedia applications such as Internet, telephony& network 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. 3. Data Communication And Networking (UPDATED EDITION) - Satish Jain - BPB 4. Communication Protocol Engineering - Pallapa Venkataram and S.S.Manvi - PHI 5. Networking Concepts And Netware - Anand - Himalaya Publications
Website Link	https://onlinecourses.nptel.ac.in/noc19_cs84/preview https://archive.nptel.ac.in/courses/106/105/106105191/
L-Lecture, T-Tutorial, C-Credit	

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5UELE01	NETWORK COMMUNICATION AND SECURITY	DSE	V	5	4	1	-	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
Mr. S. SATHISHKUMAR	MR. S. ARULMANI	

Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M5UELE02	FUNDAMENTALS OF IOT AND APPLICATIONS	DSE	V	5	4	1	-	4
Objective	To acquire the basic knowledge of students in Internet of Things and designmini projects based on its application.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Fundamentals of IoT:** Introduction, Definitions & Characteristics of IoT, IoTArchitectures, 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.	K1-K2	10
II	**Sensors Networks :**Definition, Types of Sensors, Types of Actuators, Examples and Working, IoT Development Boards: Arduino IDE and Board Types, Raspberr Pi Development Kit, RFID Principles and components, Wirel ess Sensor Networks: History and Context, The node,Connecting nodes, Networking Nodes, WSN and IoT.	K3	10
III	**Wireless Technologies for IoT:** WPAN Technologies for IoT: IEEE 802.15.4, Zigbee, HART, NFC, Z-Wave, BLE, Bacnet, Modbus. IP Based Protocols for IoT IPv6, 6LowPAN, RPL, REST, AMPQ, CoAP, MQTT-Edge connectivity and protocols - LoRa WAN	K3	10
IV	**Data Handling& Analytics:**Introduction, Bigdata, Types of data, Characteristics of Big data,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	9
V	**Applications of IoT:** Home Automation, Smart Cities, Energy, Retail Management, Logistics,Agriculture, Health and Lifestyle, Industrial IoT, Legal challenges, IoT design Ethics, IoT in Environmental Protection.	K3	8

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 analyse the applications of IOT	K4

Learning Resources	
Text Books	1. Vijay Madisetti and ArshdeepBahga, – "Internet of Things (A Hands-on-Approach)",1st Edition, VPT, 2014. 2. HakimaChaouchi, – "The Internet of Things Connecting Objects to the Web" ISBN :978-1- 84821-140-7, Wiley Publications 3. Olivier Hersent, David Boswarthick, and Omar Elloumi, – "The Internet of Things: Key Applications and Protocols", WileyPublications
Reference Books	1. Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies,Platforms, and Use Cases", CRC Press
Website Link	https://www.edx.org/course/build-your-first-iot-application-with-arm?index=product&queryID=5909fc91a84332af2fd85a3475af41b8&position=1 https://www.edx.org/course/iot-systems-and-industrial-applications-with-design-thinking?index=product&queryID=5909fc91a84332af2fd85a3475af41b8&position=2

L-Lecture, T-Tutorial, C-Credit

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5UELE02	FUNDAMENTALS OF IOT AND APPLICATIONS	DSE	V	5	4	1	-	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
MR. S. SANTHOSH	MR. S. ARULMANI	

Development Cell MCAS Autonomous Pasipuram

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**
21M5UELE03	ARTIFICIAL INTELLIGENCE	DSE	VI	5	4	1	-	4

Objective	This course provides an introduction to the fundamentals of artificial intelligence. It contains a theory component about the concepts and principles that underlie modern AI algorithms, and a practice component to relate theoretical principles with practical implementation.

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.	K1-K2	9
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.	K2-K4	9
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	9
IV	**Logical Agents:** Knowledge-based Agents - Propositional Logic - Propositional Theorem Proving -Effective Propositional Model Checking - Agents Based on Propositional Logic.	K5	9
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.	K3-K4	9

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

L-Lecture, T-Tutorial, C-Credit

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5UELE03	ARTIFICIAL INTELLIGENCE	DSE	VI	5	4	1	-	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
MR. S.SANTHOSH	MR. S. ARULMANI	

Curriculum Development Cell
MCAS Autonomous Rasipuram

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**
21M6UELE04	ADVANCED COMMUNICATION SYSTEMS	DSE	III	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.	K1-K3	9
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. Digital Codes: ASCII Code - EBCDIC Code - Error Detection Codes - Parity Check Codes - Redundant Codes - Error Correction Codes - Retransmission- Forward Error Correcting Code - Hamming Code.	K2-K3	9
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	9
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 - cassegrain antenna. **Space segment:** Power supply- Attitude control- station keeping - Transponders - TT and C subsystem - Antenna subsystem. **Earth segment:** Block diagram of Transmit receive earth station - Satellite mobile services - Basics of GPS	K3	9
V	**Mobile Communication:** (Qualitative Treatment only) 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. **Satellite Multiple Access Techniques:** TDMA, FDMA, CDMA. Digital cellular system - Global system for mobile communications (GSM) -GSM services - GSM System Architecture - Basics of GPRS.	K3-K4	9

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 - 2021	
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 edition.	
Website Link	https://onlinecourses.nptel.ac.in/noc22_ee114/preview	
L-Lecture, T-Tutorial, C-Credit		

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UELE04	ADVANCED COMMUNICATION SYSTEMS	DSE	III	5	3	2	-	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal, Seminars

Designed By	Verified By	Approved By
Mr.I. BALAKRISHNAN	Mr. S.ARULMANI	

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M6UELE05	ROBOTICS AND AUTOMATION	DSE	VI	5	4	1	-	4

Objective	To learn the various parts of robots and fields of robotics, understand the various kinematics and inverse kinematics of robots, analyze the function of sensors in the robot, the trajectory planning for robot and to learn the control of robots for some specific applications and automation.		
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	K1-K3	9
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	K2-K3	9
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	9
IV	**Kinematics and Path Planning:** Solution of inverse kinematics problem - multiple solution Jacobian work envelop - hill climbing techniques - robot programming languages	K3	9
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.	K2-K4	9
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). 4. R.D. Klafter, T.A. Chimielewski and M. Negin, Robotic Engineering - An integrated approach (Prentice Hall of India, New Delhi, 1994). 5. P. J. M. Kerrow, Introduction to Robotics (Addison Wesley, USA, 1991). 6. Alok Mani Tripathi, *"Learning Robotic Process Automation"*, Packt Publishing, 2018.
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). 4. K. S. Fu, R. C. Gonzaleaz and C.S.G. Lee, Robotics Control Sensing, Vision and Intelligence (McGraw Hill International Editions, 1987).
Website Link	https://onlinecourses.nptel.ac.in/noc19_me74/preview

L-Lecture, T-Tutorial, C-Credit

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UELE05	ROBOTICS AND AUTOMATION	DSE	VI	5	4	1	-	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
MR. I. BALAKRISHNAN	MR. S. ARULMANI	

Curriculum Development Cell MCAS (Autonomous) Rasipuram

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M6UELE06	MEDICAL ELECTRONICS	DSE	VI	5	4	1	-	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.	K1-K2	9
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	K1-K2	9
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	9
IV	**Specialized Medical Equipment:** Concurrent Signal Assignment statement - concurrent verses sequential signal assignment - 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	9
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	K1-K2	9

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. M. Kutz, Standard Handbook of Biomedical Engineering and Design, 1st Ed. (McGraw Hill Publisher, 2003). 2. J. J. Carr and J. M. Brown, Introduction to Biomedical Equipment Technology, 4th Ed. (Pearson Education, 2004) 3. G. S. Sawhney , Biomedical Electronics and Instrumentation made easy (2011) 4. Gowri Nambi, Biomedical Engineering: A Quick Reference Guide (Notion Press, 2019) 5. John G. Webster , Amit J. Nimunkar, Medical Instrumentation, Application and Design (2021)
Website Link	1. https://nptel.ac.in/courses/108108180 2. https://www.edx.org/course/biomedical-equipment-technician-trainingmaintenance-repair

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UELE06	Medical Electronics	DSE	VI	5	4	1	-	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Curriculum Development Cell MCAS (Autonomous)

Designed By	Verified By	Approved By
MR. S. SATHISHKUMAR	MR. S. ARULMANI	

List of VALUE ADDED Course for B.Sc.,Electronics & Communiaction
SYLLABUS - LOCF-CBCS Pattern ACADEMIC YEAR 2021-2022 Onwards

S.No.	SEM	COURSE_CODE	TITLE OF THE COURSE
1	V	21M6UELVA1	MOBILE PHONE AND LAPTOP SERVICING
2	VI	21M6UELVA2	PROGRAMMABLE LOGIC CONTROLLER

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UELVA1	MOBLIE PHONE AND LAPTOP SERVICING	VALUE ADDED	V	4	2	-	-	2

Objective	To impart the fundamentals of fault finding and troubleshooting techniques of mobile phones and Desktop/Laptop Computer in both software and hardware.

Unit	Course Content	Knowledge Levels	Sessions
I	Introduction to mobile phones, Generations of mobile phones, FHSS networks, GSM,3G,4G and 5G Spread spectrum, CDMA, TDMA & Basic electronics components.	K1-K2	12
II	Handset Specific operating systems, Handset features & applications, working principle of mobile handset & Components used in mobile handsets. Tools & equipment used for repairing & maintenance of mobile handsets, types of power supply & batteries, boosting a battery, Troubleshooting basics.	K1-K2	12
III	Network problems, Power failure (dead), Mobile phone hardware troubleshooting (water damage, hanging, charging & keypad problems), Handsets assembly& disassembly, Soldering & de-soldering & SMD rework station. BGA IC's, Basics of Computer, Installation of software, Flashing, PC based diagnostic tools, mobile sets formatting, used of secret codes.	K1	12
IV	Introduction mother boards & its types-ports, slots, connectors, add on cards, power supply units, and cabinet types. Storage devices. primary & secondary storage medium-magnetic disc, RAM, ROM, PROM, EPROM, Floppy, CD Rom, CDRW, DVD, Virtual memory, Cache memory, Linear & Physical memory, video memory.	K1	12
V	Hardware Trouble Shooting: Printers, floppy drive, Microphone. Scanner, Network, Hardware failure, Testing, CMOS, CDROM, Hard disk drive Monitor, Mother Board, Sound Card, Video Card, Tips	K1-K2	12

Course Outcome	CO1: To remember the basics of mobile networks and components	K1
	CO2: Understanding the mobile operating system and tools for maintenance	K2
	CO3: Applying the trouble shooting techniques for mobile assembly and disassembly	K3
	CO4: To analyze the laptop mother boards and various types	K4
	CO5: To troubleshoot the peripherals connected with laptops	K5

Learning Resources	
Text Books	1. Smartphone Troubleshooting & Repair, Mr.VictorEmeka 2. Laptop Repair Complete Guide by Garry Romaneo
Reference Books	1. Android Phones For Dummies, 3rd Edition, Dan Gookin 2. The Ultimate Laptop Repairing Course by Rahaman K A.
Website Link	1. https://www.pdfdrive.com/laptop-repair-complete-guide-including-motherboard-e17360867.html 2. https://www.pdfdrive.com/computer-repair-a-complete-illustrated-guide-to-pc-hardware-e168587735.html

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

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UELVA1	MOBLIE PHONE AND LAPTOP SERVICING	VALUE ADDED	V	4	4	-	-	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	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	Chalk and Talk, Visualization and Smart Class
Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
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Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc-Electronics & Communication Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UELVA2	PROGRAMMABLE LOGIC CONTROLLER AND APPLICATIONS	VALUE ADDED	VI	4	4	-	-	2
Objective	To make the students understand the fundamentals of Automation and various Automation systems used in Industry and understand the working of these systems and should be able to determine Hardware and Software's requirements of PLC.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Introduction to PLC:** Definition - Block diagram of PLC - Principle of Operation -Modes of Operating System - PLC Scan - Hardwire Control System compared with PLC System - Advantages and Disadvantages of PLCs - Criteria for selection of suitable PLC -Memory Organization - Input Types - Discrete input - Analog input and outputs - Elements of Power Supply Unit - PLC Types - List of various PLCs available -Applications of PLC.	K1-K2	12
II	**Input / Output Modules:** The I/O Section - Discrete I/O Modules and types - Analog I/O Modules - Special I/O Modules- I/O Module Specification - Typical Discrete and Analog I/O field Devices -Sensors - Limit Switch- Reed Switch - Proximity Sensor and types - Types of Photo Electric Sensor - Sinking and Sourcing I/O Modules- TTL Output Module - Relay Output Module -Isolated Output Module -Input /Output Addressing Scheme in important commercial PLCs.	K3-K4	12
III	**PLC Programming:** Types of Programming Methods - Types of Programming Devices - Logic Functions - AND Logic - OR Logic - NOT Logic - Relay Type instructions -Timer Instructions - ON Delay and OFF Delay Timer - (PLC Programming)Retentive Timer Instruction - Cascading Timers - Counter Instruction - UP Counter - DOWN Counter - UP/DOWN Counter - Cascading Counters - Program Control Instructions -Data Manipulation Instruction - Data Compare Instructions - Math Instructions - Sequencer Instructions - PID Instruction - PWM Function - Simple programs using above instructions - Develop ladder logic for: Bottle Filling System - Automatic Car Parking System - EB To Generator Changeover System - Batch Process - Elevator System -DOL Starter- Automatic Star-Delta Starter - Traffic Light Control.	K2	12
IV	**Networking:** Levels of Industrial Network - Network Topology -Network Protocol - OSI Reference Model - Networking with TCP / IP Protocol - I/O Bus networks - Block diagram of I/O Bus networks - Types of I/O Bus networks. Protocol standards - Advantages of I/O Bus networks - Gateway - Token passing - Data Highway - Serial Communication - Device Net - Control Net - Ethernet - Modbus -Fieldbus - Profibus- Sub Netting - Subnet mask - File transfer protocol.	K3-K5	12

V	**Data Acquisition Systems:** Computers in Process Control - Types of Processes - Structure of Control system - ON/OFF Control - Closed loop Control - PID Control - Motion Control -Block diagram of Direct Digital Control. Supervisory Control and Data Acquisition (SCADA)-Block diagram of SCADA - Features of SCADA.	K3	12
Course Outcome	**CO1:** Identify and understand the basics of PLC programming.		K1
	CO2: Discuss the different parameters of PLC.		K2
	CO2: Demonstrate and apply the concept of ladder logic programming.		K3
	CO4: Analyze and explain the different functions of PLC.		K4
	CO5: Design and program the PLC for entry-level PLC applications.		K5
Learning Resources			
Text Books	1. Programmable logic controllers (3 Edition) Frank Petruzella Tata McGraw Hill 2. Samuel M. Herb, –Understanding Distributed Processor Systems for Control‖, International Society of Automation Publication, 1st Edition, 1999. 3. PLCs & SCADA: theory and practice Prof. Rajesh Mehra and Er. Vikrant Vij		
Reference Books	1. Gary Dunning, –Introduction to Programmable Logic controller‖, Thomas Learning, Pck edition, 2001. 2. Programmable logic controllers and industrial automation: an introduction Madhuchhanda Mitra and Samarjit Sen Gupta Penram international publishing (India) Pvt. Ltd. Mumbai.		
Website Link	https://nptel.ac.in/courses/108105062 https://nptel.ac.in/courses/108105088		

L-Lecture, T-Tutorial, C-Credit

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UELVA2	PROGRAMMABLE LOGIC CONTROLLER AND APPLICATIONS	VALUE ADDED	VI	4	4	-	-	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	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
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Assessment Methods	Unit Test, Assignment, Internal & Semester Examinations

Designed By	Verified By	Approved By
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Curriculum Development Cell MCAS (Autonomous) Rasipuram