SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
(An Autonomous Institution)
Puducherry

2nd UG - Board of Studies Meeting in the department of
Electronics and Communication Engineering

for the Programme
B.Tech – Electronics and Communication Engineering

Venue
Seminar Hall, Department of ECE
Sri Manakula Vinayagar Engineering College
Madagadipet, Puducherry – 605 107

Date & Time
10-04-2021 & 10.30 am

BOARD OF STUDIES MEETING

The Second Board of Studies meeting for B.Tech. Electronics and Communication Engineering was held on 10th April 2021 at 10:30 A.M in the Seminar Hall, Department of ECE, Sri Manakula Vinayagar Engineering College with the Head of the Department in the Chair.

The following members were present for the BoS meeting in the venue

Sl. No	Name of the Member	Designation
1	**Dr. P. Raja** Professor and Head, Department of ECE	Chairman
2	**Dr. V. R. Vijayakumar** Associate Professor & Head, Department of ECE, Anna University, Regional Campus, Coimbatore	Expert Member (Academic Council Nominee)
3	**Mr. C. Gnanavel** General Manager, Production and Technology, Lenovo India Ltd., Puducherry	Industry Member
4	**Dr.V.Bharathi,** Professor / ECE **Specialization:** Wireless Communication	Member
5	**Dr.R.Ramya,** Professor/ ECE **Specialization:** ECE	Member
6	**Dr. J.Pradeep,** Associate Professor / ECE **Specialization:** Image Processing	Member

7	**Dr. R.Kurunjimalar,** Associate Professor / ECE **Specialization:** Mobile Satellite Communication	Member
8	**Dr. D. Jagadiswary,** Associate Professor / ECE **Specialization:** Biometric Security	Member
9	**Prof. R. Ilaiyaraja,** Assistant Professor / ECE **Specialization:** VLSI Design	Member
10	**Prof.Egalite Francis,** Assistant Professor **Specialization:** Mathematics	Member
11	**Prof. K. Oudayakumar,** Associate Professor **Specialization:** Physics	Member
12	**Dr. S. Deepa,** Professor **Specialization:** Chemistry	Member
13	**Dr.D.Jaichithra,** Associate Professor **Specialization:** English	Member
14	**Mr. Dharanidharan. G** Associated Functional Consultant, Birlasoft Limited, Old Mahabalipuram Road, Chennai - 600096	Alumni Member

The following members were present in the online platform

Sl. No	Name of the Member	Designation
1	**Dr.Gerardine Immaculate Mary** Professor, Department of Embedded Systems, Vellore Institute of Technology (VIT), Vellore, Tamil Nadu, India	Expert Member (University Nominee)
2	**Dr. N. Venkateswaran** Professor, Department of ECE, SSN - College of Engineering, Kalavakkam, Tamil Nadu, India	Expert Member (Academic Council Nominee)

AGENDA OF THE MEETING

Item No. : BoS / UG / ECE 2.1

To review and confirm the first BoS meeting minutes held on 17.07.2020

Item No. : BoS / UG / ECE 2.2

To consider and approve syllabi of V and VI semesters of B.Tech. ECE to be offered under Regulations 2019 for the students admitted in the academic year 2019-20

Item No. : BoS / UG / ECE 2.3

To consider and approve syllabi of III and IV semester of B.Tech. ECE to be offered under Regulations 2020 for the students admitted in the academic year 2020-21

Item No. : BoS / UG / ECE 2.4

To discuss and approve the Professional and Open electives offered in IV semester students admitted in the Academic Year 2019-20 as per Regulations 2019.

Department of ECE – Second BoS Meeting

Item No. : BoS / UG / ECE 2.5

To consider and approve the students admitted in the Academic Year 2020-21

Item No. : BoS / UG / ECE 2.6

Consideration of review on the revised Vision, Mission, Program Educational Objectives (PEOs) and Program Specific Outcomes (PSOs) of the Department

Item No. : BoS / UG / ECE 2.7

Consideration of evaluation process in End Semester Examinations and Examiners for U.G. and P.G. Programmes

Item No. : BoS / UG / ECE 2.8

To consider and approve the department committee to monitor the Academic Activities

Item No. : BoS / UG / ECE 2.9

Any other item with the permission of the chair

MINUTES OF THE MEETING

Dr. P. Raja, Chairman, BoS opened the meeting with a warm welcome and thanked all the members for accepting the 2nd BoS meeting Invitation for the program of B.Tech – Electronics and Communication Engineering. The Chairman proceeded the meeting subsequently and discussed the agenda items.

BoS / UG / ECE 2.1	**To review and confirm the first BoS meeting minutes held on 17.07.2020**

The first BoS Meeting for B.Tech.- Electronics and Communication Engineering under Regulations 2020 and Regulations 2019 held on 17-07-2020 and the following points had been confirmed

Confirmation of overall B.Tech Regulations 2019 and Regulations 2019

- Regulations 2019 (R-2019) for the students admitted in the academic year 2019-20 is reviewed and approved

- Regulations 2020 (R-2020) for the students admitted in the academic year 2020-21 is reviewed and approved

- Pondicherry University Regulations 2013 (R-2013) for the students admitted in the academic Year 2017-18 and 2018-19 is reviewed and approved. The same curriculum and syllabi are followed for these students, however, semester examinations are going to be conducted by the Institution based on the recommendation from the Pondicherry University.

- Confirmation for curriculum as per Regulations 2019 abd 2020

Regulations 2019 (Student admitted in AY 2019-20)	**Regulations 2020** (Student admitted in AY 2020-21)
• Number of credits: 182 • The Course Structure of the program • Curriculum for I to VIII Semesters • Approved the syllabi for the semesters III and IV	• Number of credits: 164 • The Course Structure of the program • Curriculum for I to VIII Semesters • Approved the syllabi for the semesters I and II

- Evaluation system implemented for B.Tech program as per Autonomous System
- The innovative teaching methodology adopted in Autonomous System

Suggestions on the Curriculum and Syllabi in First BoS Meeting

Suggestion from the Member	Action Taken
Shuffling of units to be done in the course of "Electrical Engineering" for the continuity of understanding level	Unit order had been shuffled
Title of the course "Data and File structures" to be changed as Data Structures	The title of course had been changed to "Data Structures"
Few topics of the course "Electromagnetic Field Theory" need to be included	Topics had been e included in this course
Unit V - Waveguides may be removed from the course "Network Theory" and to be included in the course "Transmission Lines and Antennas"	Topic "Waveguides" had been included in the course "Transmission Lines and Antennas"
Suggested to change the title of skill development course "Mobile Repairing" into "Mobile Servicing" under the non-credit course.	Course tile had been modified
Suggested the "Cloud Computing" course to be included in Employability Enhancement Courses	Cloud Computing course had been included in Employability Enhancement Courses
Programming courses to be provided in all the semesters	Four "Programming courses" are introduced in the Curriculum under Regulation 2020
Members suggested to include the "Financial Management and Quality Management" course in the curriculum	Two Business Management Courses had been introduced in 5th and 6th semesters
The laboratory courses may be processed with the help of industries	Industry supported Laboratory is introduced with the Microchip Technology (India) Private Limited, Chennai
Introduce the course of "Cyber-Physical Systems" in semester VIII instead of the "Cognitive Radio Networks" course	Introduced the course of "Cyber-Physical Systems" in semester VIII
Suggested to Publish UG projects in reputed Journal which is indexed by Scopus	Mandatory to publish the paper in reputed Journal

Minutes are Reviewed and Confirmed

BoS / UG / ECE 2.2	**To consider and approve syllabi of V and VI semesters of B.Tech. ECE to be offered under Regulations 2019 for the students admitted in the academic year 2019-20**

Members have discussed the syllabi of V and VI semesters of B.Tech- ECE to be offered under Regulations 2019 and the suggestions are given in course wise

Courses wise suggestions of the semester- V under Regulations 2019

1. ***Probability and Random Processes (U19ECT51)***
   The title of UNIT- III "Stochastic process" should be renamed as "Random Process" and more topics Ergodic Process, Time Series Process are to be included

2. *Linear Integrated Circuits (U19ECT52)*
   More specialized ICs which is used in uninterrupted power supplies may be included in unit-V. These contents will give more exposure to the power supply units used in Industry

3. *Microcontroller (U19ECT53)*
   - Contents are rearranged by focusing more on 8051 Microcontroller for more understanding

4. *Digital Signal Processing (U19ECT54)*
   - Include topic IDFT in Unit I
   - Syllabi content sequence of Unit – II to be rearranged for betterment of continuity.

5. *Linear Integrated Circuits Laboratory (U19ECP51)*
   - Any simulation tools can be introduced to provide the exposure about simulation
   - Demo on SMPS may be included

6. *Microcontroller Laboratory (U19ECP52)*
   The laboratory exercises are divided into three parts
   - PART –A (At least 6 experiments are mandatory): Experiments are related to Assembly Language Programming using the 8051 Trainer kit.
   - PART –B (At least 4 experiments are mandatory): Consists of Interfacing experiments using 8051 Trainer kit and interfacing modules
   - PART–C (At least 2 experiments are mandatory): Programming/Interfacing experiments with IDE for 8051/PIC/MSP/Arduino/Raspberry Pi based interfacing boards/sensor modules (Direct downloading of the pre-written ALP/C/Python programs can be used).

   Members are suggested to remove the experiments given in Part – C because the exposure of PIC and other microcontrollers are not discussed in the "Microcontroller" theory course. Hence it should be removed from this practical course

   Members are also suggested that give more importance to the "experiments related to Interfacing", hence a minimum of 6 experiments are to be conducted in both Part-A and Part – B.

7. *Digital Signal Processing Laboratory (U19ECP53)*
   - *Knowledge of* Code Composer Studio need to be provided

Suggestions to Professional Elective - II

1. *Vehicular Communication (U19ECE52)*
   Vehicular communication syllabus to be modified with next generation of network

2. *Industry 4.0 Technology (U19ECE53)*
   Give more awareness of this course by introducing some other technology used in Industry

3. *Information Theory and Coding (U19ECE54)*
   - Unit I is to be included with Binary symmetric Channel(BSC)
   - Unit I and Unit III are modified

Courses wise suggestions of the semester- VI under Regulations 2019

1. *Wireless Communication (U19ECT63)*
   - Books have to be suggested based on Unit coverage.
   - In Unit V, instead of 4G, Advanced technologies like Bluetooth have to be added.

2. *Transmission Lines and Antennas (U19ECT64)*
   - Input and transfer Impedance can be included Unit II.

Suggestions to Employment Enhancement Courses

The following certification courses are offered to the students admitted from the academic year 2019-23

Course Code	Course Title
U19ECCX1	Introduction to C++ Programming
U19ECCX2	Python Programming
U19ECCX3	Embedded System Using C
U19ECCX4	Data Science using R
U19ECCX5	CCNA
U19ECCX6	VLSI Design
U19ECCX7	Embedded System Design using Arduino
U19ECCX8	Digital Signal Processing Development System
U19ECCX9	Internet of Things

As per the curriculum, the students shall choose one course in the fifth semester and another course to be completed in the sixth semester.

Suggestions to Skill Development Courses

- Students should choose the Foreign Language/IELTS course like Japanese/French/ Germany/IELTS, etc. approved by the Department committee comprising of HoD, Programme Academic Coordinator, Class advisor. The courses are to be approved by the Academic Council on the recommendation of HoD at the beginning of the semester if necessary, subject to ratification in the next Academic council meeting.

- Students have to complete the courses successfully. The Committee will monitor the progress of the student and recommend the grade (100% Continuous Assessment pattern) based on the completion of the course. The marks attained for these courses are not considered for CGPA calculation.

Skill Development Courses

Semester	Course Code	Title of Course
V	U19ECS51	Skill Development Course 5: Foreign Language/ IELTS- I
V	U19ECS52	Skill Development Course 6: Presentation Skills using ICT
VI	U19ECS61	Skill Development Course 7: Foreign Language/IELTS - II
VI	U19ECS62	Skill Development Course 8: Technical Seminar
VI	U19ECS63	Skill Development Course 9: NPTEL/MOOC-I

- Members are suggested to conduct the skill development courses with expert members to get more exposure to the students
- NPTEL / MOOC courses may suggest either 4 or 8 weeks courses depends on the availability of the courses

Suggestions on Mandatory Courses

Semester	Course Code	Title of Course
V	U19ECM51	Essence of Indian Traditional Knowledge
V	U19ECM61	Professional Ethics

All the suggestions are considered and updated in the respcective courses. The details are given in **Annexure - I**

Approved with Minor corrections and Recommended to Academic Council

BoS / UG / ECE 2.3	**To consider and approve syllabi of III and IV semester of B.Tech ECE to be offered under Regulations 2020 for the students admitted in the academic year 2020-21**

Members have discussed the syllabi of III and IV semesters of B.Tech- ECE to be offered under Regulations 2020 for the students admitted in the academic year 2020-21 and the suggestions are given in course wise

Courses wise suggestions of the semester- III under Regulations 2020

1. *Analog Electronic Circuits (U20ECT303)*
   - The Syllabus contents are to be rearranged.

2. *Signals and Systems (U20ECT305)*
   - The Syllabus contents are to be rearranged and sequence of Unit II and III

3. *Electromagentic Field Theory (U20ECS306)*
   - Course content in unit IV, redundant topic to be removed .

Courses wise suggestions of the semester- IV under Regulations 2020

1. ***Probability and Random Processes (U20BST431)***
   The title of UNIT- III "Stochastic process" should be renamed as "Random Process" and more topics Ergodic Process, Time Series Process are to be included

2. ***Communication Systems (U20ECT407)***

   - The course title need to be modified as Analog and Digital Communication Systems.
   - Unit V title can be modified as Channel Coding

3. ***Linear Integrated Circuits (U20ECT408)***
   Specialized ICs which is used in uninterrupted power supplies may be included in unit-V. These contents will give more exposure to the power supply units

4. ***Linear Integrated Circuits Laboratory(U20ECP406)***
   - Any simulation tools can be introduced
   - Demo on SMPS can be included

Suggestions to Skill Development Courses

- Students should choose the Foreign Language/IELTS course like Japanese/French/ Germany/IELTS, etc. approved by the Department committee comprising of HoD, Programme Academic Coordinator, Class advisor. The courses are to be approved by the Academic Council on the recommendation of HoD at the beginning of the semester if necessary, subject to ratification in the next Academic council meeting.

- Students have to complete the courses successfully. The Committee will monitor the progress of the student and recommend the grade (100% Continuous Assessment pattern) based on the completion of the course. The marks attained for this course is not considered for CGPA calculation.

Skill Development Courses

Semester	Course Code	Title of Course

III	U20ECS302	Skill Development Course – 2
		  I. Computer Hardware and Troubleshooting
		  II. PCB Design
		  III. Demonstration of Electronic Equipments

IV	U20ECS403	SkillDevelopmentCourse3*

Suggestions on Mandatory Courses

Semester	Course Code	Title of Course
V	U19ECM51	Essence of Indian Traditional Knowledge
V	U19ECM61	Professional Ethics

All the suggestions are considered and updated in the respective courses. The details are given in **Annexure - II**

Approved with Minor corrections and Recommended to Academic Council

Department of ECE – Second BoS Meeting

BoS / UG / ECE 2.4	To discuss and approve the Professional and Open electives offered in IV semester students admitted in the Academic Year 2019-20 as per Regulations 2019

As per the Regulations 2019, each student shall choose one professional elective and one open elective in semester IV in consultation with the Class Advisor, Programme Academic Coordinator and the HoD.

The opted elective course will be offered only if the number of students opted for that course is not less than 30. However, if the students enrollment in a class is less than 30, the head of the department will decide the elective course.

As per the guidelines, the following details are submitted to the members of BoS for kind perusal

(a) The students have registered the following *professional electives* in IV semester

S.No	Course Code / Course Name	Number of Students registered
1	Computer Networks (U19ECE41)	60
2	Sensors for Industrial Applications (U19ECE42)	60
3	Computer Architecture (U19ECE43)	35
4	PLC and SCADA Systems and its Applications (U19ECE44)	57
	Total Number of Students	**212**

(b) The students have registered for the following *Open elective courses* in IV semester which is offered by other departments

Offering Department	Course Code / Course Name	Number of Students registered
IT	U19ITO42 : R programming	30
CSE	U19CSO41 : Web Development	60
CSE	U19CSO43 : Programming in JAVA	50
CCE	U19CCO41 : Basic DBMS	72
	Total Number of Students	**212**

List of students who is registered the Professional and Open Elective are given in **Annexure - III**

Members are appreciated for different types of Professional and Open Electives for the students which will improve the interdisciplinary knowledge

Noted and Approved

Department of ECE – Second BoS Meeting

BoS / UG / ECE 2.5	**To consider and approve the students admitted in the Academic Year 2020-21**

The details of the students admitted for the programme B.Tech – Electronics and Communication Engineering in the academic year 2020-21

Category	Number of students admitted
CETPEC (Management Quota)	87
CENTAC (Government Quota)	119
Total Number of Students	**206**

Overall admission for the academic year 2020-21 is 86 %.

Student admitted in the academic year 2020 – 21 are given in **Annexure - IV**

Noted

BoS / UG / ECE 2.6	**Consideration of review on the revised Vision, Mission, Program Educational Objectives (PEOs) and Program Specific Outcomes (PSOs) of the Department**

Feedback was collected from the stakeholders for the revision of Department Vision, Mission, Program Educational Objectives (PEOs), and Program Specific Outcomes (PSOs) in line with Institute Vision and Mission.

The revised Vision, Mission, PEOs and PSOs are given in **Annexure - V**

Noted and Approved

BoS / UG / ECE 2.7	**Consideration of evaluation process in End Semester Examinations and Examiners for U.G. and P.G. Programmes**

Student assessments play a very important role in deciding the quality of education. The academic quality of examinations (question papers) in the engineering education system has been a matter of concern for a long time. As per guidelines of Outcome-Based Education, we provided the quality question paper for both UG and PG programs consisting of Knowledge level, Course outcome etc., these type of question will provide an understanding of the subject as well as skill knowledge in the course

Examiners for both UG and PG programs are given in **Annexure - VI**

Noted and Appreciated

Department of ECE – Second BoS Meeting

BoS / UG / ECE 2.8	**To consider and approve the department committee to monitor the Academic Activities**

The following committees are constituted in the department to execute various activities, the details are submitted for kind consideration

Name of the Committee

- Department Discipline Committee
- Grievances Committee
- Department Advisory Committee
- Department Alumni Committee
- News Letter / Magazine Committee
- Class Committee
- Purchase Committee
- Training Committee
- Technical club Committee
- Student Monitoring Committee
- Department Consultative Committee
- Academic Appeal Board
- Course Committee for Common Courses
- Department Examination Committee
- Department Time Table Committee

Noted and Approved

BoS / UG / ECE 2.9	**Any other item with the permission of the chair**

- Members suggested providing Text Books with unit coverage to be mentioned in the syllabus of each course.
- Members appreciated the conduction of offline examination during the pandemic situation and also appreciated the evaluation system and publishing the result in the stipulated period.

Dr. P. Raja, Chairman – BoS and Head of Department, Electronics and Communication Engineering, concluded the meeting at 12:30 pm with the vote of thanks.

Dr. P. RAJA
Board Chairman - ECE

Dr.GERARDINE IMMACULATE MARY
Professor, Department of Embedded Systems,
Vellore Institute of Technology (VIT), Vellore
(Expert Member - University Nominee)

Dr. N. VENKATESWARAN
Professor, Department of ECE,
SSN College of Engineering, Kalavakkam
(Expert Member – AC Nominee)

Dr. V. R. VIJAYAKUMAR
Associate Professor & Head, Department of
ECE, Anna University, Regional Campus,
Coimbatore
(Expert Member – AC Nominee)

Mr. C. GNANAVEL
Manager, Production and Technology,
Lenovo India Ltd., Puducherry
(Industry Member)

Mr. DHARANIDHARAN. G
Associated Functional Consultant,
Birlasoft Limited, Chennai
(Alumni Member)

Dr. V. BHARATHI
Professor / ECE
(Member)

Dr. R. RAMYA
Professor/ ECE
(Member)

Dr. J. PRADEEP,
Associate Professor / ECE
(Member)

Dr. R. KURUNJIMALAR
Associate Professor / ECE
(Member)

Dr. D. Jagadiswary
Associate Professor / ECE
(Member)

Prof. R. ILAIYARAJA,
Assistant Professor / ECE
(Member)

Prof. EGALITE FRANCIS
Assistant Professor / Mathematics
(Member)

Prof. K. OUDAYAKUMAR,
Associate Professor / Physics
(Member)

Dr. S. DEEPA
Professor / Chemistry
(Member)

Dr. D. JAICHITHRA
Associate Professor
(Member)

Department of ECE – Second BoS Meeting

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Courses wise suggestions of the semester- V under Regulations 2019

Sl. No.	Course code	Course Title	Category
Theory			
1	U19ECT51	Probability and Random Processes	BS
2	U19ECT52	Linear Integrated Circuits	PC
3	U19ECT53	Microcontroller	PC
4	U19ECT54	Digital Signal Processing	PC
Practical			
5	U19ECP51	Linear Integrated Circuits Laboratory	PC
6	U19ECP52	Microcontroller Laboratory	PC
7	U19ECP53	Digital Signal Processing Laboratory	PC

Courses wise suggestions of the semester- VI under Regulations 2019

Sl. No	Course Code	Course Title	Category
Theory			
1	U19ECT62	Digital VLSI System Design	PC
2	U19ECT63	Wireless Communication	PC
3	U19ECT64	Transmission Lines and Antennas	PC
4	U19ECE6X	Professional Elective - III : 1. Vehicular Communication 2. Industry 4.0 Technology 3. Information Theory Coding	PE

U19ECT51   **PROBABILITY AND RANDOM PROCESSES**

L	T	P	C	Hrs
2	2	0	3	60

Course Objectives

- To understand concepts of probability.
- To acquire knowledge on Probability distributions.
- Gain knowledge about the random processes.
- Get exposed to discrete time Markov chain.
- Gain strong knowledge in principles of Queuing theory.

Course Outcomes

After completion of the course, the students shall have ability to

CO1 - Apply the specialized knowledge in probability theory. **(K3)**
CO2 - Understand the fundamental of interrelationship between discrete and continuous random variables. **(K2)**
CO3 - Apply the fundamentals of probability theory and random process. **(K3)**
CO4 - Determine theoretical solutions to the created models. **(K3)**
CO5 -Apply the knowledge of Queuing theory. **(K3)**

UNIT I DISCRETE RANDOM VARIABLES   (12Hrs)

Random variables and their event spaces - The probability mass function -Distribution functions: Binomial - Geometric - Negative Binomial and Poisson.

UNIT II CONTINUOUS RANDOM VARIABLES& APPLICATION OF DISTRIBUTION   (12Hrs)

Some important distributions: Exponential distribution - Gamma - Weibull and Gaussian distributions. Application of Distribution - Reliability - Failure density and Hazard function.\

UNIT III RANDOM PROCESS   (12Hrs)

Definition - Classification of Stochastic Process - Strictly Stationary process - Wide Sense Stationary - Poisson process.
 - Ergodic Process- Time Series Process.

UNIT IV DISCRETE PARAMETER MARKOV CHAIN   (12 Hrs)

Introduction - Computation of n-step transition Probabilities - Chapman - Kolmogorov equation State classification and limiting Probabilities - M/G/1 queuing system - Pollaczek Khinchine transform equation.

UNIT V CONTINUOUS PARAMETER MARKOV CHAIN   (12 Hrs)

M/M/1 - M/M/C - M/M/1/N - M/M/C/N (C<N) - M/M/C/C - M/M/∞ models only - Derivation of mean number of customer in the system - in the queue and waiting time - Simple applications.

Text Books

1. T. Veerarajan, "Probability and Statistics, Random Process and Queuing Theory", McGraw Hill Education, 1st Edition, 2018.
2. **P. Sivaramakrishna Das, "**Probability and Random Process", Pearson Education, 6th Edition, 2019.
3. **Scott Miller," Probability and Random Processes" Academic Press, 2nd Edition, 2012**

Reference Books

1. P.Balaji, "Probability and Random Processes", Balaji publishers, 5^{th}Edition, 2018.
2. M. Bhatt and Ravish R. Singh, "Probability and Statistics", McGraw Hill Education, 2nd Edition, 2017.
3. P.Kandasamy, Thilagavathi. K and Gunavathi.K., "Probability Random variable and Random Process", S.Chand&Co. Pvt. Ltd, 2nd Edition, 2015
4. J.Ravichandran, "Probability& Random Process for Engineers", I.K.International Publishing House Pvt. Ltd, 2014.
5. J.Medhi,StochasticProcesses,NewAgeInternational(P)Ltd.,SecondEdition,1994.

Web Resources

1. https://nptel.ac.in/courses/117/105/117105085/
2. https://www.probabilitycourse.com/
3. https://people.eecs.berkeley.edu/~wlr/126notes.pdf
4. https://www.youtube.com/watch?v=AUth5ws75nk
5. https://www.youtube.com/watch?v=adfi2dHJw4o

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	1	-	-	-	-	-	-	-	-	2	-	-
2	2	1	-	-	-	-	-	-	-	-	-	-	2	-	-
3	3	2	1	1	-	-	-	-	-	-	-	-	2	-	-
4	3	2	1	1	-	1	-	-	-	-	2	-	2	-	1
5	3	2	1	1	-	1	-	-	-	-	2	-	2	-	1

Correlation Level: 1-Low, 2-Medium, 3-High

	L	T	P	C	Hours
U19ECT52 **LINEAR INTEGRATED CIRCUITS**	3	0	0	3	45

Course Objectives
- Understand the classification of IC and basic building blocks of analog integrated circuits
- To understand the concepts, working principles and key applications of linear integrated circuits
- Design and analyze the linear and non-linear applications of operational amplifiers
- To Illustrate the operating principle of PLL, Data Converters and various special function ICs
- To design circuits and systems for specific applications using linear integrated circuits

Course Outcomes
After completion of the course, the students are able to
CO1 - Explain the internal structure of operational amplifiers and its characteristics. (K2)
CO2 –Demonstrate the applications of operational amplifiers. (K3)
CO3 –Construct the comparator and waveform generators using operational amplifier. (K3)
CO4 - Analyze the principle and operation of PLL and Data converters (K4)
CO5 –Use special function ICs and its application in modern electronic equipment. (K3)

UNIT I OPERATIONAL AMPLIFIER   (9 Hrs)
Introduction to Integrated Circuits- Classification of ICs - Operational Amplifier: Basic Information of Op-Amp, Ideal Op Amp- Operational Amplifier Internal Circuit- Differential Amplifier – Characteristics of Op-Amp - DC Characteristics, AC Characteristics - Frequency Response- Frequency Compensation -Slew Rate.

UNIT II OPERATIONAL - AMPLIFIER APPLICATIONS   (9 Hrs)
Closed Loop Op Amp Configuration - Inverting and Non inverting Amplifiers- Inverter- Voltage Follower- Summing Amplifier, Averaging Circuits – Subtractor -Differential Amplifier- Multiplier- Differentiator- Integrator- Instrumentation amplifier, Precision rectifier-log and antilog amplifiers- 1stOrder LPF, HPF and all pass filters.

UNIT III COMPARATORS AND WAVEFORM GENERATORS   (9 Hrs)
Comparators: Open Loop Op Amp Configuration - Inverting, Non-Inverting Comparator- Applications of Comparator- Regenerative Comparator (Schmitt trigger) - Waveform Generators: Multivibrators -Astable, Monostable - Triangular wave generator- Principles of Sine wave Oscillator- RC Phase Shift,Wien Bridge Oscillator.

UNIT IV PHASE LOCKED LOOP AND DATA CONVERTER   (9 Hrs)
Block Diagram of PLL- Principles-Types- Phase Detector- Voltage Controlled Oscillator-IC 566 and IC 565 Internal Block Diagram- PLL Applications - Data Converter and Applications- Sample and Hold circuits, D/A Techniques: Binary Weighted Resistor- R-2R and Inverted R-2R, Ladder DAC- A/D converter: Flash - Successive Approximation Converter - Dual Slope ADC.

UNIT V SPECIALIZED ICS   (9 Hrs)
IC 555 Timer Internal Architecture- Astable and Monostable Multivibrator using 555 Timer - Applications-Voltage regulator ,Fixed and Adjustable Voltage Regulators (Positive and Negative voltage regulators-78XX, 79XX , Adjustable Voltage Regulator LM317, LM340, LM723,) Dual Power supply – Switch Mode Power Supply (LM 1577/LM 2577) - Single power supply for op-Amp

Text Books
1. Sergio Franco, Design with operational amplifiers and analog integrated circuits, McGraw-Hill,2002.
2. Ramakant A.Gayakwad, OP-AMP and Linear IC's , Prentice Hall of India, 2002.
3. D.RoyChoudhry, Shail Jain, Linear Integrated Circuits, New Age International Pvt. Ltd., 2000.

Reference Books
1. William D.Stanely, Operational Amplifiers with Linear Integrated Circuits. Pearson Education, 2004.
2. David L.Terrell,Op Amps-Design, Application, and Troubleshooting, Elsevier publications 2005.
3. S.Salivahanan & V.S. Kanchana Bhaskaran, "Linear Integrated Circuits", Tata McGraw Hill Publications, 2008.
4. B.S.Sonde, "System design using Integrated Circuits" , 2nd Edition, New Age Pub, 2001
5. Robert F.Coughlin, Frederick F.Driscoll, "Operational Amplifiers and Linear Integrated Circuits", Sixth Edition, PHI, 2001.

Web References

1. http://www.nptelvideos.in/2012/11/analog-ics.html
2. https://www.intel.in/content/www/in/en/history/museum-making-silicon.html
3. https://developer.qualcomm.com/download/sd820e/qualcomm-snapdragon-820e-processor-apq8096sge
4. https://electrobian.files.wordpress.com/2016/07/linear-integrated-circuits-notes-arunkumar-pdf-apkart-com.pdf
5. https://learnengineering.in/ec6404-linear-integrated-circuits/

COs / POs / PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	1	1	1	1	-	-	-	-	-	-	-	2	1	-
2	3	1	1	1	1	-	-	-	-	-	-	-	2	1	-
3	3	1	1	1	1	-	-	-	-	-	-	-	2	1	-
4	3	1	1	1	1	-	-	-	-	-	-	-	2	1	-
5	3	1	1	1	1	-	-	-	-	-	-	-	2	1	-

Correlation Level: 1-Low, 2-Medium, 3-High

	L	T	P	C	Hrs
U19ECT53 **MICROCONTROLLER**	3	0	0	3	45

Course Objectives
- To understand 8051 architecture and its memory organization
- To understand 8051 Assembly Language Programming
- To understand programming 8051 timers in embedded C
- To understand programming serial port and interrupts in embedded C
- To design various real time systems using 8051 microcontroller.

Course Outcomes
After completion of the course, students will be able to
CO1 – Describe the architecture and explain the organization of memory in 8051 (K2)
CO2 – Classify and Apply 8051 instructions in Assembly Language Programming (K3)
CO3 – Explain the timer functions and Apply embedded C programming for controlling it. (K3)
CO4 - Explain serial ports and interrupts in 8051 and Apply embedded C programming for controlling it (K3)
CO5 - Understand and Develop 8051 based system by applying Assembly Language Programming. (K5)

UNIT – I 8051 MICROCONTROLLER (9 Hrs)
Microprocessors and Microcontrollers, 8051 Architecture: Introduction, 8051 Microcontroller hardware, Input/output pins, ports and circuits, External memory, Counters and timers, Serial data input/output, Interrupts

UNIT – II ASSEMBLY PROGRAMMING AND INSTRUCTION OF 8051 (9 Hrs)
Introduction to 8051 assembly programming, Assembling and running an 8051 program, Data types and Assembler directives, 8051 Addressing Modes, Arithmetic, logic instructions and programs, Jump, loop and call instructions, I/O port programming.

UNIT – III 8051 PROGRAMMING IN C (9 Hrs)
8051 programming in C: Data types and time delay in 8051C, I/O programming in 8051C, Logic operations in 8051 C, Data conversion program in 8051 C, Accessing code ROM space in 8051C, Data serialization using 8051C.
8051 Timer programming in Assembly and C: Programming 8051 timers, counter programming, Programming timers 0 and 1 in 8051 C.

UNIT – IV SERIAL PORT AND INTERRUPT PROGRAMMING (9 Hrs)
8051 serial port programming in assembly and C: Basics of serial communication, 8051 connection to RS232, 8051 serial port programming in assembly, serial port programming in C.
8051 Interrupt programming in assembly and C: 8051 interrupts, Programming timer, external hardware, serial communication interrupt, Interrupt priority in 8051, Interrupt programming in C.

UNIT – V INTERFACING APPLICATIONS (9 Hrs)
Interfacing: LCD interfacing, Keyboard interfacing
ADC, DAC and sensor interfacing: Parallel and serial ADC DAC interfacing, Sensor interfacing and signal conditioning.
Motor control: Relay, PWM, DC and stepper motor: Relays and opt isolators, stepper motor interfacing, DC motor interfacing and PWM.

Text Books
1. Mazidi Ali Muhammad, MazidiGillispie Janice, and McKinlay Rolin D, "The 8051 Microcontroller and Embedded Systems using Assembly and C", Pearson Publication, 2rd edition, 2007
2. Kenneth J Ayala, "The 8051 Microcontroller – Architecture, Programming and Applications", Penram International Publications, India, 2016
3. Uma Rathore Bhatt, "Assembly Language Programming with 8051 Microcontroller", LAP Lambert Academic Publishing, 2016

Reference Books

1. Rajkamal, "Embedded Systems Architecture, Programming and Design", TATA McGraw-Hill, 2nd edition 2015.
2. David E.Simon, "An Embedded Software Primer", Pearson Education Asia, First Indian Reprint, 2012.
3. T Bezboruah, Embedded System Design Based on 8051 and PIC Family Microcontroller, LAP Lambert Academic Publishing, 2011
4. Dogan Ibrahim, "Microcontroller Projects In C for the 8051", Elsevier Science, 2000
5. Thomas W Schultz , "C and the 8051" 4th edition, Wood Islands Prints, 2008

Web Resources

1. https://exploreembedded.com
2. https://www.elprocus.com/peripherals-interfacing-to-the-microcontroller-8051-in-electronics/
3. http://www.ti.com/microcontrollers/msp430-ultra-low-power-mcus/overview.html
4. https://developer.arm.com/products/architecture/cpu-architecture
5. https://www.udemy.com/course/8051-microcontroller-embedded-c-and-assembly-language/

COs / POs / PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	-	-	-	-	-	-	-	-	-	-	-	3	3	-
2	3	2	-	-	2	-	-	-	-	-	-	-	3	3	2
3	3	2	-	-	2	-	-	-	-	-	-	-	3	3	2
4	3	2	-	-	2	-	-	-	-	-	-	-	3	3	2
5	3	2	1	1	2	2	1	1	3	1	1	1	3	3	2

Correlation Level: 1-Low, 2-Medium, 3-High

U19ECT54	**DIGITAL SIGNAL PROCESSING**	**L**	**T**	**P**	**C**	**Hrs**
		3	**1**	**0**	**4**	**60**

Course Objectives

- To Analyze the frequency domain behavior of the Discrete Time signal using Discrete Fourier Transform
- To design IIR filters for the given specifications by following the suitable design procedures
- To design FIR filters for the given specifications by following the suitable design procedures
- To analyze the finite word length effect in the design of digital signal processing systems
- To understand the architectural overview and addressing modes in DSP processors

Course Outcomes

After completion of the course, students will be able to

CO1 - Analyze the frequency domain behavior of a given Discrete Time signal using Discrete Fourier Transform. (K4)

CO2 - Construction of Realization structures and design for IIR filters (K3)

CO3 - Construction of Realization structures and design for FIR filters (K3)

CO4 - Analyze the effect of finite word length for fixed &floating point number representation (K4)

CO5 - Develop an algorithm using TSM320C6X Processor for simple signal processing applications (K3)

UNIT - I DISCRETE FOURIER TRANSFORM (12 Hrs)

Review on DTFT- Spectrum limitations, The Discrete Fourier Transform- Need for DFT, DFT as a linear transformation. Properties of DFT- Periodicity, Linearity, Symmetry, Multiplication-Circular Convolution, Time Reversal Circular shifts in time and frequency, Inverse DFT. Efficient Computation of DFT-FFT algorithm-Implementation of Radix 2 FFT algorithm (DIT and DIF)-Applications of FFT algorithm.

UNIT – II IIR FILTER DESIGN (12 Hrs)

IIR filters - advantages and disadvantages - Design of IIR filters from analog Butterworth and Chebyschev filters - Impulse invariance and bilinear transformation methods of IIR digital filter design – Realization of IIR filters – Direct form I, II, cascade, parallel and ladder realization

UNIT - III FIR FILTERS (12 Hrs)

Linear phase FIR filters Design using Frequency sampling techniques using Windows- Hamming, Hanning, Blackman and Kaiser Window. Realization of FIR filters-Direct, Linear phase realization structures

UNIT - IV FINITE WORD LENGTH EFFECT IN DIGITAL FILTERS (12 Hrs)

Number representation-Fixed and Floating point Quantization Noise-Finite Word Length Effects in Digital filters-Input Quantization, Product Quantization, Coefficient quantization error, Limit Cycle Oscillations, Overflow and Signal Scaling Introduction to Multirate Signal Processing-Interpolation, Decimation Applications - subband coding of speech signals, Digital filter bank - 2 channel Quadrature mirror filter bank.

UNIT - V DIGITAL SIGNAL PROCESSORS (12 Hrs)

Introduction to programmable DSP processors – Von- Neumann architecture- Harvard architecture-VLIW architecture – MAC unit- pipelining.- Special addressing modes in P-DSPs- On chip peripherals, PDSPs with RISC and CISC- Architecture and addressing modes of TMS320C5X

Text Books

1   John G. Proakis and Dimitris K. Manolakis, "Digital Signal Processing", 4th edition, Pearson, 2007
2   SanjitMitra, "Digital Signal Processing", 4th edition, McGraw-Hill, New York, 2013(revised),
3   Chassaing,Rulph, "DSP applications using C and the TMS320C6x DSK", Volume 13.John Wiley and Sons,2003.

Reference Books

1   P.Ramesh Babu,"Digital Signal processing", Scitech Publications, 7th Edition, 2017
2   Alan V. Oppenheim and Ronald W. Schafer, "Discrete-Time Signal Processing", 3rd edition, Prentice Hall,2010.
3   Vinay K. Ingle and John G. Proakis, Digital Signal Processing using MATLAB, Cengage learning, Third Edition, 2011.
4   Ashok Ambardar, Digital Signal Processing: A modern introduction, Cengage Learning, First Edition, 2006.
5   B.Venkataramani and M.Bhaskar, "Digital Signal Processors- Architecture, programming and Applications", Tata McGraw Hill, Fourth Edition, 2005

Web Resources

1   https://engineering.purdue.edu/~bouman/ece438/lecture/module
2   http://freevideolectures.com/Course/2339/Digital-Signal-Processing-IITKharagpur
3   http://www.analog.com/en/content/beginners_guide_to_dsp/fca.html
4   https://nptel.ac.in/content/storage2/courses/108105057/Pdf/Lesson-7.pdf
5   https://onlinecourses.nptel.ac.in/noc21_ee20/preview

COs / POs / PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	1	1	-	-	-	-	-	-	1	1	3	1	3
2	3	3	1	1	-	-	-	-	-	-	1	1	3	1	3
3	3	3	1	1	-	-	-	-	-	-	1	1	3	1	3
4	3	3	1	1	-	-	-	-	-	-	1	1	3	1	3
5	3	3	1	1	-	-	-	-	-	-	1	1	3	1	3

Correlation Level: 1-Low, 2-Medium, 3-High

U19ECP51	**LINEAR INTEGRATED CIRCUITS**	**L**	**T**	**P**	**C**	**Hrs**
	LABORATORY	0	0	2	1	30

Course Objectives

- To expose the students to linear and integrated circuits
- To understand the basics of linear integrated circuits and available ICs
- To understand characteristics of operational amplifier
- To apply operational amplifiers in linear and nonlinear applications
- To acquire the basic knowledge of special function IC
- To understand the importance of op-amp in various applications like Precision Rectifiers, Filters, and DAC

Course Outcomes

After completion of the course, the students are able to

CO1 - Analyze the various linear and non-linear application of op-amp (K4)

CO2 - Examine and analyze filter circuits using op-amp (K4)

CO3 - Design and analyze oscillators and multivibrator circuits using op-amp (K4)

CO4 - Distinguish the various applications of linear IC's like 741,555 timer and XR2240 (K3)

CO5 - Relate the use of OP- AMP as analog to digital and digital to analog converter. (K3)

LIST OF EXPERIMENTS

1. Applications of Op-amp : To study the application of Op-amp IC741 as
   a. Inverting amplifier
   b. Non-inverting amplifier
   c. Voltage follower
   d. Summer
   e. Subtractor
2. Differentiator and Integrator
   Design the op-amp as differentiator and integrator for various time constants
3. Comparator circuits
   (a) To study zero crossing detector, window detector
   (b) Design Schmitt trigger using op-amp 741
4. Signal converters
   To study operation of op-amp as V to I and I to V converters
5. Active filters using Op-amp
   Design and test the performance of a 2nd order LPF, HPF, BPF and BSF
6. Log, antilog and instrumentation amplifier
   To study (a) logarithmic and antilog amplifiers (b) Instrumentation amplifier
7. Multivibrators using Op-Amp
   To design and study the working of
   (a). Astable Multivibrator and   (b). Monostable Multivibrator using IC 741.
8. Data converters
   Construction and study performance of
   (a). DAC circuits – R-2R and ladder type.
   (b). Successive approximation type ADC.
9. Multivibrators using IC 555
   To design and study the working of
   (a). Astable multivibrator
   (b). Monostable Multivibrator using IC 555.
10. Frequency synthesizers
    To study performance of
    (a). Frequency multiplier using PLL IC 565
    (b). Frequency synthesizer using IC XR2240
11. Precision rectifiers - To study performance of half wave and full wave precision rectifiers using IC 741.
12. Fixed Voltage regulator (Using 78XX,79XX) ,Adjustable Voltage regulator (using LM317) and switched voltage regulator (using LM 1577 / LM 2577)

Reference Books

1. William D.Stanely, Operational Amplifiers with Linear Integrated Circuits. Pearson Education, 2004.
2. David L.Terrell,Op Amps-Design, Application, and Troubleshooting, Elsevier publications 2005.
3. S.Salivahanan & V.S. Kanchana Bhaskaran, "Linear Integrated Circuits", Tata McGraw Hill, 2008.
4. B.S.Sonde, "System design using Integrated Circuits" , 2nd Edition, New Age Pub, 2001
5. Robert F.Coughlin, Frederick F.Driscoll, "Operational Amplifiers and Linear Integrated Circuits", Sixth Edition, PHI, 2001.

Web References
1. http://www.nptelvideos.in/2012/11/analog-ics.html
2. https://www.intel.in/content/www/in/en/history/museum-making-silicon.html
3. https://developer.qualcomm.com/download/sd820e/qualcomm-snapdragon-820e-processor-apq8096sge
4. https://electrobian.files.wordpress.com/2016/07/linear-integrated-circuits-notes-arunkumar-pdf-apkart-com.pdf
5. https://learnengineering.in/ec6404-linear-integrated-circuits/

COs / POs / PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	-	2	-	-	-	1	-	-	-	3	-	-
2	3	2	2	-	2	-	-	-	1	-	-	-	3	-	-
3	3	2	2	-	2	-	-	-	1	-	-	-	3	-	-
4	3	2	2	-	2	-	-	-	1	-	-	-	3	-	-
5	3	2	2	-	2	-	-	-	1	-	-	-	3	-	-

Correlation Level: 1-Low, 2-Medium, 3-High

U19ECP53 **DIGITAL SIGNAL PROCESSING LABORATORY**

	L	T	P	C	Hrs
	0	0	3	1	45

Course Objectives

- To utilize MATLAB in various signal processing applications
- To Analyze the frequency domain behavior of a given Discrete Time signal using Discrete Fourier Transform
- To design IIR and FIR filters for the provided specifications by following the suitable design procedures
- To understand the architectural overview and addressing modes in DSP processors
- Identify suitable programs and Implementation of FFT algorithm using DSP trainer Kit

Course Outcomes

After completion of the course, students will be able to

CO1 - Analyze and implement digital signal processing systems in time domain (K4)

CO2 - Develop and implement digital systems using the DFT and the Fast Fourier Transform (FFT) (K3)

CO3 - Compute circular convolution, linear convolution and the discrete Fourier transform (DFT) of discrete time signals (K3)

CO4 - Construct the digital filters using windows. (K3)

CO5 - Develop an algorithm using TSM320C6X Processor for simple signal processing applications (K3)

LIST OF EXPERIMENTS

1. Introduction to MATLAB for Signal Processing
2. Study of Code composer studio
3. Write a Program for the generation of basic signals such as unit impulse, unit step, ramp, exponential, sinusoidal and cosine
4. Perform Sampling of Continuous time Signals with various sampling rates
5. Perform Linear and Circular Convolution (with and without functions)
6. Perform Computation of DFT of a signal, using basic equation and FFT algorithms
7. Design and Simulation of IIR and FIR filters using Filter design ToolBox
8. Linear Convolution using Simulink
9. Perform Generation of Signals using DSP trainer Kit
10. Execute Manipulation of Matrix multiplication using DSP trainer kit
11. Perform Verification of Linear Convolution Operation using DSP trainer Kit
12. Verify Circular Convolution using DSP trainer kit
13. Implement FFT-DIT algorithms using DSP trainer Kit

Reference Books

1 P.Ramesh Babu,"Digital Signal processing", Scitech Publications, 7th Edition, 2017
2 Alan V. Oppenheim and Ronald W. Schafer, "Discrete-Time Signal Processing", 3rd edition, Prentice Hall,2010
3 Schilling, Robert J., and Sandra L. Harris. Fundamentals of digital signal processing using MATLAB. Cengage Learning, 2011.
4 Weeks, Michael. Digital signal processing using MATLAB & wavelets. Jones & Bartlett Publishers, 2010
5 Chassaing, Rulph, "DSP applications using C and the TMS320C6x DSK", Volume 13.John Wiley and Sons,2003.

Web Resources

1. https://engineering.purdue.edu/~bouman/ece438/lecture/module
2. http://freevideolectures.com/Course/2339/Digital-Signal-Processing-IITKharagpur
3. http://www.analog.com/en/content/beginners_guide_to_dsp/fca.html
4. https://onlinecourses.nptel.ac.in/noc21_ee20/preview
5. https://nptel.ac.in/content/storage2/courses/108105057/Pdf/Lesson-7.pdf

COs / POs / PSOs Mapping

CO s	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	3	3	-	-	-	3	1	1	1	3	1	3
2	3	3	3	3	3	-	-	-	3	1	1	1	3	1	3
3	3	3	3	3	3	-	-	-	3	1	1	1	3	1	3
4	3	3	3	3	3	-	-	-	3	1	1	1	3	1	3
5	3	3	3	3	3	-	-	-	3	1	1	1	3	1	3

Correlation Level: 1-Low, 2-Medium, 3-High

SEMESTER – VI

U19ECT62	DIGITAL VLSI SYSTEM DESIGN	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To study the introduction about design and implementation of digital circuits.
- To explain the various combinational and sequential logic blocks.
- To understand the terms and keywords in Verilog HDL.
- To understand about various levels of modelling.
- To discuss the various Programming IC technologies.

Course Outcomes

After completion of the course, students will be able to

CO1 – Understand the basic principles of design and implementation of digital circuits. **(K2)**
CO2 – Discuss about the different combinational and sequential logic blocks. **(K3)**
CO3 – Describe the terms and keywords in Verilog HDL. **(K2)**
CO4 - Identify the various levels of modeling of Verilog HDL. **(K2)**
CO5 - Explain the various programmable IC technologies with its implementation concepts. **(K2)**

UNIT - I   INTRODUCTION OF DESIGN AND IMPLEMENTATION   (9 Hrs)

Digital Hardware, The Design Process, Design of Digital Hardware, Standard Chips, Programmable Logic Devices, Custom Chips, Standard Cells, and Gate Arrays, Implementation Details for SPLDs, CPLDs, and FPGAs.

UNIT - II   DIGITAL CIRCUITS DESIGN   (9 Hrs)

Combinational Logic Design; Adders, Subtractor, Multiplier, Multiplexers, Demultiplexers, Decoders, Encoders, Code Converters. Sequential Logic Design- Flip-Flops, Registers, Counters, Finite State Machines-Mealy and Moore type, Serial Adder.

UNIT - III   INTRODUCTION TO VERILOG HDL   (9 Hrs)

Introduction to Verilog HDL: Verilog as HDL, Levels of Design Description, Concurrency, Simulation and Synthesis, Functional Verification, System Tasks, Programming Language Interface (PLI), Module, Simulation and Synthesis Tools.
Language Constructs and Conventions: Introduction, Keywords, Identifiers, White Space Characters, Comments, Numbers, Strings, Logic Values, Strengths, Data Types, Scalars and Vectors, Parameters, Operators.

UNIT - V   LEVELS OF MODELING   (9 Hrs)

Gate Level Modeling: Array of Instances of Primitives, Design of Flip-flops with Gate Primitives, Delays,.
Dataflow Level Modeling: Continuous Assignment Structure, Delays and Continuous Assignments, Assignment to Vectors. **Behavioural level Modeling**: Initial and Always Construct, Assignments with Delays, Blocking and Non-Blocking Assignments, Procedural Statements, Assign-De-Assign construct, Parallel Blocks, Force-Release construct. Functions and Tasks, Design Examples.

UNIT - IV PROGRAMMABLE IC TECHNOLOGIES   (9 Hrs)

PROM, PLA, PAL ,CPLD Programmable IC Technologies - Introduction to FPGA – FPGA Implementation Process - FPGA EDA Tools - FPGA Infernal Architectures - Logic Implementation using LUTs - Programmable Interconnections

Text Books

1. Fundamentals of Digital Logic Design with Verilog Design– Stephen. Brown and Zvonko Vranesic, TMH, 2nd Edition,2017.
2. M.J. Smith, "Application Specific Integrated Circuits", Addisson Wesley, 1997
3. Samir Palnitkar, Verilog HDL, Pearson Education, 2nd Edition, 2004.

Reference Books

1. Ion Grout, Digital Systems Design with FPGAs and CPLDs, Elsevier, 2008.
2. Bob Zeidman, Designing with FPGAs and CPLDs, Elsevier, CMP Books, 2002.
3. Ming-Bo Lin, Digital System Designs and Practices using Verilog HDL and FPGAs, Wiley,2012.
4. Advanced Digital Logic Design using Verilog, State Machine & Synthesis for FPGA – Sunggu Lee, Cengage Learning , 2012.
5. Advanced Digital Design with Verilog HDL – Michael D. Ciletti, PHI, 2009.

Web Resources

1. http://www.asic-world.com/verilog/veritut.html
2. https://hackr.io/tutorials/learn-verilog
3. https://www.coursera.org/
4. https://nptel.ac.in/courses/117/106/117106092/

COs / POs / PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	-	-	-	-	-	-	-	-	-	-	-	3	-	-
2	2	1	-	2	-	-	-	-	-	-	-	-	3	-	-
3	2	1	-	2	-	-	-	-	-	-	-	1	3	-	-
4	1	-	-	-	2	-	-	-	-	-	-	-	2	-	-
5	2	3	-	3	-	-	-	-	-	-	-	1	2	-	-

Correlation Level: 1-Low, 2-Medium, 3-High

			L	T	P	C	Hours
U19ECT63	**WIRELESS COMMUNICATION**		3	0	0	3	45

Course Objectives

- To study the characteristic of wireless channel
- To acquire knowledge about various digital signaling techniques
- To understand the design of a cellular system
- To know various wireless and bluetooth technology
- To gain the knowledge about MIMO technology

Course Outcomes

Upon completion of the course, students will be able to

CO1- Characterize a wireless channel and evolve the system design specifications(K1)
CO2- Understand cellular system based on resource availability and traffic demands(K2)
CO3- Identify suitable signaling and fading channels for wireless communication(K3)
CO4- Learn about multipath mitigation techniques for the wireless channel(K4)
CO5- Learn about the multiplexing and diversity techniques (K4)

UNIT – I BASICS OF WIRELESS COMMUNICATION (9 Hrs)

History of Wireless Communication - General Model of Wireless Communication Link - Types of Signals - Wireless Channel and Radio Communication - Free Space Propagation Model - Channel Noise and Losses – Fading - Multipath Fading - Fading Effects on Signal and Frequency – Shadowing - Wireless ChannelModelling: AWGN Channel, Rayleigh Channel, Rician Fading Channel.

UNIT –II MEDIUM ACCESS ALTERNATIVES FOR WIRELESS COMMUNICATION (9 Hrs)

Spread Spectrum Modulation - Pseudo-Noise Codes with Properties and Code Generation Mechanisms -DSSS and FHSS Systems - Time Hopping and Hybrid Spread Systems; Multicarrier Modulation Techniques -Zero Inter Symbol Interference Communication Techniques - Detection Strategies - Diversity CombiningTechniques: Selection Combining - Threshold Combining - Equal Gain Combining - Maximum RatioCombining.

UNIT – III CELLULAR SYSTEM DESIGN FUNDAMENTALS (9 Hrs)

Introduction to Cellular Communications - GSM system for mobile Telecommunication - Frequency reuse - Multiple Access Technologies - Cellular Processes - Call Setup, Handover -Teletraffic Theory - General Packet Radio Service – EDGE Technology - CDMA Based Standards: IS 95 to CDMA 2000 - Wireless Local Loop.

UNIT –IV WIRELESS LAN AND BLUETOOTH TECHNOLOGY (9 Hrs)

Introduction to Mobile Adhoc Networks – IEEE 802.11 Architecture and Services - Bluetooth – BluetoothProtocol Stack - Wi-Fi Standards -WiMax Standards – WLAN Technology – Requirements of WLAN –Infrared Communication - Li-Fi Communication.

UNIT – V LTE AND MIMO TECHNOLOGIES (9 Hrs)

Ultra-Wideband Communication - Mobile data networks - Introduction to the concept of NGN - Long Term Evolution (LTE) - Mobile Satellite Communication - Introduction to MIMO - MIMO Channel Capacity - SVD and Eigen modes of the MIMO Channel - MIMO Spatial Multiplexing – MIMO Diversity – MIMO -OFDM.

Text Books

1. T.S. Rappaport, "Wireless Communication-Principles and practice", Pearson Publications,2ndEdition, 2010.
2. Mobile Cellular Communication, Gottapu Sasibhushana Rao, Pearson Education, 2012.
3. Steve Rackley, Wireless Networking Technology, From Principles to Successful Implementation, Newnes; 1st edition,2011

Reference Books

1. UpenaDalal and Manoj K. Shukla, "Wireless and Mobile Communication", Oxford Press Publications,2016.
2. Andrea Goldsmith, "Wireless Communications", Cambridge University Press, 2012.
3. EzioBiglieri and Robert Calderbank, "MIMO Wireless Communications", Cambridge University Press,2015.
4. Principles of Wireless Networks — Kaveh PahLaven and P. Krishna Murthy, 2012, PE
5. Wireless Communication and Networking — William Stallings, 2003,PHI.

Web Resources

1. http://nptel.ac.in/courses/117102062/
2. https://onlinecourses.nptel.ac.in/noc17_cs37/
3. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-452-principles-of-wireless-communications-spring-2006/
4. https://learnengineering.in/ec8652-wireless-communication/

COs / POs / PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	1	-	-	-	1	-	2	2	2	3	1	1
2	3	2	1	1	-	-	-	1	-	2	2	2	3	-	2
3	2	1	1	2	-	-	-	1	-	3	2	2	3	-	2
4	2	1	1	2	-	-	-	1	-	2	2	2	3	2	2
5	3	1	1	2	-	-	-	1	-	2	2	2	3	2	2

Correlation Level: 1-Low, 2-Medium, 3-High

	L	T	P	C	Hrs
U19ECE52 **VEHICULAR COMMUNICATION**	3	0	0	3	45

Course Objectives

- To introduce the emerging technologies in vehicular communication systems
- To study the design considerations and challenges of vehicular communication
- To analyze the vehicular mobility modelling, and vehicular technologies
- To introduce the standards from the physical to network layers
- To study about various emerging applications of vehicular communications

Course Outcomes

Upon completion of the course, students shall have ability to

CO1 - Describe the emerging technologies in vehicular communication systems. **(K2)**

CO2 – Infer technologies and system architecture of VANET or inter-vehicle communication networks. .**(K2)**

CO3 - Examine the vehicular mobility modelling, and vehicular technologies **(K4)**

CO4 – Infer standards from the physical layers to network layers **(K2)**

CO5 - Illustrate vehicular communication platforms for various kinds of safety and infotainment applications .**(K3)**

UNIT- I INTRODUCTION   (9 Hrs)

Introduction to Vehicular Communication- Basic principles and challenges, Inter and intra vehicular sensor communications for various functions such as collision control and vehicle localization. Sensors deployed for inter and intra vehicular communications- Ultra Wide Band sensors, GPS sensors. Various algorithms developed for collisions.

UNIT- II SYSTEM ARCHITECTURE OF VANET   (9 Hrs)

Cooperative Vehicular Safety Applications Enabling technologies, cooperative system architecture, safety applications. Infrastructure-based vs. infrastructure-less technologies

UNIT - III VEHICULAR MOBILITY MODELS   (9 Hrs)

Vehicular Mobility Modelling Random models, flow and traffic models, behavioral models, trace and survey-based models, joint transport and communication simulations

UNIT - IV STANDARDS IN VARIOUS LAYERS   (9 Hrs)

Physical Layer Considerations for Vehicular Communications Signal propagation, Doppler spread and its impact on OFDM systems. MAC Layer of Vehicular Communication Networks Proposed MAC approaches and standards, IEEE 802.11p VANET Routing protocols Opportunistic packet forwarding, topology-based routing, geographic routing

UNIT - V EMERGING APPLICATIONS   (9 Hrs)

Bus Systems–Classification, Applications in the vehicle- Coupling of networks- Networked vehicles -Buses - CAN Bus- LIN Bus- MOST Bus- Bluetooth- FlexRay- Diagnostic Interfaces. DSRC Protocol Stack, Cellular V2X

Text Books

1. H. Hartenstein and K. P. Laberteaux, VANET: Vehicular Applications and Inter Networking Technologies, Wiley, 2010.
2. H. Moustafa, Y. Zhang, Vehicular Networks: Techniques, Standards, and Applications, CRC Press, 2009.
3. Intelligent Vehicular Networks and Communications: Fundamentals, Architectures and Solutions, Anand Paul, Naveen Chilamkurti, Seungmin Rho, Alfred Daniel, Elsevier, 2016.

Reference Books

1. .P. H.-J. Chong, I. W.-H. Ho, Vehicular Networks: Applications, Performance Analysis and Challenges, Nova Science Publishers, 2019.
2. C. Sommer, F. Dressler, Vehicular Networking, Cambridge University Press, 2015.
3. M. Emmelmann, B. Bochow and C. C. Kellum, Vehicular Networking: Automotive Applications and Beyond, Wiley, 2010.
4. M. Watfa, Advances in Vehicular Ad-Hoc Networks: Development and Challenges, Information Science Reference, 2010.
5. Vehicular Communications and Networks: Architectures, Protocols, Operation and Deployment, Wai Chen, Elsevier, - Technology & Engineering, 2015

Web Resources

1. https://arxiv.org/pdf/1704.05746
2. https://www.springerprofessional.de/en/5g-enabled-vehicular-communications-and- networking/16262476
3. http://publications.lib.chalmers.se/records/fulltext/174782/174782.pdf
4. https://www.sciencedirect.com/science/article/pii/S221420961930261X

COs / POs / PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3				2				2		1		3		2
2	3				2				2		1		3		2
3	3				2				2		1		3		2
4	3				2				2		1		3		2
5	3				2				2		1		3		2

Correlation Level: 1-Low, 2-Medium, 3-High

	L	**T**	**P**	**C**	**Hours**

U19ECE53   **INDUSTRY 4.0 TECHNOLOGY**

L	T	P	C	Hours
3	0	0	3	45

Course Objectives

- To study the integration of modern technologies such as sensors, communication, and computational processing
- To understand basic industrial processes and its reference architecture
- To perceive the knowledge of networks and programming of IIOT
- To master security in IIOT
- To study application of IIOT in various fields

Course Outcomes

Upon completion of the course, students shall have ability to
CO1-Comprehend to the modern technologies need for IIOT **(K2)**
CO2-Interpret basic industrial processes and its reference architecture **(K2)**
CO3-Illustrate the programming of IIOT **(K3)**
CO4-Handle real time security issues in IIOT **(K2)**
CO5-Analyse the various industrial IOT applications **(K3)**

UNIT-I FUNDAMENTALS OF INDUSTRY 4.0   (9 Hrs)

Introduction: Sensing & actuation, Communication-Part I, Part II, Networking-Part I, Part II- Industry 4.0: Globalization and Emerging Issues, The Fourth Revolution, LEAN Production Systems, Smart and Connected Business Perspective, Smart Factories. Industry 4.0: Cyber Physical Systems and Next Generation Sensors, Collaborative Platform and Product Lifecycle Management, Augmented Reality and Virtual Reality, Artificial Intelligence, Big Data and Advanced Analysis

UNIT-II INDUSTRIAL INTERNET OF THINGS   (9 Hrs)

Cybersecurity in Industry 4.0, Basics of Industrial IoT: Industrial Processes-Part I, Part II, Industrial Sensing & Actuation, Industrial Internet Systems.IIoT-Introduction, Industrial IoT: Business Model and Referece Architerture: IIoT-Business Models-Part I, Part II, IIoT Reference Architecture-Part I, Part II.

UNIT-III NETWORK AND PROGRAMMING OF IIOT   (9 Hrs)

Industrial IoT- Layers: IIoT Sensing-Part I, Part II, IIoT Processing-Part I, Part II, IIoT Communication-Part I.Industrial IoT- Layers: IIoT Communication-Part II, Part III, IIoT Networking-Part I, Part II, Part III. Industrial IoT: IIoT Analytics - Introduction, Machine Learning and Data Science - Part I, Part II, R and Julia Programming, Data Management with Hadoop

UNIT-IV COMPUTATION IN IIOT AND SECURITY   (9 Hrs)

Industrial IoT: Big Data Analytics and Software Defined Networks: SDN in IIoT-Part I, Part II, Data Center Networks, Industrial IoT: Security and Fog Computing- Cloud Computing in IIoT-Part I, Part II.Industrial IoT: Security and Fog Computing- Fog Computing in IIoT, Security in IIoT-Part I, Part II, Industrial IoT- Application Domains: Factories and Assembly Line, Food Industry

UNIT-V INDUSTRIAL IOT APPLICATION   (9 Hrs)

Domains: Healthcare, Power Plants, Inventory Management & Quality Control, Plant Safety and Security: AR and VR safety applications, Facility Management. Industrial IoT- Application Domains: Oil, chemical and pharmaceutical industry, Applications of UAVs in Industries, Case studies. Self-Referential Structures and Introduction to Lists; Advanced Topics

Text Books

1. Honbo Zhou, "The Internet of Things in the Cloud: A Middleware Perspective", CRC Press,2012.
2. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), "Architecting the Internet of Things", Springer, 2011.
3. David Easley and Jon Kleinberg, "Networks, Crowds, and Markets: Reasoning About a Highly Connected World", Cambridge University Press, 2010.

Reference Books

1. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)",1st Edition, VPT, 2014
2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013
3. CunoPfister, Getting Started with the Internet of Things, O"Reilly Media, 2011, ISBN: 978-1- 4493-9357-1
4. Olivier Hersent, David Boswarthick, Omar Elloumi , "The Internet of Things – Key• applications and Protocols", Wiley, 2012
5. Alasdair Gilchrist, Industry 4.0: The Industrial Internet of Things, Apress, 2017

Web Resources

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2. https://global.hitachi-solutions.com/blog/industry-4-0-technologies
3. https://www.i-scoop.eu/industry-4-0/
4. https://ottomotors.com/blog/5-industry-4-0-technologies
5. https://www.machinemetrics.com/blog/industry-4-0-technologies

COs / POs / PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	1	2	-	3	-	3	-	3	-	3	3	-	-
2	3	3	1	2	-	3	-	3	-	3	-	3	-	-	-
3	3	3	1	2	3	3	-	3	3	3	-	3	-	-	-
4	3	3	1	2	-	3	-	3	-	3	-	3	-	-	3
5	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3

Correlation Level: 1-Low, 2-Medium, 3-High

U19ECE54	INFORMATION THEORY AND CODING	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives
- To define and apply the basic concepts of information theory.
- To Understand encoding and decoding of digital data streams.
- To be familiar with the Source Coding techniques.
- To be aware of compression and decompression techniques.
- To Learn the concepts of multimedia communication.

Course Outcomes
After completion of the course, students will be able to
CO1 – Explain the fundamentals of Information Theory such as Entropy and Channel capacity **(K2)**
CO2 – Describe the Data and Voice Modulation techniques **(K2)**
CO3 - Demonstrate the Source Coding Techniques **(K3)**
CO4 - Describe the Text and Image compression techniques **(K2)**
CO5 - Explain the Audio and Video Coding techniques **(K2)**

UNIT - I INFORMATION THEORY (9 Hrs)
Concept of amount of information, information units Entropy: marginal, conditional, joint and relative entropies, relation among entropies Mutual information, information rate, channel capacity, redundancy and efficiency of channels Discrete channels – Symmetric channels, Binary Symmetric Channel, Binary Erasure Channel, Noise-Free Channel, Channel with independent I/O, Cascaded channels, repetition of symbols, Binary asymmetric channel- Shannon theorem.

UNIT - II DATA AND VOICE CODING (9 Hrs)
Differential Pulse code Modulation – Adaptive Differential Pulse Code Modulation – Adaptive sub-band coding – Delta Modulation – Adaptive Delta Modulation – Coding of speech signal at low bit rates -Vocoders, LPC.

UNIT - III SOURCE CODING TECHNIQUES (9 Hrs)
Purpose of encoding, Instantaneous codes, Construction of instantaneous codes, Kraft's inequality, Coding efficiency and redundancy, Source coding theorem. Construction of basic source codes – Shannon Fano coding, Shannon Fano Elias coding, Huffman coding, Minimum variance Huffman coding, Adaptive Huffman coding, Arithmetic coding, Channel coding theorem for DMC.

UNIT - IV COMPRESSION TECHNIQUES (9 Hrs)
Principles – Text compression – Static Huffman Coding – Dynamic Huffman coding – Arithmetic coding – Image Compression – Graphics Interchange format – Tagged Image File Format – Digitized documents – Introduction to JPEG standards.

UNIT - V AUDIO AND VIDEO CODING (9 Hrs)
Linear Predictive coding – code excited LPC – Perceptual coding, MPEG audio coders – Dolby audio coders – Video compression – Principles – Introduction to H.261 & MPEG Video standards.

Text Books
1. Simon Haykin, "Communication Systems", 4th Edition, John Wiley and Sons, 2007.
2. Fred Halsall, "Multimedia Communications, Applications Networks Protocols and Standards", Pearson Education, Asia 2002;
3. R. Togneri, C.J.S deSilva, Fundamentals of Information Theory and Coding Design, Taylor and Francis,2006

Reference Books
1. Mark Nelson, "Data Compression Book", BPB Publication 1992.
2. Watkinson J, "Compression in Video and Audio", Focal Press, London, 1995.
3. R. J. McEliece, The Theory of Information and Coding, Cambridge Uinversity Press
4. R. Bose, Information Theory Coding and Cryptography, Tata McGraw Hill
5. T. M. Cover, J. A. Thomas, Elements of Information Theory, Wiley

Web Resources

1. https://nptel.ac.in/courses/117/101/117101053/
2. https://web.stanford.edu/class/ee376a/files/scribes/
3. https://people.montefiore.uliege.be/lwh/Info/Transp2000/introduction.pdf
4. http://link.springer.com/content/pdf/bfm%3A978-1-4757-2319-9%2F1.pdf
5. https://nptel.ac.in/content/storage2/courses/117108097/Learning%20Material%20-%20ITC.pdf

COs / POs / PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	-	1	-	-	-	-	1	1	-	3	2	2
2	3	1	1	-	1	-	-	-	-	1	1	-	3	2	2
3	3	2	2	-	1	-	-	-	-	1	1	-	3	2	2
4	3	1	1	-	1	-	-	-	-	1	1	-	3	2	2
5	3	1	1	-	1	-	-	-	-	1	1	-	3	2	2

Correlation Level: 1-Low, 2-Medium, 3-High

SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
(An Autonomous Institution)
Puducherry

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Courses wise suggestions of the semester- III under Regulations 2020

Sl.No.	Course Code	Course Title	Category
Theory			
1	U20ECT303	Analog Electronic Circuits	PC
2	U20ECT305	Signals and Systems	PC
3	U20ECT306	Electromagnetic Field Theory	PC

Courses wise suggestions of the semester- IV under Regulations 2020

Course Code	Course Title	Category
Theory		
U20BST431	Probability and Random Processes	BS
U20ECT407	Analog and Digital Communication Systems	PC
U20ECT408	Linear Integrated Circuits	PC
Practical		
U20ECP406	Linear Integrated Circuits Laboratory	PC

SEMESTER – III

U20ECT303	ANALOG ELECTRONIC CIRCUITS	L	T	P	C	Hours
		3	0	0	3	45

Course Objectives

- To learn the fundamental concepts behind transistor biasing and to differentiate small signal & large signal circuit models
- To understand the small signal low frequency model of BJT and FET
- To understand the small signal high frequency model of BJT and FET
- To study the performance metrics of Multistage and Power amplifiers
- To understand the working of signal generating and wave shaping circuits

Course Outcomes

After completion of the course, the students are able to

CO1 - Analyze different biasing methods for Bipolar Junction Transistors and Field Effect Transistors (K4)

CO2- Compare and model different Transistor configurations for Bipolar Junction Transistors and Field Effect Transistors (K4)

CO3- Analyze the behavior of Bipolar Junction Transistors and Field Effect Transistors at different Frequency Conditions (K4)

CO4- Construct multistage and feedback amplifier circuits using Bipolar Junction Transistors and Field Effect Transistors (K3)

CO5- Construct the Oscillator and Multi vibrator circuits using Bipolar Junction Transistors (K3)

UNIT– I FREQUENCY ANALYSIS (9 Hrs)

Transistor Low Frequency Analysis: Definition of h–parameters – Small signal low frequency h-parameter model –Mid band analysis of CB, CE and CC amplifier to obtain gain, input impedance and output impedance – Analysis of CE amplifier with an emitter resistance – Low frequency FET model – CS, CD and CG amplifiers.

Transistor High Frequency Analysis: Hybrid pi CE transistor model – Hybrid pi conductances and capacitances – CE short circuit current gain using Hybrid pi model - Current gain with resistive load.

UNIT– II MULTISTAGE AND FEEDBACK AMPLIFIER (9 Hrs)

Multistage Amplifiers: Need for cascading – Cascade amplifier – Cascode amplifier – Darlington Pair – Basic emitter coupled differential amplifier – Tuned amplifiers – single tuned –double tuned –stagger tuned amplifiers.

Feedback Amplifiers: Concept of feedback- topological classification-voltage series, voltage shunt, current series, current shunt - effect of feedback on gain, stability, distortion, band width, input and output impedances – practical feedback amplifier circuits and their analysis.

UNIT– III OSCILLATORS AND MULTIVIBRATORS (9 Hrs)

Oscillators: Barkhausen criterion for sustained oscillations - RC oscillators – RC phase shift oscillator and Wien bridge oscillator- LC oscillators - Hartley and Colpitts oscillators – crystal oscillators and frequency stability.

Multivibrators: Astable, monostable and bistable multivibrators using transistors–Schmitt trigger circuit.

UNIT– IV WAVE SHAPING CIRCUITS (9 Hrs)

Wave Shaping Circuits: RC Integrator and Differentiator circuits – Storage, Delay and Calculation of Transistor Switching Times – Speed-up Capacitor- Clamper circuits – positive, negative and biased clampers -Voltage doubler, tripler and quadrupler circuits. **Time Base Generators:** General features of time base signals – RC ramp generator – Constant current ramp generator, UJT saw tooth generator – Bootstrap ramp generator – Miller integrator ramp generator – triangular waveform generator – pulse generator circuit – function generator – sine wave converter.

UNIT– V LARGE SIGNAL AMPLIFIERS **(9 Hrs)**

Classification of power amplifiers - Class A power amplifier-direct and transformer coupled amplifiers; - Class B - Push-pull arrangements and complementary symmetry amplifiers; conversion efficiency calculations, cross over distortion – class AB amplifier - amplifier distortion – power transistor heat sinking – Class C and D amplifiers.

Text Books:

1. Millman J and Halkias C, –Integrated Electronics‖, Tata McGraw Hill International Edition, 2007.
2. David A. Bell, –Solid State Pulse circuits‖, PHI Learning Private Ltd, Fourth Edition, 2007

Reference Books:

1. R.L. Boylestad and L. Nashelsky, –Electronic Devices and Circuit Theory‖, PHI Learning Pvt. Ltd, India, Ninth Edition, 2008
2. David A. –Bell Electronic Devices and Circuits‖, Oxford university press, 5th Edition, 2010.
3. Sedra and Smith, Micro Electronic Circuits, Oxford University Press, 2012.
4. S. Salivahanan, N. Suresh Kumar and A. Vallavaraj, Electronic Devices and Circuits, 2nd Edition, TMH, 2007.
5. Fundamentals of Analog Circuits Thomas L Floyd Pearson 2nd Edition, 2012

Web References:

1. https://nptel.ac.in/courses/108102095/
2. https://lecturenotes.in/subject/7/analog-electronic-circuits-aec
3. https://gradeup.co/electronics-communication-exams/analog-circuits
4. http://www.electronics.teipir.gr/personalpages/papageorgas/download/2/shmeiwseis/ELECTRONIC_COMPONENTS/varistor/Analog_Electronics.pdf
5. https://sites.google.com/site/eeenotes2u/home/analog-electronic-circuits

COs /POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	2	-	-	-	-	-	-	-	-	2	2	-
2	3	2	2	2	1	-	-	-	-	-	-	-	2	2	-
3	3	2	2	2	1	-	-	-	-	-	-	-	2	2	-
4	3	2	2	2	1	-	-	-	-	-	-	-	2	2	-
5	3	2	2	2	1	-	-	-	-	-	-	-	2	2	-

Correlation Level: 1-Low, 2-Medium, 3- High

	L	**T**	**P**	**C**	**Hours**
U20ECT305 **SIGNALS AND SYSTEMS**	2	2	0	3	60

Course Objectives
- To understand the Mathematical Representation of Signals and Systems
- To describe the concept of fourier transform and laplace transform
- To describe the concept of discrete time fourier transform and Z transform
- To understand the behavior of continuous time systems
- To understand the behavior of discrete time systems

Course Outcomes

After completion of the course, the students are able to
CO1–Describe the elementary signals and properties of the systems by mathematical representation (K2)
CO2–Discuss the properties of continuous time signals using Fourier and Laplace Transforms (K2)
CO3–Discuss the properties of discrete time signals using DTFT and Z - transform (K2)
CO4 –Demonstrate the behavior of continuous time systems (K3)
CO5–Demonstrate the behavior of discrete time systems (K3)

UNIT I IINTRODUCTION TO SIGNALS AND SYSTEMS (12 Hrs)
Introduction to Signals and Systems, Classification of Signals based on Independent Variable, Elementary Signals - Step, Ramp, Pulse, Impulse, Sinusoidal, Exponential signals, Amplitude and Time Operation on Signals, Classification of Systems, Properties of Systems.

UNIT II ANALYSIS OF CT SIGNALS (12 Hrs)
Fourier series, Properties of Continuous Time Fourier Series, Trigonometric and Exponential Fourier Series Fourier Transform, Properties of Continuous Time Fourier Transform, Gibbs Phenomena, Dirichlet Conditions, Laplace Transforms, Properties of Laplace Transforms-R.O.C -Inverse Laplace transform

UNIT III ANALYSIS OF DT SIGNALS (12 Hrs)
Discrete Time Fourier Transform, Properties of Discrete Time Fourier Transform, Inverse Discrete Fourier Transform, Z-Transform, Properties of Z-Transforms--R.O.C –Inverse Z transform

UNIT IV CONTINOUS TIME SYSTEMS (12 Hrs)
LTI continuous time systems- Differential equations, Transfer function and Impulse response , Convolution Integral- Block diagram representation - State variable techniques – State equations

UNIT V DISCRETE TIME SYSTEMS (12 Hrs)
Difference equations, System function and impulse response, Convolution Sum, Block diagram representation, Convolution Sum, State equations for discrete time systems, Frequency response of discrete time signals

Text Books
1. Alan V. Oppenheim, Alan S. Willsky, Syed Hamid Nawab, "Signals and Systems", 2nd Edition, Pearson, 2013
2. P. Ramesh Babu," Signals and Systems", Fifth Edition, Scitech Publishers, 2014.
3. A.Nagoor Kani, "Signals and Systems", Tata McGraw Hill Education Private Limited,2010

Reference Books

1. B. P. Lathi, "Principles of Linear Systems and Signals", 2nd Edition, Oxford University Press, 2009
2. Michael Corithios, "Signals, Systems, Transforms, and Digital Signal Processing with MATLAB", CRC Press. 2018
3. Tarun Kumar Rawat, "Signals and Systems", Oxford University Press, 2010Grewal B.S., Higher Engineering Mathematics, 40th Edition, Khanna Publishers, Delhi 2007
4. John Alan Stuller, —An Introduction to Signals and Systemsǁ, Thomson, 2007.
5. Signal, Systems and Transforms by Charles L. Philips, J. M. Parr and E. A. Riskin, Pearson Education.

Web References

1. https://nptel.ac.in/courses/108/104/108104100/
2. https://lecturenotes.in/subject/36/signals-and-systems-ss
3. http://signalsandsystems.wikidot.com/notes-signals-problems
4. http://signalsandsystems.wikidot.com/problems
5. http://home.npru.ac.th/sopapun/Solved_Problems.pdf

COs Mapping with POs and PSOs

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	1	-	-	-	-	-	-	-	1	3	1	-
2	3	2	1	1	-	-	-	-	-	-	-	1	3	1	-
3	3	2	1	1	-	-	-	-	-	-	-	1	3	1	-
4	3	2	1	1	-	-	-	-	-	-	-	1	3	1	-
5	3	2	1	1	-	-	-	-	-	-	-	1	3	1	-

	L	T	P	C	Hrs
U20ECT306 **ELECTROMAGNETIC FIELD THEORY**	3	0	0	3	45

Course Objectives

- To gain knowledge on vector calculus
- To acquire knowledge of various static electric and magnetic fields
- To gain knowledge on different applications of electromagnetic fields
- To acquire knowledge on Electromagnetic Fields in various Materials
- To understand about Maxwell's equations in various forms

Course Outcomes

After completion of the course, the students are able to

CO1 - Relate vector calculus to electrostatic fields and infer the behavior of static electric field of various geometries. (K2)

CO2- Summarize the applications of Electrostatics (K2)

CO3– Explore the knowledge in magneto statics fields and its applications. (K2)

CO4- Infer knowledge about electromagnetic fields in various materials and Boundary conditions (K2)

CO5 - Extract the Maxwell's equation in different forms to determine field waves, potential waves, Energy and charge conservation conditions. (K2)

UNIT- I ELECTROSTATIC FIELDS (9 Hrs)

Vector Calculus - Scalar and Vector fields - Coordinate Systems and Transformation, Del - Gradient of a Scalar- Divergence of a Vector and Divergence Theorem-Curl of a Vector and Stokes Theorem, Coulombs Law - Coulombs Law in Vector Form - Electric Field Intensity - Electric Field due to discrete charges. electric fields due to point, line, surface and volume charge distributions – Electric flux density – Gauss law – Electric potential – potential gradient – Divergence and divergence theorem – Poisson's and Laplace equations.

UNIT– II ELECTROSTATIC APPLICATIONS (9 Hrs)

Field due to dipoles – dipole moment – Current and current density – Conductors and Dielectrics - Boundary conditions – capacitance – Dielectric interface – Capacitance of system of conductors – Dielectric constant and Dielectric strength - Energy stored in capacitor – Energy density

UNIT- III MAGNETOSTATICS FIELDS (9 Hrs)

Biot - Savart Law and Field Intensity - Magnetic Field intensity due to a finite and infinite wire carrying a current - Magnetic field intensity on the axis of a circular loop carrying a current - Amperes Circuital Law - Applications - infinite line current-infinite sheet of current-infinitely long coaxial transmission line. Magnetic Potential-Magnetic Scalar and Vector Potentials - Magnetic Flux Density

UNIT- IV MAGNETIC FORCES, MATERIALS AND DEVICES (9Hrs)

Forces due to magnetic field- Lorentz force equation for a moving charge- Force on a Current Element-Force between Two Current Elements. Magnetic Torque and moment- Magnetic dipole - Magnetization in materials – Classification of Magnetic materials –- magnetic boundary conditions – Inductors - inductances – magnetic energy stored in inductors.

UNIT- V TIME VARYING ELECTROMAGNETIC FIELDS (9 Hrs)

Maxwell's Equations - Faradays Law - Displacement Current – Maxwell's Equations in integral form and differential form - Time-Varying Potentials. Wave Propagation-Helmholtz wave Equation-wave motion in free space- perfect dielectric - lossy dielectric and good conductor- Skin effect. Poynting vector and power considerations.

Text Books

1. Matthew Sadiku, 'Elements of Electromagnetics', Oxford University Publication, 2018
2. Edward C. Jordon, Keith G. Balmain, "Electromagnetic Waves and Radiating Systems", Pearson Education, Prentice hall, 2015.
3. William H. Hayt and John A. Buck, 'Engineering Electromagnetics', McGraw Hill Special Indian edition, 2014.

Reference Books

1. Joseph A.Edminister, 'Theory and Problems of Electromagnetics-Schaum series'-TMH-2007.
2. J.D.Kraus and D.A Fleisch, Electromagnetics with applications,5/e-Tata McGraw-Hill- 2011.
3. Bhag Guru and HuseyinHiziroglu," Electromagnetic Field Theory Fundamentals", Cambridge University Press, 2nd edition, 2004
4. S.P.Ghosh, LipikaDatta, "ElectromagneticFieldTheory", 1stedition,McGrawHillEducation(India) Private Limited, 2012.

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3. https://ocw.mit.edu/resources/res-6-001-electromagnetic-fields-and-energy-spring-2008/
4. https://www.khanacademy.org/science/physics/magnetic-forces-and-magnetic-fields
5. http://www.transmission-line.net/search/label/Electromagnetics

COs /POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	1	-	-	-	-	-	-	1	-	3	-	-
2	3	2	2	1	-	-	-	-	-	-	1	-	3	-	-
3	3	2	2	1	-	-	-	-	-	-	1	-	3	-	-
4	3	2	2	1	-	-	-	-	-	-	1	-	3	-	-
5	3	2	2	1	-	-	-	-	-	-	1	-	3	-	-

Correlation Level: 1-Low, 2-Medium, 3- High

		L	T	P	C	Hrs
U20BST431	PROBABILITY AND RANDOM PROCESSES	2	2	0	3	60

Course Objectives
- To understand concepts of probability.
- To acquire knowledge on Probability distributions.
- Gain knowledge about the random processes.
- Get exposed to discrete time Markov chain.
- Gain strong knowledge in principles of Queuing theory.

Course Outcomes
After completion of the course, the students shall have ability to
CO1 - Apply the specialized knowledge in probability theory.**(K3)**
CO2 - Understand the fundamental of interrelationship between discrete and continuous random variables.**(K2)**
CO3 - Apply the fundamentals of probability theory and random process.**(K3)**
CO4 - Determine theoretical solutions to the created models. **(K3)**
CO5 -Apply the knowledge of Queuing theory.**(K3)**

UNIT-I DISCRETE RANDOM VARIABLES **(12 Hrs)**
Random variables and their event spaces - The probability mass function - Distribution functions: Binomial-Geometric - Negative Binomial and Poisson.

UNIT- II CONTINUOUS RANDOM VARIABLES& APPLICATION OF DISTRIBUTION **(12 Hrs)**
Some important distributions: Exponential distribution - Gamma - Weibull and Gaussian distributions. Application of Distribution - Reliability - Failure density and Hazard function.

UNIT III RANDOM PROCESS **(12Hrs)**
Definition - Classification of Stochastic Process - Strictly Stationary process - Wide Sense Stationary - Poisson process.- Ergodic Process- Time Series Process.

UNIT- IV DISCRETE PARAMETER MARKOV CHAIN **(12 Hrs)**
Introduction - Computation of n-step transition Probabilities - Chapman - Kolmogorov equation State classification and limiting Probabilities - M/G/1 queuing system –Pollaczek Khinchine transform equation.

UNIT V CONTINUOUS PARAMETER MARKOV CHAIN **(12 Hrs)**
M/M/1 - M/M/C - M/M/1/N - M/M/C/N (C<N) - M/M/C/C - M/M/∞ models only - Derivation of mean number of customer in the system - in the queue and waiting time - Simple applications.

Text Books
1. T. Veerarajan, "Probability and Statistics, Random Process and Queuing Theory", McGraw Hill Education, 1st Edition, 2018.
2. P. Sivaramakrishna Das, "Probability and Random Process", Pearson Education, 6th Edition, 2019.
3. M.B.K .Moorthy, K. Subramani. andA. Santha , "Probability & Random Process", Scitech Publication Pvt. Ltd., 7th Edition, 2017.

Reference Books
1. P.Balaji, "Probability and Random Processes", Balaji publishers, 5thEdition, 2018.
2. M. Bhatt and Ravish R. Singh, "Probability and Statistics", McGraw Hill Education, 2nd Edition, 2017.
3. P.Kandasamy, Thilagavathi. K and Gunavathi.K., "Probability Random variable and Random Process", S.Chand&Co. Pvt. Ltd, 2nd Edition, 2015
4. J.Ravichandran, "Probability& Random Process for Engineers", I.K.International Publishing House Pvt. Ltd, 2014
5. J.Medhi, Stochastic Processes, New Age International (P)Ltd.,SecondEdition,1994.

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2. https://www.probabilitycourse.com/
3. https://people.eecs.berkeley.edu/~wlr/126notes.pdf
4. https://www.youtube.com/watch?v=AUth5ws75nk
5. https://www.youtube.com/watch?v=adfi2dHJw4o

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	1	-	-	-	-	-	-	-	-	2	-	-
2	2	1	-	-	-	-	-	-	-	-	-	-	2	-	-
3	3	2	1	1	-	-	-	-	-	-	-	-	2	-	-
4	3	2	1	1	-	1	-	-	-	-	2	-	2	-	1
5	3	2	1	1	-	1	-	-	-	-	2	-	2	-	1

Correlation Level: 1-Low, 2-Medium, 3- High

		L	T	P	C	Hrs
U20ECT407	**ANALOG AND DIGITAL COMMUNICATION SYSTEMS**	3	0	0	3	45

Course Objectives

- To analyze techniques for the generation, transmission and reception of amplitude modulation, frequency modulation and phase modulation signals
- To gain knowledge of various pulse modulation techniques and the corresponding demodulation techniques
- To understand various digitization techniques, generation and reconstruction of PCM, DPCM and DM
- To gain knowledge in various band pass digital transmission
- To analyze the fundamental limits on the error free representation of information signals and the transmission of such signals over a noisy communication channel

Course Outcomes

After completion of the course, the students are able to
CO1 - Understand about fundamentals of Analog communication **(K2)**
CO2 - Explain Pulse modulation techniques **(K2)**
CO3 - Describe all digitalization techniques **(K2)**
CO4 - Explain digital modulation techniques **(K2)**
CO5 - Illustrate error detecting and correcting codes **(K4)**

UNIT- I FUNDAMENTALS OF ANALOG COMMUNICATION SYSTEMS   (9 Hrs)

Introduction to Communication Systems: Modulation – Types - Need for Modulation. Theory of Amplitude Modulation - Evolution and Description of SSB Techniques - Theory of Frequency and Phase Modulation – Comparison of various Analog Communication System (AM – FM – PM)Band Pass Signals and Systems, Band Pass Transmission, Bandwidth, Double Side Band Amplitude Modulation – AM Signals and Spectra, DSB Signals and Spectra, Suppressed Side Band Amplitude Modulation - Single Side Band Signals and Spectra, Single Side Band Generation, Vestigial Side Band Signals and Spectra, Illustrative Problems.

UNIT- II PULSE MODULATION TECHNIQUES   (9 Hrs)

Pulse amplitude modulation – Flat top sampling and Pulse amplitude modulation (PAM), Pulse-Time Modulation – Pulse Duration and Pulse Position modulations, PPM spectral analysis, Illustrative Problems

UNIT- III DIGITIZATION TECHNIQUES   (9 Hrs)

Pulse Code Modulation (PCM) - Generation and Reconstruction, Quantization Noise, Non-Uniform Quantization and Companding, PCM with Noise, Delta modulation, Adaptive Delta Modulation, Differential PCM systems (DPCM), Digital Multiplexing-Multiplexers and Hierarchies

UNIT- IV BAND PASS DIGITAL TRANSMISSION   (9 Hrs)

Quadrature Carrier and M–ary Systems- Quadrature Carrier Systems, M–ary PSK Systems, M–ary QAM Systems, M–ary FSK Systems, BPSK and FSK, Timing and Synchronization, Interference, Non-Coherent Binary Systems, Non-Coherent FSK, Differentially Coherent PSK, Optimum Binary Detection, Coherent ASK (OOK (on-off keying)).

UNIT- V CHANNEL CODING   (9 Hrs)

Error Detection & Correction - Repetition & Parity Check Codes, Interleaving, Code Vectors and Hamming Distance, Forward Error Correction (FEC) Systems, Automatic Retransmission Query (ARQ)Systems, Linear Block Codes – Matrix Representation of Block Codes, Convolutional Codes –Convolutional Encoding, Decoding Methods

Text Books

1. Bruce Carlson, & Paul B. Crilly, "Communication Systems – An Introduction to Signals & Noise in Electrical Communication", McGraw-Hill International Edition, 5th Edition, 2010
2. Simon Haykin, "Communication Systems", Wiley-India edition, 3rd edition, 2010
3. B. P. Lathi and Z. Ding, Modern Digital and Analog Communication Systems, 4th Edition, Oxford University Press, 2011.

Reference Books

1. Sam Shanmugam, "Digital and Analog Communication Systems", John Wiley, 2005
2. J. M. Wozencraft and I. M. Jacobs, Principles of Communication Engineering, Wiley, 1965.
3. J. R. Barry, E. A. Lee, and D. G. Messerschmitt, Digital Communication, 3rd Edition, Springer, 2004.
4. Taub and Schilling , "Principles of Communication Systems", 2nd ed., Mc-Graw Hill
5. V Chandra Sekar – Analog Communication- Oxford University Press

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2.   http://www.ee.iitm.ac.in/~andrew/videolectures/EE419/index.html
3.   https://new.siemens.com/global/en/company/about/history/technology/information-and-communications-technology/telephony.html
4.   https://www.vedantu.com/revision-notes/cbse-class-12-physics-notes-chapter-15-communication-systems
5.   https://learn.careers360.com/physics/communication-systems-chapter/

COs /POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	-	-	-	2	-	-	-	-	-	-	1	3	-	3
2	3	-	-	-	2	-	-	-	-	-	-	1	3	-	3
3	3	-	-	-	2	-	-	-	-	-	-	1	3	-	3
4	3	-	-	-	2	-	-	-	-	-	-	1	3	-	3
5	3	-	-	-	2	-	-	-	-	-	-	1	3	-	3

Correlation Level: 1-Low, 2-Medium, 3- High

	L	T	P	C	Hours
U20ECT408 **LINEAR INTEGRATED CIRCUITS** | | 3 | 0 | 0 | 3 | 45 |

Course Objectives

- Understand the classification of IC and basic building blocks of analog integrated circuits
- To understand the concepts, working principles and key applications of linear integrated circuits
- Design and analyze the linear and non-linear applications of operational amplifiers
- To Illustrate the operating principle of PLL, Data Converters and various special function ICs
- To design circuits and systems for specific applications using linear integrated circuits

Course Outcomes

After completion of the course, the students are able to

CO1 - Explain the internal structure of operational amplifiers and its characteristics. (K2)
CO2 –Demonstrate the applications of operational amplifiers. (K3)
CO3 –Construct the comparator and waveform generators using operational amplifier. (K3)
CO4 - Analyze the principle and operation of PLL and Data converters (K4)
CO5 –Use special function ICs and its application in modern electronic equipment. (K3)

UNIT I OPERATIONAL AMPLIFIER **(9 Hrs)**

Introduction to Integrated Circuits- Classification of ICs - Operational Amplifier: Basic Information of Op-Amp, Ideal Op Amp- Operational Amplifier Internal Circuit- Differential Amplifier – Characteristics of Op-Amp - DC Characteristics, AC Characteristics - Frequency Response- Frequency Compensation -Slew Rate.

UNIT II OPERATIONAL - AMPLIFIER APPLICATIONS **(9 Hrs)**

Closed Loop Op Amp Configuration - Inverting and Non inverting Amplifiers- Inverter- Voltage Follower- Summing Amplifier, Averaging Circuits – Subtractor -Differential Amplifier- Multiplier- Differentiator- Integrator- Instrumentation amplifier, Precision rectifier-log and antilog amplifiers- 1stOrder LPF, HPF and all pass filters.

UNIT III COMPARATORS AND WAVEFORM GENERATORS **(9 Hrs)**

Comparators: Open Loop Op Amp Configuration - Inverting, Non-Inverting Comparator- Applications of Comparator- Regenerative Comparator (Schmitt trigger) - Waveform Generators: Multivibrators -Astable, Monostable - Triangular wave generator- Principles of Sine wave Oscillator- RC Phase Shift,Wien Bridge Oscillator.

UNIT IV PHASE LOCKED LOOP AND DATA CONVERTER **(9 Hrs)**

Block Diagram of PLL- Principles-Types- Phase Detector- Voltage Controlled Oscillator-IC 566 and IC 565 Internal Block Diagram- PLL Applications - Data Converter and Applications- Sample and Hold circuits, D/A Techniques: Binary Weighted Resistor- R-2R and Inverted R-2R, Ladder DAC- A/D converter: Flash - Successive Approximation Converter - Dual Slope ADC.

UNIT V SPECIALIZED ICS **(9 Hrs)**

IC 555 Timer Internal Architecture- Astable and Monostable Multivibrator using 555 Timer - Applications-Voltage regulator ,Fixed and Adjustable Voltage Regulators (Positive and Negative voltage regulators-78XX, 79XX , Adjustable Voltage Regulator LM317, LM340, LM723,) Dual Power supply – Switch Mode Power Supply (LM 1577/LM 2577) - Single power supply for op-Amp

Text Books

1. Sergio Franco, Design with operational amplifiers and analog integrated circuits, McGraw-Hill,2002.
2. Ramakant A.Gayakwad, OP-AMP and Linear IC's , Prentice Hall of India, 2002.
3. D.RoyChoudhry, Shail Jain, Linear Integrated Circuits, New Age International Pvt. Ltd., 2000.

Reference Books

1. William D.Stanely, Operational Amplifiers with Linear Integrated Circuits. Pearson Education, 2004.
2. David L.Terrell,Op Amps-Design, Application, and Troubleshooting, Elsevier publications 2005.
3. S.Salivahanan & V.S. Kanchana Bhaskaran, "Linear Integrated Circuits", Tata McGraw Hill Publications, 2008.
4. B.S.Sonde, "System design using Integrated Circuits" , 2nd Edition, New Age Pub, 2001
5. Robert F.Coughlin, Frederick F.Driscoll, "Operational Amplifiers and Linear Integrated Circuits", Sixth Edition, PHI, 2001.

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3. https://developer.qualcomm.com/download/sd820e/qualcomm-snapdragon-820e-processor-apq8096sge
4. https://electrobian.files.wordpress.com/2016/07/linear-integrated-circuits-notes-arunkumar-pdf-apkart-com.pdf
5. https://learnengineering.in/ec6404-linear-integrated-circuits/

COs / POs / PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	1	1	1	1	-	-	-	-	-	-	-	2	1	-
2	3	1	1	1	1	-	-	-	-	-	-	-	2	1	-
3	3	1	1	1	1	-	-	-	-	-	-	-	2	1	-
4	3	1	1	1	1	-	-	-	-	-	-	-	2	1	-
5	3	1	1	1	1	-	-	-	-	-	-	-	2	1	-

Correlation Level: 1-Low, 2-Medium, 3-High

U20ECP406	**LINEAR INTEGRATED CIRCUITS LABORATORY**	**L**	**T**	**P**	**C**	**Hours**
		0	0	2	1	30

Course Objectives

- To expose the students to linear and integrated circuits
- To understand the basics of linear integrated circuits and available ICs
- To understand characteristics of operational amplifier
- To apply operational amplifiers in linear and nonlinear applications
- To acquire the basic knowledge of special function IC
- To understand the importance of op-amp in various applications like Precision Rectifiers, Filters, and DAC

Course Outcomes

After completion of the course, the students are able to

CO1 - Analyze the various linear and non-linear application of op-amp (K4)

CO2 - Examine and analyze filter circuits using op-amp (K4)

CO3 - Design and analyze oscillators and multivibrator circuits using op-amp (K4)

CO4 - Distinguish the various applications of linear IC's like 741,555 timer and XR2240 (K3)

CO5 - Relate the use of OP- AMP as analog to digital and digital to analog converter. (K3)

LIST OF EXPERIMENTS

1. Applications of Op-amp : To study the application of Op-amp IC741 as
    a. Inverting amplifier
    b. Non-inverting amplifier
    c. Voltage follower
    d. Summer
    e. Subtractor
2. Differentiator and Integrator
    Design the op-amp as differentiator and integrator for various time constants
3. Comparator circuits
    (a) To study zero crossing detector, window detector
    (b) Design Schmitt trigger using op-amp 741
4. Signal converters
    To study operation of op-amp as V to I and I to V converters
5. Active filters using Op-amp
    Design and test the performance of a 2nd order LPF, HPF, BPF and BSF
6. Log, antilog and instrumentation amplifier
    To study (a) logarithmic and antilog amplifiers (b) Instrumentation amplifier
7. Multivibrators using Op-Amp
    To design and study the working of
    (a). Astable Multivibrator and   (b). Monostable Multivibrator using IC 741.
8. Data converters
    Construction and study performance of
    (a). DAC circuits – R-2R and ladder type.
    (b). Successive approximation type ADC.
9. Multivibrators using IC 555
    To design and study the working of
    (a). Astable multivibrator
    (b). Monostable Multivibrator using IC 555.
10. Frequency synthesizers
    To study performance of
    (a). Frequency multiplier using PLL IC 565
    (b). Frequency synthesizer using IC XR2240
11. Precision rectifiers - To study performance of half wave and full wave precision rectifiers using IC 741.
12. Fixed Voltage regulator (Using 78XX,79XX) ,Adjustable Voltage regulator (using LM317) and switched voltage regulator (using LM 1577 / LM 2577)

Reference Books

1. William D.Stanely, Operational Amplifiers with Linear Integrated Circuits. Pearson Education, 2004.
2. David L.Terrell,Op Amps-Design, Application, and Troubleshooting, Elsevier publications 2005.
3. S.Salivahanan & V.S. Kanchana Bhaskaran, "Linear Integrated Circuits", Tata McGraw Hill, 2008.
4. B.S.Sonde, "System design using Integrated Circuits" , 2nd Edition, New Age Pub, 2001
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2. https://www.intel.in/content/www/in/en/history/museum-making-silicon.html
3. https://developer.qualcomm.com/download/sd820e/qualcomm-snapdragon-820e-processor-apq8096sge
4. https://electrobian.files.wordpress.com/2016/07/linear-integrated-circuits-notes-arunkumar-pdf-apkart-com.pdf
5. https://learnengineering.in/ec6404-linear-integrated-circuits/

COs / POs / PSOs Mapping

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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2	3	2	2	-	2	-	-	-	1	-	-	-	3	-	-
3	3	2	2	-	2	-	-	-	1	-	-	-	3	-	-
4	3	2	2	-	2	-	-	-	1	-	-	-	3	-	-
5	3	2	2	-	2	-	-	-	1	-	-	-	3	-	-

Correlation Level: 1-Low, 2-Medium, 3-High

SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
(An Autonomous Institution)
Puducherry
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

1.   Professional Electives offered in Semester – IV

S.No	Course Code / Course Name	Number of Students registered
1	Computer Networks (U19ECE41)	60
2	Sensors for Industrial Applications (U19ECE42)	60
3	Computer Architecture (U19ECE43)	35
4	PLC and SCADA Systems and its Applications (U19ECE44)	57
	Total Number of Students	**212**

2.   Open Electives Offered in Semester – IV by Other Departments

Offering Department	Course Code / Course Name	Number of Students registered
IT	U19ITO42 : R programming	30
CSE	U19CSO41 : Web Development	60
CSE	U19CSO43 : Programming in JAVA	50
CCE	U19CCO41 : Basic DBMS	72
	Total Number of Students	**212**

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE
(An Autonomous Institution)
(Approved by AICTE, New Delhi & Affiliated to Pondicherry University)
(Accredited by NBA-AICTE, New Delhi, ISO 9001:2000 Certified Institution &
Accredited by NAAC with "A" Grade)
Madagadipet, Puducherry - 605 107

Year / Semester: II / IV　　　　　　　　　　　　　　　　Batch: 2019-23

Course Name: Computer Networks　　　　Course Code: U19ECE41　　Elective: Professional

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9	19TC0085	Divyabharathi U	B	btechece190510@smvec.ac.in
10	19TC0087	Erick Jeffery.N	A	btechece190027@smvec.ac.in
11	19TC0090	Gayathri. S	B	btechece190816@smvec.ac.in
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13	19TC0101	Harshavardhni. A	A	btechece190443@smvec.ac.in
14	19TC0105	Hiran Lal. A	B	btechece190131@smvec.ac.in
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16	19TC0107	Indhuja. M	B	btechece191207@smvec.ac.in
17	19TC0110	Janaki.S	C	btechece190634@smvec.ac.in
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35	19TC0160	Pradikksha. S	A	btechece190410@smvec.ac.in
36	19TC0166	Premalatha. S	B	btechece191035@smvec.ac.in
37	19TC0171	Rajesh.J	B	btechece191036@smvec.ac.in
38	19TC0175	Ramya .T	C	btechece190647@smvec.ac.in
39	19TC0178	Roshan Solomon .A	C	btechece190557@smvec.ac.in
40	19TC0179	Sandhiya V	C	btechece190701@smvec.ac.in
41	19TC0182	Sankavi.S	A	btechece190923@smvec.ac.in
42	19TC0183	Santhiya. S	C	btechece190494@smvec.ac.in
43	19TC0184	Santhiya.V	C	btechece191016@smvec.ac.in
44	19TC0195	Sermalakshmi.P	C	btechece191040@smvec.ac.in
45	19TC0201	Sivaraj .T	C	btechece190507@smvec.ac.in
46	19TC0203	Snega .R	C	btechece190732@smvec.ac.in
47	19TC0206	Soundarya S	B	btechece190084@smvec.ac.in
48	19TC0208	Sowmmiya. E	A	btechece190767@smvec.ac.in
49	19TC0227	Suvetha. S	A	btechece190504@smvec.ac.in
50	19TC0228	Suvetha Ve	B	btechece190930@smvec.ac.in
51	19TC0233	Thanush. M	A	btechece190790@smvec.ac.in
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55	19TC0241	Velmurugan.P	C	btechece190638@smvec.ac.in
56	19TC0242	Venisri T	B	btechece190492@smvec.ac.in
57	19TC0245	Vigneshwarar.V	C	btechece191179@smvec.ac.in
58	19TC0247	Vijayalakshmy .R	B	btechece191018@smvec.ac.in
59	19TE0116	Nivetha.S	B	btechece190456@smvec.ac.in
60	19TI0007	Gautham Venkatesh	B	btechece190017@smvec.ac.in

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Madagadipet, Puducherry - 605 107

Year / Semester: II / IV   Batch: 2019-23

Course Name: Sensors for Industrial Applications Course Code: U19ECE42 Elective : Professional

S.No	Regn.No.	Name of the Student	Section	Email ID
1	19TC0053	Aishwarya.L.S	C	btechece190522@smvec.ac.in
2	19TC0056	Ajaydev.C.R	C	btechece190762@smvec.ac.in
3	19TC0057	Akshaya S	A	btechece190548@smvec.ac.in
4	19TC0058	Akshaya. I	B	btechece190394@smvec.ac.in
5	19TC0063	Anantapadmanaban R	B	btechece190562@smvec.ac.in
6	19TC0067	Arunprasanth S	B	btechece190535@smvec.ac.in
7	19TC0070	Azeess Basha G	A	btechece190590@smvec.ac.in
8	19TC0072	Balamurugan. V	A	btechece190831@smvec.ac.in
9	19TC0076	Chandranath.G	C	btechece191224@smvec.ac.in
10	19TC0078	Deepika. S	A	btechece190309@smvec.ac.in
11	19TC0082	Dharani. A	B	btechece190082@smvec.ac.in
12	19TC0089	Fleming Roland. P	A	btechece190435@smvec.ac.in
13	19TC0094	Gokul. A	A	btechece190194@smvec.ac.in
14	19TC0095	Gokulakrishnan. K.S.	B	btechece190148@smvec.ac.in
15	19TC0097	Goventhan. M	A	btechece190955@smvec.ac.in
16	19TC0102	Hemabala. R	C	btechece190837@smvec.ac.in
17	19TC0103	Hemamalini S	B	btechece190465@smvec.ac.in
18	19TC0108	Ishwar. V	A	btechece190890@smvec.ac.in
19	19TC0111	Janani. M	B	btechece190979@smvec.ac.in
20	19TC0115	Jeevan Sanjay. S	A	btechece190824@smvec.ac.in
21	19TC0120	Kavin. S	A	btechece190391@smvec.ac.in
22	19TC0122	Keerthivasan.V	B	btechece190910@smvec.ac.in
23	19TC0126	Kiruthivaas.E	B	btechece190985@smvec.ac.in
24	19TC0129	Kugan A	C	btechece190583@smvec.ac.in
25	19TC0132	Lokkeswaran.P	B	btechece190948@smvec.ac.in
26	19TC0133	Madhumitha M	A	btechece190681@smvec.ac.in
27	19TC0135	Manibharathi.R	C	btechece190958@smvec.ac.in
28	19TC0143	Mohamed Faisal B	A	btechece190511@smvec.ac.in
29	19TC0147	Nachellai.I	C	btechece190428@smvec.ac.in
30	19TC0149	Nandhidha. R	A	btechece190859@smvec.ac.in
31	19TC0154	Naveen Chander. P	A	btechece190945@smvec.ac.in

32	19TC0156	Naveen. M	B	btechece190792@smvec.ac.in
33	19TC0164	Praveena. P	C	btechece190568@smvec.ac.in
34	19TC0167	Priyadharshini V	B	btechece190717@smvec.ac.in
35	19TC0170	Ragnal Kevin Jerome. A	C	btechece190553@smvec.ac.in
36	19TC0172	Rajesh.P	C	btechece190946@smvec.ac.in
37	19TC0176	Ranjith. S	B	btechece190377@smvec.ac.in
38	19TC0177	Riyaz Ahamad. S	A	btechece190167@smvec.ac.in
39	19TC0180	Sanjay. C	A	btechece190921@smvec.ac.in
40	19TC0186	Saran.A	A	btechece190953@smvec.ac.in
41	19TC0188	Sargunal A	B	btechece190656@smvec.ac.in
42	19TC0192	Saumya.V	A	btechece190303@smvec.ac.in
43	19TC0198	Shrutii. E	C	btechece190527@smvec.ac.in
44	19TC0204	Sneha.K	A	btechece190900@smvec.ac.in
45	19TC0210	Srinivas. V	C	btechece190276@smvec.ac.in
46	19TC0211	Sri Ram. R	A	btechece190339@smvec.ac.in
47	19TC0212	Srivatsan G	A	btechece190515@smvec.ac.in
48	19TC0213	Stephen Jebakumar.S	C	btechece190802@smvec.ac.in
49	19TC0216	Subiksha S	C	btechece190715@smvec.ac.in
50	19TC0219	Sundar Ganesh .N	C	btechece190617@smvec.ac.in
51	19TC0234	Thatchitha. K	A	btechece191189@smvec.ac.in
52	19TC0240	Vasunthra. A	B	btechece190188@smvec.ac.in
53	19TC0246	Vijay.B	C	btechece191220@smvec.ac.in
54	19TC0250	Yamini Krishna.G	C	btechece190065@smvec.ac.in
55	19TC0253	Yokesh.S	C	btechece191216@smvec.ac.in
56	19TC0254	Yuvalatchumi.S	C	btechece190440@smvec.ac.in
57	19TCL002	Elangkavi.K	C	btechece20098133@smvec.ac.in
58	19TCL004	Prasanth.K.N	A	btechece20098044@smvec.ac.in
59	19TCL005	Saranraj.M	A	btechece20098234@smvec.ac.in
60	19TCL006	Saravanan.P	C	btechece20098122@smvec.ac.in

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Madagadipet, Puducherry - 605 107

Year / Semester: II / IV   Batch: 2019-23
Course Name: Computer Architecture Course Code: U19ECE43   Elective : Professional

S.No	Regn.No.	Name of the Student	Section	Email ID
1	19TA0031	Vijay.R	B	btechece190152@smvec.ac.in
2	19TC0051	Aakash.A	A	btechece191004@smvec.ac.in
3	19TC0052	Agarvin.B	C	btechece190716@smvec.ac.in
4	19TC0065	Arivoomathi. P	B	btechece191213@smvec.ac.in
5	19TC0068	Aswin.Z	C	btechece190610@smvec.ac.in
6	19TC0071	Balabharathi.V	C	btechece190849@smvec.ac.in
7	19TC0079	Devavasanth R	A	btechece190719@smvec.ac.in
8	19TC0086	Easwarakumar. K	A	btechece190821@smvec.ac.in
9	19TC0088	Eswara Pandian. S	A	btechece190838@smvec.ac.in
10	19TC0099	Harikaran. U	B	btechece191219@smvec.ac.in
11	19TC0112	Jayavignesh S	A	btechece190509@smvec.ac.in
12	19TC0125	Kirthana. A	B	btechece191209@smvec.ac.in
13	19TC0127	Krishnan.G	C	btechece190793@smvec.ac.in
14	19TC0134	Maithili .S	C	btechece190702@smvec.ac.in
15	19TC0146	Muthukumaran. A	A	btechece190842@smvec.ac.in
16	19TC0152	Naresh Kumar. M	A	btechece190863@smvec.ac.in
17	19TC0153	Nasser Hussain. J	A	btechece191008@smvec.ac.in
18	19TC0155	Naveen .P	C	btechece190665@smvec.ac.in
19	19TC0162	Prasannavasan. V	B	btechece190559@smvec.ac.in
20	19TC0168	Ragaventra.R	A	btechece190951@smvec.ac.in
21	19TC0173	Rajeshvaran N	A	btechece190482@smvec.ac.in
22	19TC0181	Sanjay N	A	btechece190491@smvec.ac.in
23	19TC0185	Sarah. S	B	btechece191245@smvec.ac.in
24	19TC0196	Shakila. T	A	btechece191021@smvec.ac.in
25	19TC0199	Shurekha. S	B	btechece190772@smvec.ac.in
26	19TC0202	Sivasankaran. M	A	btechece190731@smvec.ac.in
27	19TC0205	Somnath. S	C	btechece191232@smvec.ac.in
28	19TC0217	Sudhakar.S	C	btechece191115@smvec.ac.in
29	19TC0225	Surya Raja. S	A	btechece190783@smvec.ac.in
30	19TC0229	Swedha. J	B	btechece190448@smvec.ac.in
31	19TC0231	Swetha.R	C	btechece190845@smvec.ac.in
32	19TC0239	Vanmuhil.B	A	btechece190822@smvec.ac.in
33	19TC0243	Venkattheeban.V	A	btechece191106@smvec.ac.in
34	19TC0244	Vigneshvar. V	B	btechece190056@smvec.ac.in
35	19TCL003	Kaviyarasan. S	C	btechece20098542@smvec.ac.in

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Year / Semester: II / IV   Batch: 2019-23

Course Name: PLC and SCADA Systems and its Applications   Course Code: U19ECE44

S.No	Regn.No.	Name of the Student	Section	Email ID
1	19TC0054	Aishwin. M	B	btechece190811@smvec.ac.in
2	19TC0055	Ajay Ganesh. J	A	btechece190447@smvec.ac.in
3	19TC0062	Anandavel .V	C	btechece191009@smvec.ac.in
4	19TC0064	Anusree Manoj	A	btechece190636@smvec.ac.in
5	19TC0069	Aswin. S	A	btechece191097@smvec.ac.in
6	19TC0073	Balavinayaga. S	B	btechece190723@smvec.ac.in
7	19TC0074	Balla Veera Venkata Durga Prasad	C	btechece190771@smvec.ac.in
8	19TC0077	Charulatha. M	A	btechece190409@smvec.ac.in
9	19TC0083	Dharanidar.S	C	btechece190524@smvec.ac.in
10	19TC0091	Gayathry R	A	btechece190739@smvec.ac.in
11	19TC0092	Gogulakrishnan.P	A	btechece190828@smvec.ac.in
12	19TC0093	Gokul Krishnan. S	B	btechece190990@smvec.ac.in
13	19TC0096	Gopinath.M	C	btechece190289@smvec.ac.in
14	19TC0098	Hari Krishnan.V	C	btechece191173@smvec.ac.in
15	19TC0104	Hera.V	C	btechece190726@smvec.ac.in
16	19TC0109	Jagadeesan.A	C	btechece191208@smvec.ac.in
17	19TC0113	Jayapreethi K	A	btechece190475@smvec.ac.in
18	19TC0116	Kailash.V	C	btechece191246@smvec.ac.in
19	19TC0123	Kesavavarathan.K	C	btechece190984@smvec.ac.in
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21	19TC0130	Logesh.R	B	btechece190927@smvec.ac.in
22	19TC0136	Manikandan. D	A	btechece190437@smvec.ac.in
23	19TC0139	Manoj Lara.C	C	btechece191195@smvec.ac.in
24	19TC0140	Maria Jenifer E	B	btechece190098@smvec.ac.in
25	19TC0144	Mohanprasath. R	B	btechece190949@smvec.ac.in
26	19TC0158	Pampana Venkata Nikhil	B	btechece190720@smvec.ac.in
27	19TC0161	Prakash.V	C	btechece190473@smvec.ac.in
28	19TC0163	Prathela. T	A	btechece191166@smvec.ac.in
29	19TC0165	Pravin Kumaar.C	C	btechece190045@smvec.ac.in

30	19TC0169	Raghul A	B	btechece190469@smvec.ac.in
31	19TC0174	Ramanathan. M	B	btechece190905@smvec.ac.in
32	19TC0187	Sarath Chandiran S	B	btechece190554@smvec.ac.in
33	19TC0189	Saritha.G	C	btechece190347@smvec.ac.in
34	19TC0190	Sashanka Naga Sai Sunkara	C	btechece190388@smvec.ac.in
35	19TC0191	Sathya Moorthy. J	B	btechece190336@smvec.ac.in
36	19TC0193	Sedhuraman. S	A	btechece190573@smvec.ac.in
37	19TC0194	Seran. P	B	btechece190189@smvec.ac.in
38	19TC0197	Sharmila .M	C	btechece190760@smvec.ac.in
39	19TC0200	Sivanesan.B	C	btechece190864@smvec.ac.in
40	19TC0207	Sowmiya M	B	btechece190614@smvec.ac.in
41	19TC0209	Srikkaanth. D	B	btechece191170@smvec.ac.in
42	19TC0214	Subathra. V	B	btechece190904@smvec.ac.in
43	19TC0215	Subhiksha. R	A	btechece190033@smvec.ac.in
44	19TC0218	Sumanth. G.V.	B	btechece190975@smvec.ac.in
45	19TC0220	Sunnivas. K	B	btechece190981@smvec.ac.in
46	19TC0222	Suraj.V	C	btechece190686@smvec.ac.in
47	19TC0223	Surender. V	C	btechece190991@smvec.ac.in
48	19TC0224	Surjiith. S	B	btechece190766@smvec.ac.in
49	19TC0226	Suryakumar.S	C	btechece190355@smvec.ac.in
50	19TC0230	Swetha.A	C	btechece191060@smvec.ac.in
51	19TC0232	Thamizh Chemmal. S	A	btechece191181@smvec.ac.in
52	19TC0238	Vaasan C	A	btechece190233@smvec.ac.in
53	19TC0248	Vineeth.R	C	btechece190851@smvec.ac.in
54	19TC0249	Vishwaa. M	C	btechece190631@smvec.ac.in
55	19TC0251	Yogesh Krushna. R	A	btechece191172@smvec.ac.in
56	19TC0252	Yogi Ram Kumar. M.S.	B	btechece190417@smvec.ac.in
57	19TCL001	Aravind.G	B	btechece20098246@smvec.ac.in

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Year / Semester: II / IV   Batch: 2019-23

Course Name: R programming   Course Code: U19ITO42   Open Elective

S.No	Regn.No.	Name of the Student	Section	Email ID
1	19TC0055	Ajay Ganesh. J	A	btechece190447@smvec.ac.in
2	19TC0056	Ajaydev.C.R	C	btechece190762@smvec.ac.in
3	19TC0067	Arunprasanth S	B	btechece190535@smvec.ac.in
4	19TC0070	Azeess Basha G	A	btechece190590@smvec.ac.in
5	19TC0093	Gokul Krishnan. S	B	btechece190990@smvec.ac.in
6	19TC0098	Hari Krishnan.V	C	btechece191173@smvec.ac.in
7	19TC0109	Jagadeesan.A	C	btechece191208@smvec.ac.in
8	19TC0116	Kailash.V	C	btechece191246@smvec.ac.in
9	19TC0126	Kiruthivaas.E	B	btechece190985@smvec.ac.in
10	19TC0130	Logesh.R	B	btechece190927@smvec.ac.in
11	19TC0134	Maithili .S	C	btechece190702@smvec.ac.in
12	19TC0138	Manju S	B	btechece190703@smvec.ac.in
13	19TC0141	Meharaj. C	C	btechece190560@smvec.ac.in
14	19TC0161	Prakash.V	C	btechece190473@smvec.ac.in
15	19TC0162	Prasannavasan. V	A	btechece190559@smvec.ac.in
16	19TC0181	Sanjay N	A	btechece190491@smvec.ac.in
17	19TC0182	Sankavi.S	A	btechece190923@smvec.ac.in
18	19TC0187	Sarath Chandiran S	B	btechece190554@smvec.ac.in
19	19TC0191	Sathya Moorthy. J	B	btechece190336@smvec.ac.in
20	19TC0193	Sedhuraman. S	A	btechece190573@smvec.ac.in
21	19TC0197	Sharmila .M	C	btechece190760@smvec.ac.in
22	19TC0204	Sneha.K	A	btechece190900@smvec.ac.in
23	19TC0209	Srikkaanth. D	B	btechece191170@smvec.ac.in
24	19TC0212	Srivatsan G	A	btechece190515@smvec.ac.in
25	19TC0213	Stephen Jebakumar.S	C	btechece190802@smvec.ac.in
26	19TC0217	Sudhakar.S	C	btechece191115@smvec.ac.in
27	19TC0218	Sumanth. G.V.	B	btechece190975@smvec.ac.in
28	19TC0228	Suvetha Ve	B	btechece190930@smvec.ac.in
29	19TC0249	Vishwaa. M	C	btechece190631@smvec.ac.in
30	19TC0252	Yogi Ram Kumar. M.S.	B	btechece190417@smvec.ac.in

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Year / Semester: II / IV   Batch: 2019-23
Course Name: Web Development   Course Code: U19CSO41   Open Elective

S.No	Regn.No.	Name of the Student	Section	Email ID
1	19TC0053	Aishwarya.L.S	C	btechece190522@smvec.ac.in
2	19TC0054	Aishwin. M	B	btechece190811@smvec.ac.in
3	19TC0057	Akshaya S	A	btechece190548@smvec.ac.in
4	19TC0060	Alex Xavier	A	btechece191105@smvec.ac.in
5	19TC0062	Anandavel .V	C	btechece191009@smvec.ac.in
6	19TC0078	Deepika. S	A	btechece190309@smvec.ac.in
7	19TC0087	Erick Jeffery.N	A	btechece190027@smvec.ac.in
8	19TC0095	Gokulakrishnan. K.S.	B	btechece190148@smvec.ac.in
9	19TC0096	Gopinath.M	C	btechece190289@smvec.ac.in
10	19TC0097	Goventhan. M	A	btechece190955@smvec.ac.in
11	19TC0104	Hera.V	C	btechece190726@smvec.ac.in
12	19TC0105	Hiran Lal. A	B	btechece190131@smvec.ac.in
13	19TC0106	Humaira. C	B	btechece190516@smvec.ac.in
14	19TC0110	Janaki.S	C	btechece190634@smvec.ac.in
15	19TC0117	Kamalraj.A	B	btechece190630@smvec.ac.in
16	19TC0118	Kaniya Kayathri V	A	btechece191017@smvec.ac.in
17	19TC0119	Karthikcharan. D	B	btechece190343@smvec.ac.in
18	19TC0122	Keerthivasan.V	B	btechece190910@smvec.ac.in
19	19TC0124	Kirithiga. V	B	btechece190785@smvec.ac.in
20	19TC0129	Kugan A	C	btechece190583@smvec.ac.in
21	19TC0131	Logeshprassanna.R	B	btechece191034@smvec.ac.in
22	19TC0132	Lokkeswaran.P	B	btechece190948@smvec.ac.in
23	19TC0135	Manibharathi.R	C	btechece190958@smvec.ac.in
24	19TC0137	Manivannan. P	A	btechece190038@smvec.ac.in
25	19TC0139	Manoj Lara.C	C	btechece191195@smvec.ac.in
26	19TC0140	Maria Jenifer E	B	btechece190098@smvec.ac.in
27	19TC0142	Michael Antony .M	C	btechece190576@smvec.ac.in
28	19TC0145	Muhammad Aadhil.M	B	btechece190378@smvec.ac.in
29	19TC0146	Muthukumaran. A	A	btechece190842@smvec.ac.in
30	19TC0148	Nadaesh. D	A	btechece190799@smvec.ac.in
31	19TC0149	Nandhidha. R	A	btechece190859@smvec.ac.in

32	19TC0153	Nasser Hussain. J	A	btechece191008@smvec.ac.in
33	19TC0157	Nivethitha. D	B	btechece190745@smvec.ac.in
34	19TC0159	Piradeep.R	B	btechece190970@smvec.ac.in
35	19TC0160	Pradikksha. S	A	btechece190410@smvec.ac.in
36	19TC0164	Praveena. P	C	btechece190568@smvec.ac.in
37	19TC0165	Pravin Kumaar.C	C	btechece190045@smvec.ac.in
38	19TC0167	Priyadharshini V	B	btechece190717@smvec.ac.in
39	19TC0171	Rajesh.J	B	btechece191036@smvec.ac.in
40	19TC0172	Rajesh.P	C	btechece190946@smvec.ac.in
41	19TC0178	Roshan Solomon .A	C	btechece190557@smvec.ac.in
42	19TC0183	Santhiya. S	C	btechece190494@smvec.ac.in
43	19TC0185	Sarah. S	B	btechece191245@smvec.ac.in
44	19TC0186	Saran.A	A	btechece190953@smvec.ac.in
45	19TC0192	Saumya.V	C	btechece190303@smvec.ac.in
46	19TC0200	Sivanesan.B	C	btechece190864@smvec.ac.in
47	19TC0206	Soundarya S	B	btechece190084@smvec.ac.in
48	19TC0214	Subathra. V	B	btechece190904@smvec.ac.in
49	19TC0215	Subhiksha. R	A	btechece190033@smvec.ac.in
50	19TC0219	Sundar Ganesh .N	C	btechece190617@smvec.ac.in
51	19TC0223	Surender. V	C	btechece190991@smvec.ac.in
52	19TC0224	Surjiith. S	B	btechece190766@smvec.ac.in
53	19TC0227	Suvetha. S	B	btechece190504@smvec.ac.in
54	19TC0232	Thamizh Chemmal. S	A	btechece191181@smvec.ac.in
55	19TC0233	Thanush. M	A	btechece190790@smvec.ac.in
56	19TC0235	Thirukumaran. M	B	btechece190287@smvec.ac.in
57	19TC0236	Thirumurugan.T	C	btechece190302@smvec.ac.in
58	19TC0241	Velmurugan.P	C	btechece190638@smvec.ac.in
59	19TC0245	Vigneshwarar.V	C	btechece191179@smvec.ac.in
60	19TC0254	Yuvalatchumi.S	C	btechece190440@smvec.ac.in

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

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Accredited by NAAC with "A" Grade)
Madagadipet, Puducherry - 605 107

Year / Semester: II / IV   Batch: 2019-23
Course Name: Programming in JAVA   Course Code: U19CSO43   Open Elective

S.No	Regn.No.	Name of the Student	Section	Email ID
1	19TC0052	Agarvin.B	C	btechece190716@smvec.ac.in
2	19TC0059	Alagamma.V	C	btechece190705@smvec.ac.in
3	19TC0063	Anantapadmanaban R	B	btechece190562@smvec.ac.in
4	19TC0064	Anusree Manoj	A	btechece190636@smvec.ac.in
5	19TC0071	Balabharathi.V	C	btechece190849@smvec.ac.in
6	19TC0073	Balavinayaga. S	B	btechece190723@smvec.ac.in
7	19TC0074	Balla Veera Venkata Durga Prasad	C	btechece190771@smvec.ac.in
8	19TC0083	Dharanidar.S	C	btechece190524@smvec.ac.in
9	19TC0084	Dhevipriyanka. S	A	btechece190299@smvec.ac.in
10	19TC0088	Eswara Pandian. S	A	btechece190838@smvec.ac.in
11	19TC0089	Fleming Roland. P	A	btechece190435@smvec.ac.in
12	19TC0094	Gokul. A	A	btechece190194@smvec.ac.in
13	19TC0099	Harikaran. U	B	btechece191219@smvec.ac.in
14	19TC0101	Harshavardhni. A	A	btechece190443@smvec.ac.in
15	19TC0102	Hemabala. R	C	btechece190837@smvec.ac.in
16	19TC0103	Hemamalini S	B	btechece190465@smvec.ac.in
17	19TC0111	Janani. M	B	btechece190979@smvec.ac.in
18	19TC0113	Jayapreethi K	A	btechece190475@smvec.ac.in
19	19TC0114	Jeevabharathi. T	A	btechece191184@smvec.ac.in
20	19TC0115	Jeevan Sanjay. S	A	btechece190824@smvec.ac.in
21	19TC0121	Kaviya.M	A	btechece191199@smvec.ac.in
22	19TC0123	Kesavavarathan.K	C	btechece190984@smvec.ac.in
23	19TC0128	Krishna Priya.K	A	btechece190680@smvec.ac.in
24	19TC0136	Manikandan. D	A	btechece190437@smvec.ac.in
25	19TC0143	Mohamed Faisal B	A	btechece190511@smvec.ac.in
26	19TC0147	Nachellai.I	C	btechece190428@smvec.ac.in
27	19TC0151	Narmadha. S	A	btechece190446@smvec.ac.in
28	19TC0154	Naveen Chander. P	A	btechece190945@smvec.ac.in
29	19TC0158	Pampana Venkata Nikhil	B	btechece190720@smvec.ac.in
30	19TC0169	Raghul A	B	btechece190469@smvec.ac.in

31	19TC0174	Ramanathan. M	B	btechece190905@smvec.ac.in
32	19TC0177	Riyaz Ahamad. S	A	btechece190167@smvec.ac.in
33	19TC0179	Sandhiya V	C	btechece190701@smvec.ac.in
34	19TC0184	Santhiya.V	C	btechece191016@smvec.ac.in
35	19TC0190	Sashanka Naga Sai Sunkara	C	btechece190388@smvec.ac.in
36	19TC0195	Sermalakshmi.P	C	btechece191040@smvec.ac.in
37	19TC0201	Sivaraj .T	C	btechece190507@smvec.ac.in
38	19TC0203	Snega .R	C	btechece190732@smvec.ac.in
39	19TC0207	Sowmiya M	B	btechece190614@smvec.ac.in
40	19TC0220	Sunnivas. K	B	btechece190981@smvec.ac.in
41	19TC0226	Suryakumar.S	C	btechece190355@smvec.ac.in
42	19TC0231	Swetha.R	C	btechece190845@smvec.ac.in
43	19TC0242	Venisri T	B	btechece190492@smvec.ac.in
44	19TC0244	Vigneshvar. V	B	btechece190056@smvec.ac.in
45	19TC0247	Vijayalakshmy .R	B	btechece191018@smvec.ac.in
46	19TC0253	Yokesh.S	C	btechece191216@smvec.ac.in
47	19TCL002	Elangkavi.K	C	btechece20098133@smvec.ac.in
48	19TCL004	Prasanth.K.N	A	btechece20098044@smvec.ac.in
49	19TCL005	Saranraj.M	A	btechece20098234@smvec.ac.in
50	19TCL006	Saravanan.P	C	btechece20098122@smvec.ac.in

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Accredited by NAAC with "A" Grade)

Madagadipet, Puducherry - 605 107

Year / Semester: II / IV   Batch: 2019-23

Course Name: Basic DBMS   Course Code: U19CCO41   Open Elective

S.No	Regn.No.	Name of the Student	Section	Email ID
1	19TA0031	Vijay.R	B	btechece190152@smvec.ac.in
2	19TC0051	Aakash.A	A	btechece191004@smvec.ac.in
3	19TC0058	Akshaya. I	B	btechece190394@smvec.ac.in
4	19TC0061	Anandkumar C	B	btechece190694@smvec.ac.in
5	19TC0065	Arivoomathi. P	B	btechece191213@smvec.ac.in
6	19TC0066	Arunkumar.N	B	btechece191012@smvec.ac.in
7	19TC0068	Aswin.Z	C	btechece190610@smvec.ac.in
8	19TC0069	Aswin. S	A	btechece191097@smvec.ac.in
9	19TC0072	Balamurugan. V	A	btechece190831@smvec.ac.in
10	19TC0075	Bangayar Selvi.N.G	C	btechece190325@smvec.ac.in
11	19TC0076	Chandranath.G	C	btechece191224@smvec.ac.in
12	19TC0077	Charulatha. M	A	btechece190409@smvec.ac.in
13	19TC0079	Devavasanth R	A	btechece190719@smvec.ac.in
14	19TC0080	Dhanraj. S	B	btechece190422@smvec.ac.in
15	19TC0081	Dhanush Jawahar Magee .M	A	btechece190718@smvec.ac.in
16	19TC0082	Dharani. A	A	btechece190082@smvec.ac.in
17	19TC0085	Divyabharathi U	B	btechece190510@smvec.ac.in
18	19TC0086	Easwarakumar. K	A	btechece190821@smvec.ac.in
19	19TC0090	Gayathri. S	B	btechece190816@smvec.ac.in
20	19TC0091	Gayathry R	A	btechece190739@smvec.ac.in
21	19TC0092	Gogulakrishnan.P	A	btechece190828@smvec.ac.in
22	19TC0100	Harini. K	B	btechece190846@smvec.ac.in
23	19TC0107	Indhuja. M	B	btechece191207@smvec.ac.in
24	19TC0108	Ishwar. V	A	btechece190890@smvec.ac.in
25	19TC0112	Jayavignesh S	A	btechece190509@smvec.ac.in
26	19TC0120	Kavin. S	A	btechece190391@smvec.ac.in
27	19TC0125	Kirthana. A	B	btechece191209@smvec.ac.in
28	19TC0127	Krishnan.G	C	btechece190793@smvec.ac.in
29	19TC0133	Madhumitha M	A	btechece190681@smvec.ac.in
30	19TC0144	Mohanprasath. R	B	btechece190949@smvec.ac.in
31	19TC0150	Nandhini. P	B	btechece190588@smvec.ac.in
32	19TC0152	Naresh Kumar. M	A	btechece190863@smvec.ac.in
33	19TC0155	Naveen .P	C	btechece190665@smvec.ac.in

34	19TC0156	Naveen. M	B	btechece190792@smvec.ac.in
35	19TC0163	Prathela. T	A	btechece191166@smvec.ac.in
36	19TC0166	Premalatha. S	B	btechece191035@smvec.ac.in
37	19TC0168	Ragaventra.R	A	btechece190951@smvec.ac.in
38	19TC0170	Ragnal Kevin Jerome. A	C	btechece190553@smvec.ac.in
39	19TC0173	Rajeshvaran N	A	btechece190482@smvec.ac.in
40	19TC0175	Ramya .T	C	btechece190647@smvec.ac.in
41	19TC0176	Ranjith. S	B	btechece190377@smvec.ac.in
42	19TC0180	Sanjay. C	A	btechece190921@smvec.ac.in
43	19TC0188	Sargunal A	B	btechece190656@smvec.ac.in
44	19TC0189	Saritha.G	C	btechece190347@smvec.ac.in
45	19TC0194	Seran. P	B	btechece190189@smvec.ac.in
46	19TC0196	Shakila. T	A	btechece191021@smvec.ac.in
47	19TC0198	Shrutii. E	C	btechece190527@smvec.ac.in
48	19TC0199	Shurekha. S	B	btechece190772@smvec.ac.in
49	19TC0202	Sivasankaran. M	A	btechece190731@smvec.ac.in
50	19TC0205	Somnath. S	C	btechece191232@smvec.ac.in
51	19TC0208	Sowmmiya. E	A	btechece190767@smvec.ac.in
52	19TC0210	Srinivas. V	A	btechece190276@smvec.ac.in
53	19TC0211	Sri Ram. R	A	btechece190339@smvec.ac.in
54	19TC0216	Subiksha S	C	btechece190715@smvec.ac.in
55	19TC0222	Suraj.V	C	btechece190686@smvec.ac.in
56	19TC0225	Surya Raja. S	A	btechece190783@smvec.ac.in
57	19TC0229	Swedha. J	B	btechece190448@smvec.ac.in
58	19TC0230	Swetha.A	C	btechece191060@smvec.ac.in
59	19TC0234	Thatchitha. K	A	btechece191189@smvec.ac.in
60	19TC0237	Thiruvikraman.V	C	btechece190997@smvec.ac.in
61	19TC0238	Vaasan C	A	btechece190233@smvec.ac.in
62	19TC0239	Vanmuhil.B	C	btechece190822@smvec.ac.in
63	19TC0240	Vasunthra. A	B	btechece190188@smvec.ac.in
64	19TC0243	Venkattheeban.V	A	btechece191106@smvec.ac.in
65	19TC0246	Vijay.B	C	btechece191220@smvec.ac.in
66	19TC0248	Vineeth.R	C	btechece190851@smvec.ac.in
67	19TC0250	Yamini Krishna.G	C	btechece190065@smvec.ac.in
68	19TC0251	Yogesh Krushna. R	A	btechece191172@smvec.ac.in
69	19TE0116	Nivetha.S	B	btechece190456@smvec.ac.in
70	19TI0007	Gautham Venkatesh	B	btechece190017@smvec.ac.in
71	19TCL001	Aravind.G	B	btechece20098246@smvec.ac.in
72	19TCL003	Kaviyarasan. S	C	btechece20098542@smvec.ac.in

SRI MANAKULA VINAYAGAR

ENGINEERING COLLEGE

(An Autonomous Institution)

Puducherry

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Student Admission for the Academic Year 2020- 21

The details of the students admitted for the programme B.Tech – Electronics and Communication Engineering in the academic year 2020-21

Category	Number of students admitted
CETPEC (Management Quota)	87
CENTAC (Government Quota)	119
Total Number of Students	**206**

SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
(An Autonomous Institution)
Puducherry
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Student Admitted under CENTAC

S.NO	ENROLL.NO	NAME OF THE STUDENT
1	20098822	Aashika.B
2	20098694	Abirami S
3	210392	Abirami.S
4	20098652	Agilan.E
5	20098677	Ajay Kumar S. A
6	210234	Akasthia.S.K
7	20098616	Akilesh S
8	210264	Anukaviya. S
9	20098669	Anushri G
10	210195	Aparna R
11	20098639	Arul Mozhie B
12	210545	Aruljayasrija.A
13	210115	Arunraj K
14	20098732	Arvind R
15	210373	Atchaya.R
16	210263	Balaji.B
17	210548	Balaji.C
18	210508	Balakumaran.A.S
19	210291	Bhagya Shree. S
20	20098755	Bhavane S
21	210092	Bhavanesh A
22	20098779	Boobash Dayal S
23	20098784	Chandru S
24	20098756	Dhananjayan D
25	210424	Dharma Prakash.R
26	210510	Dhinakaran. V
27	20098713	Dinakar G
28	20098668	Dineshkumar B

29	20098659	Gejalakshmy.M
30	20098761	Gokulakrishnan.R
31	20098673	Gokulanath P
32	210511	Hariharan. V
33	210154	Hariprasad S
34	20098817	Harish.V
35	210239	Harivardani.A
36	210087	Hemma.P.S
37	20098760	Jaaru Nishaline T
38	20098656	Janani S
39	210163	Jayadharshini.P
40	20098861	Jayasruthika K
41	20098618	Jeethika U
42	210519	Jivanthika Avisyaa.D
43	210381	John Miltton.A
44	20098825	Kartthik.B
45	210524	Kaushikka. E.M
46	210542	Keerthivasan. A
47	210530	Kishore Kumar.R
48	20098840	Kishore.M
49	210199	Lakshmi A
50	20098102	Lalitkumar.R
51	20098794	Lokesh.S
52	210568	Lokeshvaran.V
53	210101	Madhavan.I
54	210418	Madhubala.R
55	210288	Manikandan.M.K
56	210161	Mathiazhagan D
57	210174	Mohanapriyan.R
58	210387	Monisha. M
59	210505	Muntasir.M
60	20098617	Murali Sriram B
61	20098664	Muthukumaran G
62	20098730	Naresh.U
63	210546	Natarajah.B
64	20098733	Naveen.R
65	210433	Niran Amalore.V
66	210518	Niranjan. L
67	210330	Nirupama. S

68	210073	Nithish S
69	210274	Nivetha.R
70	210070	Paayal K
71	20098796	Parmesh V
72	210254	Pavithra.M
73	20098708	Phadhmapreeya P
74	210536	Pragaspathi.S
75	210198	Praveen Kumar M
76	20098789	Praveen S
77	210215	Pravin E
78	20098721	Priyavarshini P
79	210522	Pushpa.M
80	210513	Pushparaj. N
81	20098435	Raghul. S
82	210272	Raja Rajeswari.R
83	210197	Ram Prasath R
84	20098777	Retheega S D
85	210380	Saanchitaasri.K
86	20098780	Saranraj V
87	20098744	Senthilkumar T
88	210423	Shakshi.P
89	210521	Sharankrishna.R.S
90	20098769	Sharmila E
91	210204	Shwetha S
92	20098052	Sibbi.T
93	210223	Sreeja.M
94	20098676	Srihari V
95	210527	Sriram .S
96	210103	Subhashini S
97	210136	Subithra P
98	210303	Suhana Taslim.M
99	20098695	Suhasini.D
100	20098811	Sunitha P
101	210529	Suresh Kannan V
102	210178	Sushmitha T
103	20098129	Swedha S
104	210543	Swetha.R
105	20098606	Tamilsooriya T
106	210089	Varath Anish S

107	210145	Vaseemullah G
108	210379	Vel Arasan.S
109	210079	Venkadanathan A
110	210085	Vidhya Latchoumi T
111	20098854	Vijayaraghavan R
112	20098154	Vincent Amaladoss.A
113	20098510	Vivekanandan. T
114	210556	Wahidullah N
115	20098792	Yazhiniyan.D
116	20098782	Yogavarshini R
117	210241	Yogeshwar.S.N
118	20098781	Yukesh Santhana Kumaran V
119	210191	Yuvaraj V

SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
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Puducherry
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Student Admitted under MANAGEMENT

S.NO	ENROLL.NO	NAME OF THE STUDENT
1	210475	Aaliyaa Fathima. N
2	210074	Aarya.R
3	20098273	Adhetya Prasath. H
4	20098348	Akash.V
5	210014	Aravindan. K
6	20098333	Aravindh. M
7	20098300	Aravindmaalavan. L
8	20098603	Bhuvaneshwar. B
9	210607	Daneil Anne Rufex . P
10	20098922	Deepadharshini. R
11	20098417	Deepak Kumaar. T
12	20098577	Dharani. S
13	210569	Divya.K
14	210577	Eswar. M
15	210581	Hareesh.S
16	210588	Harini. R
17	20098225	Harirajan. R
18	210611	Harish Ragul. S
19		Harishkanna.R
20	210614	Harshavardhanan. R
21	20098317	Hemalatha. B
22	210571	Jesina. B
23	20098262	Kadhiravan. K
24	20098452	Kanakalakshme. S
25	210360	Kandrathi Yogesh Kumar
26	210336	Karthikeyan Aakash
27	20098809	Keerthana. M
28	20098138	Kiruthika.S

29	210400	Kishore Kanth. S
30	20098876	Kridshna Raj. R
31	210329	Kumaran. T
32	20098205	Loga Sankar. D
33	20098324	Logesh. D
34	210575	Maheswaran. S
35	210596	Manju Shree. P
36	20098209	Monisha. I
37	210589	Mukesh. N
38	210431	Mukilan. R
39	20098067	Narayani.R
40	20098206	Narendiran. S
41	20098208	Niranjan. S
42		Nithisharika
43	210370	Nived Tm
44	20098335	Nivetha C
45	210605	Padmasri. S
46	210254	Pavithra. M
47	20098390	Pavithra.R
48	20098591	Pradeesh. D
49	20098337	Pranith .P
50	20098254	Prasanth. K
51	210582	Praveena.N
52	210473	Pravin. R
53	210564	Preethi. P
54	210277	Raghul. S
55	210024	Rahul. S.A
56	210602	Rajeswari. E
57	20098266	Ratchana.K
58	20098249	Ruthish Dharshana. V
59	210583	Sangeetha Priya.M
60	210326	Sanjai Prasad. S
61	210339	Santhosh. S
62	210345	Saravanakumar.M.L
63	20098315	Sathish Balaji. A
64	210246	Sedhuraman.B
65	210470	Shakthi.M
66	210584	Sheshmaa. J
67	20098290	Shre Krithick. R

68	210585	Sindu.E
69	20098384	Sneha. S
70	210296	Sofiya. A
71	210503	Srisanthoshi. D
72	20098508	Sumalesh. V
73	20098141	Surendhar. M
74	20098282	Suruthi.G
75		Susheetha. S
76	210331	Threkha. N.S
77	20098265	Thulasi Sri.B
78	20098519	Varrun. K
79	210580	Varshini.G.S
80		Veerappan. J
81	20098866	Velmurugan. E
82	20098291	Vigneshwaran.S
83	210606	Vijayasaarathy. J
84	20098238	Vishal.M
85	210601	Vishnu Bhagavath .S.T
86	20098077	Vishnu Ram.R
87	210036	Yadhanandh Manoj

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Puducherry
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

VISION

Facilitate academic excellence and research among Electronics and Communication Engineers to meet the global needs with high competence and ethical professionalism.

MISSION

M1: Academic Excellence: To impart learning skills to meet the global challenges in the field of Electronics and Communication Engineering.

M2: Research and Innovation: To provide excellence in research and innovation through multidisciplinary specialization

M3: Employability and Entrepreneurship: To enhance inter and intrapersonal skills among students to make them employable and entrepreneurs.

M4: Ethics: To inculcate the significance of human values and professional skills to serve the society

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1:Technical Knowledge: Graduates will be able to develop an insightful combination of modern electronics and communication technology through technical knowledge.

PEO2: Research and Development: Enhance analytical and thinking skills to develop initiatives and innovative ideas for research and development, industry and societal requirements.

PEO3: Leadership: Inculcate the qualities of teamwork as well as social, interpersonal and leadership skills and adapt to the changing professional environments in the fields of engineering and technology.

PEO4: Professional Ethics: Motivate graduates to become good human beings and responsible citizens for the overall welfare of society.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Domain Knowledge: Ability to understand the concepts in Electronics and Communication Engineering and to apply in various engineering fields.

PSO2: Embedded System Design: Ability to design a system based on the technical knowledge gained for embedded applications in electronics and communications engineering.

PSO3: Professional Competency: Ability to select cutting-edge engineering hardware and software tools to solve complex problems in Electronics and Communication Engineering

SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
(An Autonomous Institution)
Puducherry
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

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112.	Dr.A.Rajeswari	Ph.D	Wireless Communication	25	Professor and Head Department of Electronics and Communication Engineering, Coimbatore Institute of Technology,Peelamedu, Coimbatore 641014	rajeshwari.ece.cit@gmail.com hodece@cit.edu.in Mobile:9865907804
113.	Dr. G. Lakshmi Sutha	Ph.D	Signal Processing, Wireless Communication	20	Professor& Head, Department of Electronics and Communication Engineering National Institute of Technology Puducherry, Thiruvettakudy Karaikal – 609609	lakshmi@nitpy.ac.in Mobile :9751953651
114.	Dr.M.Arivamudhan	Ph.D	RF and Radio wave propagation, Remote Sensing	18	Associate Professor, Dept of Electronics and Communication Engineering, Government College of Engineering,Dharmapuri-636704.	Mail ID: aumaei@gmail.com Cell: 9842565051
115.	Dr.S.Raghavan	Ph.D	Microwave and RF Engineering	28	Professor HAG (Higher Administrative Grade), Electronics and Communication Engineering Department, National Institute of Technology Tiruchirapalli, 620015	raghavan@nitt.edu 9443130663
116.	Dr.B.Ramachandran	Ph.D	Cryptography and Network Security, Wireless Communication	22	Professor, Department of ECE, SRM Institute of Science and Technology, Kattankulathur – 603203	ramachab@srmist.edu.in
117.	Dr. A. Rajesh	Ph.D	LTE-A, Mobile And Vehicular Ad-Hoc Networks, MIMO Antennas	8	Associate Professor Department of Communication Engineering School of Electronics Engineering Vellore Institute of Technology, Vellore, India - 632014	Mail(Work): rajesha@vit.ac.in Mail(Home): rajeshtechece@gmail.com Mobile: +91-9994220967

118.	Dr.T.Perarasi	Ph.D	Wireless Communication	18	Assistant Professor (SS-3), Department of Electronics and Communication Engineering Bannari Amman Institute of Technology, Sathyamangalam 638 401	perarasi@bitsathya.ac.in Mobile: +91-8883850826
119.	Dr. P. Vetrivelan	Ph.D	Wireless Communication Network Security and Cryptography IoT	14	Associate Professor Vellore Institute of Technology, School of Electronics Engineering, Melakottaiyur, Chennai – 600127.	vetrivelansir@gmail.com 9840982987
120.	Dr. M. Jagannath	Ph.D	Biomedical Signal Processing Microcontroller and its Applications Control System	14	Vellore Institute of Technology, Associate Professor, School of Electronics Engineering, Melakottaiyur, Chennai – 600127.	Jagan.faith@gmail.com 9884386262
121.	Dr. V.J.K. Kishore Sonti	Ph.D	Electronics / VLSI Design	16	Sathyabama Institute of Science and Technology, Jeppiaar Nagar, Rajiv Gandhi Road, Chennai - 600 119.	jayakrishna_adc@yahoo.com 9043536557
122.	Dr. B. Rajasekar	Ph.D	VLSI Design / Image Processing, Wireless Communications	15	Sathyabama Institute of Science and Technology,Jeppiaar Nagar, Rajiv Gandhi Road, Chennai - 600 119.	rajarrec@gmail.com 7358167666
123.	Dr.L.Vanitha	Ph.D	Signal Processing	23	Prathyusha Engineering College 18/13,kandasamy Nagar, II street,Poonamalee, Chennai-600056	vanitha.ece@prathyusha.edu.in 8637401273
124.	Mrs.P.Malathi	Ph.D(Pursuing)	Speech Processing	20	Prathyusha Engineering College 37,Brindavan Nagar (Main),Valasarawakkam, Chennai-87	malathi.ece@prathyusha.edu.in 9884400314
125.	Dr.K.Vijayan	Ph.D	VLSI Design	17	Dept of ECE ,SRMIST Mahatma Gandhi Rd, Potheri, SRM Nagar, Kattankulathur, Tamil Nadu 603203	vijayankvijayan@gmail.com 9841324496
126.	Dr.K.Kalimuthu	Ph.D	Wireless Communicatioon	17	Dept of ECE,SRMIST	Kaykay2k2@gmail.com 9841631531

					Mahatma Gandhi Rd, Potheri, SRM Nagar, Kattankulathur, Tamil Nadu 603203	
127.	Mr.S.Praveenkumar	Ph.D(Pursuing)	Embedded system technology	12	Dept of ECE,SRMIST Mahatma Gandhi Rd, Potheri, SRM Nagar, Kattankulathur, Tamil Nadu 603203	praveenembd@gmail.com 9894882274
128.	Dr. R. Boopathi Rani	Ph.D	Microwaves, Antennas, CAD of Microwaves, Metamaterials	14	Assistant Professor, Dept. of ECE, National Institute of Technology Puducherry, Thiruvettakudy Karaikal – 609609	rbrani@gmail.com 9843791683
129.	Dr.AniruddhaKanhe	Ph.D	Audio Steganography and Watermarking, VLSI, Signal Processing	9	Assistant Professor, Dept. of ECE, National Institute of Technology Puducherry, Thiruvettakudy Karaikal – 609609	kanheaniruddha@gmail.com 7904322049
130.	Dr.Malaya Kumar Nath	Ph.D	Image Processing, Signal Processing, Pattern Recognition, VLSI, Image processing	10	Assistant Professor, Dept. of ECE, National Institute of Technology Puducherry, Thiruvettakudy Karaikal – 609609	malaya.nath@gmail.com 9488947184
131.	Dr.S.M. Ramesh	Ph.D	Wireless Communications	15	Professor & Head E.G.S Pillay Engineering College Nagapattinam - 611002 Tamil Nadu	drsmramesh@gmail.com 9443505446
132.	Dr.DeepaJose	Ph.D	VLSI	12	KCG college of Technology Karapakkam Chennai	deepa.ece@kcgcollege.com 9840929084
133.	Dr. P. Vijayalakshmi	Ph.D	ECE	15	SSN College of Engineering SSN Nagar,Chennai	vijayalakshmip@ssn.edu.in 044 - 27474844 Ext. 327
134.	Dr.S.JoshuaKumaresan	Ph.D	ECE	22	RMK College of Engineering, RSM Nagar, Gummidipoondi Taluk, Puduvoyal, Thiruvallur, Tamil Nadu 601206	Skn.ece@rmkec.ac.in 9789961751
135.	Ms. T.S.Sheriba	Ph.D(Pursuing)	Information and Communication	11	Valliammai Engineering College SRM Nagar, Kattankulathur-603203, Kancheepuram District, Tamil Nadu	sheribats.ece@valliammai.co.in

136.	Mr. K. Sivakumar	Ph.D(Pursuing)	ECE	13	Rajalakshmi Institute of Technology, Kuthambakkam Post, National Highway 4, Chembarambakkam, Chennai, Tamil Nadu 600124	sivakumarece@ritchennai.edu.in 9789982701
137.	**Dr.V.Samthira Pandi**	Ph.D	Wireless Communication	8	Associate Professor Saveetha Engineering Collage	samuthirapandi@saveetha.ac.in 9965899039
138.	Dr. E. Gnanamanoharan	Ph.D	Communication Networks	15	Assistant Professor, Department of ECE, Annamalai University	gnanamanohar@gmail.com 9865607488
139.	Dr.P.Vijayakumar	Ph.D	Wireless Communication	13	Associate Professor, Department of ECE, Vellore Institute of Technology	vijayrgcet@gmail.com 9894727271
140.	Dr. Vetrivelan.P	Ph.D	Communication Systems	12	Associate Professor, Department of ECE,VIT Chennai	vetrivelan.p@vit.ac.in 9840982987
141.	**Dr. S. Sivagnanam**	Ph.D	**Microstrip Patch Antenna Design**	18	Assistant Professor, Department of ECE, Annamalai University	sivadots@gmail.com 8122997403
142.	Dr .T. Venkatesh Kanna	Ph.D	Signal Processing	17	Associate Professor, Department of ECE, SKR Engineering College	venkateshkanna2@gmail.com 7904210493
143.	Dr. K. Vijayan	Ph.D	ECE	19	Assistant Professor, Department of ECE, SRM College of Engineering	vijayank@srmist.edu.in 9790580118
144.	Dr. S. Ilaiyaraja	Ph.D	Embedded System	14	Professor, Department of ECE, Velammal Institute of Technology	sir@velammalitech.edu.in 9840355052
145.	Dr. A. Sundar Raj	Ph.D	Wireless Communication	15	Associate Professor, E.G.S. Pillay Engineering College	drasr1982@gmail.com 7598690233
146.	Dr. M. IrshadAhamed	Ph.D	Wireless Communication	18	Associate Professor, E.G.S. Pillay Engineering College	irshad_bcet@yahoo.co.in 7904106119
147.	Mr.Arulkumar.M	M.E	Digital Image Processing	18	Assistant Professor, Department of ECE, Government College of Engineering,Bargur	arul03@gmail.com 8940814134
148.	Mr.Saravanan S	M.E	VLSI	15	Assistant Professor, Department of ECE, K S Rangasamy College of Technology	saran.vpm@gmail.com 9894887631
149.	Dr.M.Lordwin Cecil Prabhaker	Ph.D	Wireless Communication	19	Associate Professor, Department of ECE, VelTech University	cecillord@gmail.com 9600988669
150.	DrS.Karthikeyan	Ph.D	ECE	20	Professor, Department of ECE, K S.R.College of Engineering	skkn03@gmail.com 9942591602
151.	Dr.V.SamthiraPandi	Ph.D	Wireless Communication	18	Associate Professor,Department of ECE, Saveetha Engineering College	samuthirapandi@saveetha.ac.in 9965899039

152.	Dr.S.Kumaran	Ph.D	Wireless Networks	17	Associate Professor,Department of ECE, Saveetha Engineering College	kumarans@saveetha.ac.in 9994958058
153.	Dr. S. Yuvaraj	Ph.D	VLSI Design	21	Assistant Professor, Department of ECE, SRM Institute of Science and Technology	yuvarajs@srmist.edu.in 9789810237
154.	Dr. M.Phenmina Selvi	Ph.D	ECE	15	Associate Professor, Department of ECE, University College of Engineering, Anna University, Villupuram	vm.femina@gmail.com 9994267707
155.	Mr.V.Magesh	M.E	Wireless Communication	18	Associate Professor, Department of ECE Velammal Engineering College	Mahi0437@gmail.com 8124428388

SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
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Puducherry

2nd - Board of Studies Meeting in the department of
Electronics and Communication Engineering

for the Programme
M.Tech – Electronics and Communication Engineering
M.Tech – VLSI and Embedded Systems
P.hD – Electronics and Communication Engineering

Venue
Seminar Hall, Department of ECE
Sri Manakula Vinayagar Engineering College
Madagadipet, Puducherry – 605 107

Date & Time
10-04-2021 & 11.30 am

BOARD OF STUDIES MEETING

The Second Board of Studies meeting for PG and Research programmes was held on 10th April 2021 at 11:30 am in the Seminar Hall, Department of ECE, Sri Manakula Vinayagar Engineering College with the Head of the Department in the Chair.

The following members were present for the BoS meeting in the venue

Sl. No	Name of the Member	Designation
1	**Dr. P. Raja** Professor and Head, Department of ECE	Chairman
2	**Dr. V. R. Vijayakumar** Associate Professor & Head, Department of ECE, Anna University, Regional Campus, Coimbatore	Expert Member (Academic Council Nominee)
3	**Mr. C. Gnanavel** Manager, Production and Technology, Lenovo India Ltd., Puducherry	Industry Member
4	**Dr.V.Bharathi,** Professor / ECE **Specialization:** Wireless Communication	Member
5	**Dr.R.Ramya,** Professor/ ECE **Specialization:** ECE	Member
6	**Dr. J.Pradeep,** Associate Professor / ECE **Specialization:** Image Processing	Member
7	**Dr. R.Kurunjimalar,** Associate Professor / ECE **Specialization:** Mobile Satellite Communication	Member
8	**Dr. D. Jagadiswary,** Associate Professor / ECE **Specialization:** Biometric Security	Member
9	**Prof. R. Ilaiyaraja,** Assistant Professor / ECE **Specialization:** VLSI Design	Member
10	**Prof.Egalite Francis,** Assistant Professor **Specialization:** Mathematics	Member
11	**Prof. K. Oudayakumar,** Associate Professor **Specialization:** Physics	Member
12	**Dr. S. Deepa,** Professor **Specialization:** Chemistry	Member
13	**Dr.D.Jaichithra,** Associate Professor **Specialization:** English	Member
14	**Mr. Dharanidharan. G** Associated Functional Consultant, Birlasoft Limited, Old Mahabalipuram Road, Chennai - 600096	Alumni Member

The following members were present in online plat form

Sl. No	Name of the Member	Designation
1	**Dr.Gerardine Immaculate Mary** Professor, Department of Embedded Systems, Vellore Institute of Technology (VIT), Vellore, Tamil Nadu, India	Expert Member (University Nominee)
2	**Dr. N. Venkateswaran** Professor, Department of ECE, SSN - College of Engineering, Kalavakkam, Tamil Nadu, India	Expert Member (Academic Council Nominee)

AGENDA OF THE MEETING

Item No. : BoS / PG / ECE 2.1

To discuss and review the minutes of the first BoS meeting held on 18-07-2020

Item No. : BoS / PG / ECE 2.2

To consider and ratify the Common Courses and Audit courses introduced in PG programmes from the Academic Year 2020-21

Item No. : BoS / PG / ECE 2.3

To consider and approve the students admitted in the Academic Year 2020-21

Item No. : BoS / PG / ECE 2.4

To consider and approve the admission process introduced in research program (Ph.D- Electronics and Communication Engineering)

Item No. : BoS / PG / ECE 2.5

To appraise about the recognized research guides in the department of Electronics and Communication Engineering.

Item No. : BoS / PG / ECE 2.6

To discuss and appraise the Examiners for M.Tech programs

Item No. : BoS / PG / ECE 2.7

Consideration of review on the revised Program Educational Objectives (PEOs) and Program Specific Outcomes (PSOs) of the M. Tech programs

Item No. : BoS / PG / ECE 2.8

Any other item with the permission of chair

MINUTES OF THE MEETING

Dr. P. Raja, Chairman, BoS opened the meeting with warm welcome and thanked all the Members for accepting the second BoS meeting Invitation for the M.Tech and Research programmes. The Chairman proceeded the meeting subsequently and discussed the agenda items.

BoS / PG / ECE 2.1	**To discuss and review the minutes of the first BoS meeting held on 18-07-2020**

The first BoS Meeting for M.Tech.- Electronics and Communication Engineering and M. Tech – VLSI and Embedded Systems under Regulations 2020 held on 18-07-2020 and confirmed the following points

Confirmation of M.Tech Regulations 2020

M.Tech – Electronics and Communication Engineering (Student admitted in AY 2020-21)	M.Tech – VLSI and Embedded Systems (Student admitted in AY 2020-21)
• Number of credits: 72 • Course structure of the programme • Curriculum for I to IV Semesters	• Number of credits: 72 • Course structure of the programme • Curriculum for I to IV Semesters

• Approved the syllabi for the semesters I to IV	• Approved the syllabi for the semesters I to IV

- Evaluation system followed for courses offered in M.Tech programmes
- Internal mark evaluation based on student activity in every course was appreciated

Suggestions and action taken on M.Tech – Electronics and Communication Engineering

Suggestion given by the Member	Action Taken
Suggested to include "simulation of different modulation" using different tools based on the instructional of the course of "Advanced Digital Communication"	Included the topics in the course of "Advanced Digital Communication"
Suggested to introduce the course "Image and Video processing" instead of "Advanced Digital Signal Processing"	Course was introduced in semester - II
Suggested to remove the course "Advanced Electromagnets" and instead of introduce "Millimeter Wave Communication Networks" in the curriculum	Course "Millimeter Wave Communication Networks" was introduced in semester - II
Suggested to publish papers in reputed journals	Made mandatory to publish the paper in reputed Journals and included in regulation
Introduce the course of "Advanced Technologies in Wireless Networks" as elective course	Introduced the course of "Advanced Technologies in Wireless Networks" in professional elective – V group

Suggestions and action taken on M.Tech – VLSI and Embedded Systems

Suggestion given by the Member	Action Taken
Common and Audit courses are needed to be introduced	Discussed with other department and incorporated
Suggested to increase number of elective papers in Semester-III	Increased the elective papers from 2 to 3
Suggested to publish papers in reputed journals	Made mandatory to publish the paper in reputed Journals and included in regulation
Suggested to include the course PLC-SCADA in elective	Included the course in "Industrial Automation using PLC and SCADA" as elective
Suggested to invite Industrial Expert for Project Review-III	Process initiated and to be implemented from the academic year 2021-22

Minutes are Reviewed and Confirmed

BoS / PG / ECE 2.2	**To consider and ratify the Common Courses and Audit courses introduced in PG programmes from the Academic Year 2020-21**

The following common courses are introduced in semester I and II in all M.Tech programmes as per guidelines of AICTE model curriculum.

Semester	Course Code	Course Title	Objective of the Course
1	P20CCT101	Research Methodology and IPR	• To impart knowledge and skills required for research and IPR • Problem formulation, analysis and solutions • Technical paper writing / presentation without violating professional ethics • Patent drafting and filing patents
1	P20CCP101	Technical Report Writing and Seminar	• Selection of topic based on interest • Formulate the Objective • To develop their scientific and technical reading and writing skills by which they need to understand and construct research articles. • To obtain information from a variety of sources (i.e., Journals, dictionaries, reference books) and then place it in logically developed ideas. • Preparation of report
2	P20CCP202	Seminar on ICT a hands on approach	• To develop their technical reading and presentation skills that they need to understand and present using ICT Tools. • To obtain information from a variety of sources (i.e., Journals, dictionaries, reference books) and practice to present.

Audit Courses

The All India Council for Technical Education (AICTE) introduced Audit courses in M.Tech programmes covering subjects of developing desired attitude among the learners is on the line of initiatives such as Unnat Bharat Abhiyan, Yoga, Value education, Disaster management, Sanskrit, Pedagogy, Constitution of India, Personality development through Indian culture etc. The students are asked to complete minimum two audit courses in duration of the program.

Sl. No	Course Code	Course Title
1	**P20ACTX01**	**English for Research Paper Writing**
2	P20ACTX02	Disaster Management
3	P20ACTX03	Sanskrit for Technical Knowledge
4	P20ACTX04	Value Education
5	P20ACTX05	Constitution of India
6	P20ACTX06	Pedagogy Studies
7	P20ACTX07	Stress Management by Yoga
8	P20ACTX08	Personality Development Through Life Enlightenment Skills
9	P20ACTX09	Unnat Bharat Abhiyan

A common courses mentioned above had been introduced in Semester I & II and audit courses from the academic year 2020-21 under Regulations 2020.

Considered and ratified changes made in M.Tech curriculum and syllabi for Common and Audit Courses

BoS / PG / ECE 2.3	**To consider and approve the students admitted in the Academic Year 2020-21**

The details of the students admitted in M.Tech – Electronics & Communication Engineering and M. Tech – VLSI and Embedded Systems in the academic year 2020-21

Name of the Programs	Number of students admitted
M.Tech – Electronics and Communication Engineering	2
M.Tech – VLSI and Embedded Systems	4
Total Number of Students	**6**

Overall admission for the academic year 2020-21 is 13 %.

Student admitted details are given in Annexure given in **Annexure - I**

Considered and Approved

BoS / PG / ECE 2.4	**To consider and approve the admission process introduced in research program (Ph.D- Electronics and Communication Engineering)**

Pondicherry University recommended to admit the research scholar by conducting national entrance examination as per the UGC Guidelines and Admission to be done based on the Merit list and reservation Policy

Overview of Research Program

Regulation	2020
Eligibility	M.E. / M.Tech. / M.S. (By Research) in the relevant branch of Engineering or Technology
Categories of Ph.D Scholars	Full time Research Scholar
	Part time Research Scholar
Mode of Selection	• Entrance Examinations shall be conducted as written test for eligible candidates • Conduct the interview for the selection of the Ph.D. candidates
Duration of the Research	Part-Time candidates, both Internal and External, shall have to complete a minimum of three years from the date of registration
	All candidates shall publish minimum of two research paper in UGC approved journals or standard journal
Doctoral committee	Doctoral committee should conduct Twice per year and four DC meeting required for submission of synapsis
Course of Study	• Two theory (each 4 credits) subject of course work that is prescribed by the Doctoral Committee for the scholar to undergo as a part of the programme research • Research Methodology course is mandatory • The scholars shall secure a CGPA of 7.0 on 10-point scale in the course work

Extension of Research	• **Maximum duration: six years**, Extension of time three months prior to the completion of six years with the recommendation of the Supervisor
	• Maximum grace period of one year, beyond the normal maximum period of 6 years shall be granted by the Director to enable the scholar to submit the Synopsis and Thesis
Doctoral committee	Doctoral committee should conduct Twice per year and four DC meeting required for submission of synopsis

Noted and Approved

BoS / PG / ECE 2.5	**To appraise about the recognized research guides in the department of Electronics and Communication Engineering**

Research Committee is constituted as per UGC guidelines and committee is scrutiny the "Research Supervisor" application based on the eligibility criteria. The following faculty members are recognized as "Research Guide/ Supervisor" in the department of Electronics and Communication Engineering**.**

S. No	Name of the Research Supervisor	Designation
1	Dr. P. Raja	Professor and Head
2	Dr. L. M. Varalakshmi	Professor
3	Dr. V. Bharathi	Professor
4	Dr. R. Ramya	Professor
5	Dr. A. Vijayalakshmi	Professor
6	Dr.A.Jayachitra	Professor
7	Dr.R.Kurinjimalar	Associate Professor
8	Dr.J.Pradeep	Associate Professor

Noted and Apprised

BoS / PG / ECE 2.6	**To discuss and appraise the Examiners for M.Tech programs**

The list of Examiners are discussed and given in **Annexure-II**

Noted and Apprised

BoS / PG / ECE 2.7	Consideration of review on the revised Program Educational Objectives (PEOs) and Program Specific Outcomes (PSOs) of the M. Tech programs

Feedback was collected from the stakeholders for the revision of Program Educational Objectives (PEOs), and Program Specific Outcomes (PSOs) of the PG programs.

Revised PEOs and PSOs are given in Annexure given in **Annexure - III**

Considered and Approved

BoS / PG / ECE 2.8	Any other item with the permission of chair

- Introduction of new M.Tech program in Cyber Security Systems and Networks by changing the name of M.Tech – Electronics and Communication Engineering with the intake of 24.

- The M.Tech program in Cyber Security Systems and Networks is going to be introduced from the academic year 2021-22. In this regard, the Chairman of BoS submitted the overview of curriculum for kind consideration and suggestions
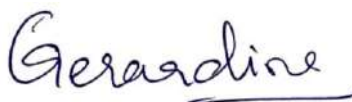
Considered and recommended to introduce the new M.Tech – Cyber Security Systems and Networks

Dr. P. Raja, Chairman – BoS and Head of Department, Electronics and Communication Engineering, concluded the meeting at 12:30 pm with vote of thanks.

Dr. P. RAJA
Board Chairman - ECE

Dr.GERARDINE IMMACULATE MARY
Professor, Department of Embedded Systems,
Vellore Institute of Technology (VIT), Vellore
(Expert Member - University Nominee)

Dr. N. VENKATESWARAN
Professor, Department of ECE,
SSN College of Engineering, Kalavakkam
(Expert Member – AC Nominee)

Dr. V. R. VIJAYAKUMAR
Associate Professor & Head, Department of
ECE, Anna University, Regional Campus,
Coimbatore
(Expert Member – AC Nominee)

Mr. C. GNANAVEL
Manager, Production and Technology,
Lenovo India Ltd., Puducherry
(Industry Member)

Mr. DHARANIDHARAN. G
Associated Functional Consultant,
Birlasoft Limited, Chennai
(Alumni Member)

Dr. V. BHARATHI
Professor / ECE
(Member)

Dr. R. RAMYA
Professor/ ECE
(Member)

Dr. J. PRADEEP,
Associate Professor / ECE
(Member)

Dr. R. KURUNJIMALAR
Associate Professor / ECE
(Member)

Dr. D. Jagadiswary
Associate Professor / ECE
(Member)

Prof. R. ILAIYARAJA,
Assistant Professor / ECE
(Member)

Prof. EGALITE FRANCIS
Assistant Professor / Mathematics
(Member)

Prof. K. OUDAYAKUMAR,
Associate Professor / Physics
(Member)

Dr. S. DEEPA
Professor / Chemistry
(Member)

Dr. D. JAICHITHRA
Associate Professor
(Member)

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Puducherry
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Student Admitted in M. Tech – Electronics and Communication Engineering

S. No	Enroll No	Name of the Student
1	20098226	S.Priyadharshini
2	20098559	M.Vidhya Bharathi

Student Admitted in M. Tech – VLSI and Embedded Systems

S. No	Enroll No	Name of the Student
1	20098456	Bharathi. G
2	20098436	Dhanush. R
3	20098142	Gayathri. S
4	20098221	Sivashankari . S

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Puducherry
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Consolidated Examiners List

S. No	Name of the Examiner	Highest Qualification	Specialization	Experience (in Years)	Communication Address	Email ID with Mobile Number
1.	Dr.T.Shankar	Ph.D	Wireless Communication, Networks	19	Professor, Department of Communication Engineering, School of Electronics Engineering (SENSE), VIT University, Vellore- 632 014	tshankar@vit.ac.in 9486282025 7810972776
2.	Dr.K.Gunavathi	Ph.D	VLSI Design, Communication Systems	32	Professor, Department of Electronics and Communication Engineering, PSG college of Technology Peelamedu, Coimbatore -641004	kgunavathi2000@yahoo.com 9486399299
3.	Dr.G.Umamaheswari	Ph.D	Communication Engineering, Wireless Network Security	28	Professor, Department of Electronics and Communication Engineering, PSG college of Technology Peelamedu, Coimbatore -641004	uma@ece.psgtech.ac.in 9944449295
4.	Dr.S.J.Thiruvengadam	Ph.D	Signal processing Wireless communication	25	Professor, Department of ECE, Thiagarajar College of Engineering, Thiruparankundram, Madurai Tamil Nadu 625015	sjtece@tce.edu 9865079402

5.	Dr.V.Janakiraman	Ph.D	VLSI, Signal processing	20	Professor & Vice Principal Department of Electronics and Communication Engineering Dhanalakshmi Srinivasan College of Engineering and Technology, East Coast Road, Mallapuram, Chennai, Tamil Nadu 603104	vjramece@gmail.com 9444255029, 7358374100
6.	Dr.V.Kamatchi Sundari	Ph.D	Image Processing	20	Professor Department of ECE Prince Shri Venkateshwara Padmavathy Engineering College, Mambakkam - Medavakkam Main Rd, Ponmar, Chennai, Tamil Nadu 600127	vkamatchisundari@gmail.com 9952041393
7.	Dr. P. Vijayakumar	Ph.D	Wireless Communication, Network Security	13	Associate Professor, Department of Electronics Engineering, Vellore Institute of Technology, Kelambakkam - Vandalur Rd, Rajan Nagar, Chennai, Tamil Nadu 600127	vijayrgcet@gmail.com 9894727271
8.	Dr.A.Rajesh	Ph.D	Wireless Communication	8	Associate Professor Department of Communication Engineering School of Electronics Engineering VIT University, Vellore Campus, Tiruvalam Rd, Katpadi, Vellore, Tamil Nadu 632014	rajesha@vit.ac.in 9994220967
9.	Dr J.Raja	Ph.D	Digital Communication	30	Professor & Head Department of Electronics and Communication Engineering Sri Sairam Engineering College, Sai Leo Nagar, West Tambaram, Chennai - 600 044	rajaj.ece@sairam.edu.in 9444477858
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128.	Dr. R. Boopathi Rani	Ph.D	Microwaves, Antennas, CAD of Microwaves, Metamaterials	14	Assistant Professor, Dept. of ECE, National Institute of Technology Puducherry, Thiruvettakudy Karaikal – 609609	rbrani@gmail.com 9843791683
129.	Dr.AniruddhaKanhe	Ph.D	Audio Steganography and Watermarking, VLSI, Signal Processing	9	Assistant Professor, Dept. of ECE, National Institute of Technology Puducherry, Thiruvettakudy Karaikal – 609609	kanheaniruddha@gmail.com 7904322049
130.	Dr.Malaya Kumar Nath	Ph.D	Image Processing, Signal Processing, Pattern Recognition, VLSI, Image processing	10	Assistant Professor, Dept. of ECE, National Institute of Technology Puducherry, Thiruvettakudy Karaikal – 609609	malaya.nath@gmail.com 9488947184
131.	Dr.S.M. Ramesh	Ph.D	Wireless Communications	15	Professor & Head E.G.S Pillay Engineering College Nagapattinam - 611002 Tamil Nadu	drsmramesh@gmail.com 9443505446
132.	Dr.DeepaJose	Ph.D	VLSI	12	KCG college of Technology Karapakkam Chennai	deepa.ece@kcgcollege.com 9840929084
133.	Dr. P. Vijayalakshmi	Ph.D	ECE	15	SSN College of Engineering SSN Nagar,Chennai	vijayalakshmip@ssn.edu.in 044 - 27474844 Ext. 327
134.	Dr.S.JoshuaKumaresan	Ph.D	ECE	22	RMK College of Engineering, RSM Nagar, Gummidipoondi Taluk, Puduvoyal, Thiruvallur, Tamil Nadu 601206	Skn.ece@rmkec.ac.in 9789961751
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139.	Dr.P.Vijayakumar	Ph.D	Wireless Communication	13	Associate Professor, Department of ECE, Vellore Institute of Technology	vijayrgcet@gmail.com 9894727271
140.	Dr. Vetrivelan.P	Ph.D	Communication Systems	12	Associate Professor, Department of ECE,VIT Chennai	vetrivelan.p@vit.ac.in 9840982987
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147.	Mr.Arulkumar.M	M.E	Digital Image Processing	18	Assistant Professor, Department of ECE, Government College of Engineering,Bargur	arul03@gmail.com 8940814134
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154.	Dr. M.Phenmina Selvi	Ph.D	ECE	15	Associate Professor, Department of ECE, University College of Engineering, Anna University, Villupuram	vm.femina@gmail.com 9994267707
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SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
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Puducherry

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

M.TECH. - VLSI AND EMBEDDED SYSTEMS

PROGRAMME OUTCOMES (POs)

PO1: Exploration of Research: An ability to independently carry out research/investigation and development work to solve practical problems.

PO2: Technical Skill: An ability to write and present a substantial technical report/document.

PO3: Expertise in Academics: Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.

PO4: Problem solving: An ability to discriminate, analyze, evaluate and synthesize the technologies to provide solution for multidimensional engineering problems.

PO5: Usage of Modern Tools: Create, select, learn and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities with an understanding of the limitations.

PO6: Ethical Practices and Social Responsibility: Acquire professional and intellectual integrity, professional code of conduct, ethics of research and scholarship, consideration of the impact of research outcomes on professional practices and an understanding of responsibility to contribute to the community for sustainable development of society.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Technical Knowledge : To Provide a solid basis and experience in the field of VLSI and Embedded System to meet the unique needs of the society

PEO2: Leadership Skill : To develop good leadership skills in the respective domain to perform creative and collaborative work

PEO3: Research and Development : To inculcate practical knowledge to undertake quality interdisciplinary research projects addressing industrial and social needs

PEO4: Professional Behavior: To train students to be an active collaborators and responsible engineers to solve social, technical and engineering challenges.

Program Specific Outcomes (PSOs)

PSO1-Technical Knowledge in VLSI and Embedded Systems :   Ability to apply cutting-edge technology to solve complex problems and provide an optimized solution in the domain of VLSI and Embedded Systems.

PSO2- Competency in VLSI Design : Ability to design and test systems by applying the concepts of FPGA, ASIC, System On Chip etc

PSO3-Competency in Embedded System : Ability to develop and analyze Embedded Systems to solve real time societal problems.

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M.TECH. – Electronics and Communication Engineering

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PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Technical Knowledge : To develop intellectual combination of technology with modern electronics and communication systems through well-built technical acquaintance

PEO2: Leadership Skill : To endure changes and challenges in the areas of Electronics and Communication Engineering with good leadership skills

PEO3: Research and Development : To identify the requisite of the nation, industry and come out with innovative solutions to maintain a sustainable position

PEO4: Professional Behavior: To promote competitive graduates global wise in the area of Electronics and Communication Engineering

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1- Technical Knowledge in Electronics and Communication Engineering : Ability to understand the technological advancements in the field of electronics and communication by using modern design tools and sub system end processes.

PSO2- Competency in Electronics : Apply research ideas to offer solutions for extant problems in areas including signal processing, image processing, consumer electronics, VLSI, Embedded with given requirements

PSO3- Competency in   Communication: Ability to develop and provide optimal solutions to subsystems like RF, baseband of modern communication systems and networks.