SONA COLLEGE OF TECHNOLOGY, SALEM-5

(An Autonomous Institution)

B.E-Electronics and Communication Engineering

CURRICULUM and SYLLABI

[For students admitted in 2022-2023]

B.E / B.Tech Regulation 2019

Approved by BOS and Academic Council meetings

Sona College of Technology, Salem

(An Autonomous Institution)

Courses of Study for B.E/B. Tech. Semester I under Regulations 2019 (CBCS)

Branch: Electronics and Communication Engineering

S.No	Course Code	Course Title	L	T	P	C	Category	Total Contact Hours
Theory								
1	U19ENG101B	English For Engineers - I	1	0	2	2	HS	45 (15L+30P)
2	U19MAT102B	Linear Algebra and Multivariable Calculus	3	1	0	4	BS	60
3	U19PHY103C	Engineering Physics	3	0	0	3	BS	45
4	U19CHE104C	Chemistry of Organic Electronics	4	0	0	4	BS	60
5	U19PPR105	Problem Solving using Python Programming	3	0	0	3	ES	45
6	U19BEE106B	Basic Electrical and Electronics Engineering	3	0	0	3	PC	45
Practical								
7	U19PPL111	Python Programming Laboratory	0	0	2	1	ES	30
8	U19BEEL113B	Basic Electrical and Electronics Engineering Laboratory	0	0	2	1	PC	30
9	U19GE101	Basic Aptitude - I	0	0	2	0	EEC	30
		Total Credits				**21**		
Optional Language Elective*								
10	U19OLE1101	French	0	0	2	1	HS	30
11	U19OLE1102	German						30
12	U19OLE1103	Japanese						30

*Students may opt for foreign languages viz., German/French/Japanese with additional one credit (Not accounted for CGPA calculation)

Approved By

	30/6/2022		
Chairperson, Science and Humanities BoS	**Chairperson, Electronics and Communication Engineering BoS**	**Member Secretary, Academic Council**	**Chairperson, Academic Council & Principal**
Dr. M. Renuga	**Dr. R.S. Sabeenian**	**Dr. R. Shivakumar**	**Dr. S. R. R. Senthil Kumar**

Copy to:-HOD/ Electronics and Communication Engineering, First Semester BE ECE Students and Staff, COE

Sona College of Technology, Salem – 636 005
(An Autonomous Institution)
Courses of Study for BE / B Tech Semester II under Regulations 2019 (CBCS)
Branch: Electronics and Communication Engineering

S. No	Course Code	Course Title	L	T	P	C	Category	Total Contact Hours
Theory								
1	U19TAM201	தமிழர் மரபு / Heritage of Tamils	1	0	0	1	HSMC	15
2	U19ENG201B	English for Engineers-II	2	0	0	2	HSMC	30
3	U19MAT202C	Transforms and Differential Equations	3	1	0	4	BSC	60
4	U19PHY203B	Physics for ECE	2	0	0	2	BSC	30
5	U19EGR206A	Engineering Graphics	2	0	2	3	ESC	60 (30L+30P)
6	U19EC201	Electronic Devices and Circuits	2	0	2	3	PCC	60 (30L+30P)
7	U19EC202	Circuit Theory	3	0	0	3	PCC	45
Practical								
8	U19WPL212	Workshop Practice	0	0	2	1	ESC	30
9	U19PCL208B	Physics and Chemistry Laboratory	0	0	4	2	BSC	60
10	U19GE201	Basic Aptitude - II	0	0	2	0	EEC	30
Total Credits						**21**		
Optional Language Elective*								
11	U19OLE1201	French	0	0	2	1	HSMC	30
12	U19OLE1202	German						
13	U19OLE1203	Japanese						

*Students may opt for foreign languages viz., German/French/Japanese with additional one credit (Not accounted for CGPA calculation)

Approved by

	30/06/2022		
Chairperson, Science and Humanities BoS	**Chairperson, Electronics and Communication Engineering BoS**	**Member Secretary, Academic Council**	**Chairperson, Academic Council & Principal**
Dr. M. Renuga	**Dr. R.S. Sabeenian**	**Dr. R. Shivakumar**	**Dr. S. R. R. Senthil Kumar**

Copy to:-HOD/ Electronics and Communication Engineering, Second Semester BE ECE Students and Staff, COE

ECE
III

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester III Regulations 2019
Branch: Electronics and Communication Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
Theory							
1.	U19MAT301C	Probability and Stochastic Processes	3	1	0	4	60
2.	U19EC301	Signals and Systems	3	1	0	4	60
3.	U19EC302	Digital Electronics	3	0	0	3	45
4.	U19EC303	Electronic circuits	3	0	0	3	45
5.	U19CS307	Programming in C	3	0	0	3	45
6.	U19TAM301	தமிழரும் தொழில்நுட்பமும் /Tamils and technology	1	0	0	1	15
7.	U19GE303	**Mandatory Course:** Essence of Indian Traditional knowledge	2	0	0	0	30
Practical							
8.	U19EC304	Digital Electronics laboratory	0	0	2	1	30
9.	U19EC305	Electronic Circuits and Simulation laboratory	0	0	2	1	30
10.	U19CS308	C programing laboratory	0	0	2	1	30
11.	U19GE301	Soft Skills and Aptitude – I	0	0	2	1	30
					Total Credits	**22**	**420**

Approved By

5/7/2023

Chairman, Electronics and Communication Engineering BoS
Dr.R.S.Sabeenian

Member Secretary, Academic Council
Dr.R.Shivakumar

Chairperson, Academic Council & Principal
Dr.S.R.R.Senthil Kumar

Copy to:-

HOD/Electronics and Communication Engineering, Third Semester BE ECE Students and Staff, COE

ECE
IV

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester IV Regulations 2019
Branch: Electronics and Communication Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
Theory							
1	U19EC401	Engineering Electromagnetics	3	0	0	3	45
2	U19EC402	Linear Integrated Circuits	3	0	0	3	45
3	U19EC403	Digital Signal Processing	3	0	0	3	45
4	U19EC404	Analog Communication Systems	3	0	0	3	45
5	U19CS406	Data Structures	3	0	0	3	45
6	U19GE402	**Mandatory Course :** Environment and Climate Science	2	0	0	0	30
Practical							
7.	U19EC405	Linear Integrated Circuits Laboratory	0	0	2	1	30
8.	U19EC406	Digital Signal Processing Laboratory	0	0	2	1	30
9.	U19CS407	Data Structures Laboratory	0	0	2	1	30
10.	U19GE401	Soft Skills and Aptitude – II	0	0	2	1	30
Total Credits						**19**	**375**

Approved By

06/01/2024

Chairperson, Electronics and Communication Engineering BoS
Dr.R.S.Sabeenian

Member Secretary, Academic Council
Dr.R.Shivakumar

Chairperson, Academic Council & Principal
Dr.S.R.R.Senthil Kumar

Copy to:-

HOD/Electronics and Communication Engineering, Fourth Semester BE ECE Students and Staff, COE

Sona College of Technology, Salem-5

List of Professional Electives B.E/B.Tech under Regulation 2019

Department:- Electronics and Communication Engineering

S.No	Course Code	Course Name	L	T	P	C
1.	U19EC901	FPGA Based System design (Lab Integrated)	2	0	2	3
2.	U19EC902	Advanced Digital System design	3	0	0	3
3.	U19EC903	Nano Electronics	3	0	0	3
4.	U19EC904	Machine learning (Lab Integrated)	2	0	2	3
5.	U19EC905	Artificial Neural Networks	3	0	0	3
6.	U19EC906	Advanced digital signal processing	3	0	0	3
7.	U19EC907	Speech Processing	3	0	0	3
8.	U19EC908	Radar Engineering	3	0	0	3
9.	U19EC909	Satellite Communication	3	0	0	3
10.	U19EC910	Advanced microcontrollers	3	0	0	3
11.	U19EC911	IoT System architecture	3	0	0	3
12.	U19EC912	Smart sensors for wearable applications	3	0	0	3
13.	U19EC913	Computer Networks	3	0	0	3
14.	U19EC914	Wireless Network	3	0	0	3
15.	U19EC915	Wireless sensor Networks	3	0	0	3
16.	U19EC916	Virtual Instrumentation	3	0	0	3
17.	U19EC917	Measurements and Instrumentation	3	0	0	3
18.	U19EC918	Biomedical Instrumentation	3	0	0	3
19.	U19EC919	Computer system Architecture	3	0	0	3
20.	U19EC920	Low power VLSI Design	3	0	0	3
21.	U19EC921	Pattern Recognition	3	0	0	3
22.	U19EC922	Deep Learning	3	0	0	3
23.	U19EC923	Natural Language Processing	3	0	0	3
24.	U19EC924	RF MEMS	3	0	0	3
25.	U19EC925	Electromagnetic Interference and Electromagnetic Compatibility	3	0	0	3
26.	U19EC926	RF Circuit Design	3	0	0	3
27.	U19EC927	Smart Sensors for Wearable applications	3	0	0	3
28.	U19EC928	IoT and Sensors	3	0	0	3
29.	U19EC929	Web page and Mobile App Development	3	0	0	3
30.	U19EC930	Network Security	3	0	0	3
31.	U19EC931	Wireless Adhoc Network	3	0	0	3
32.	U19EC932	Cognitive Radio Network	3	0	0	3

SONA COLLEGE OF TECHNOLOGY (AUTONOMOUS), SALEM

DEPARTMENT OF ECE

LIST OF PROFESSIONAL ELECTIVES FOR HONOR DEGREE

Date : 5.5.23

S.NO	Vertical-I Advanced Communication Technologies	Vertical-II Smart Sensors and IoT	Vertical-III Nanoscience for Modern Industries	Vertical-IV Signal analysis and computer vision	Vertical-V Semiconductor chip design and testing
1.	Mobile Communication Technologies	Fundamentals of IOT	Nano Electronics for Modern Industries	Image Analysis and Computer Vision	Verilog HDL
2.	Optical Communication Networks	Sensors and Wearable Technology	Synthesis & Characterization of Nanomaterials	Machine Learning	VLSI Physical Design
3.	5G Communication	IOT for system design	PCB Design	Sparse Signal and Image processing	Testing of VLSI circuits
4.	Millimetre Wave Communication	Industrial IoT and Networking	Nano Sensors and Transducers	Deep Learning for image analysis	Synthesis and Verification of VLSI circuits
5.	Communication Network Security	Real Time Operating System.	Nanotechnology in Food Preservation and Safety Management	Pattern Recognition	System on Chip Design
6.	5G and its applications	IOT design using Raspberry PI	PCB manufacturing	Artificial Intelligence of Real-time Image Processing	Low-power IC Design
7.	Advanced Wireless Communication	ARM RISC architecture	Nano Technology in the Textile and Agriculture industry	Natural Language Processing	Validation and testing technology
8.	Software Defined Radio	Smart system design using MSB 430 controller	Nanomaterials for Energy and Environment Applications	Biomedical signal and Image Processing	Analog IC Design
9.	Project- Advanced Communication Technologies	Project- Smart Sensors and IoT	Project- Nanoscience for Modern Industries	Project- Signal analysis and computer vision	Project- Semiconductor chip design and testing

SONA COLLEGE OF TECHNOLOGY, SALEM-5

Department of Electronics and Communication

Honors and Minor - Verticals & Courses

(Offered to UG students admitted during AY 2021- 2022 onwards, Regulation 2019)

[1]. HONOURS degree courses

Vertical 1: Advanced Communication Technologies

S.No	Course Code	Course Name	L	T	P	C
1.	U19EC2001	Mobile Communication Technologies	3	0	0	3
2.	U19EC2002	Optical Communication Networks	2	0	2	3
3.	U19EC2003	5G Communication	3	0	0	3
4.	U19EC2004	Millimetre Wave Communication	3	0	0	3
5.	U19EC2005	Communication Network Security	3	0	0	3
6.	U19EC2006	5G and its Applications	3	0	0	3
7.	U19EC2007	Advanced Wireless Communication	3	0	0	3
8.	U19EC2008	Software Defined Radio	3	0	0	3
9.	U19EC2009	Project- Advanced Communication Technologies	0	0	6	3
Maximum of two SWAYAM courses in the **Advanced Communication Technologies** vertical identified and approved by the department consultative Committee of the department. SWAYAM courses should have to cover at least 80% of the prescribe course.						

Vertical 2: Smart Sensors and IoT

S.No	Course Code	Course Name	L	T	P	C
1.	U19EC2010	Fundamentals of IOT	3	0	0	3
2.	U19EC2011	Sensors and Wearable Technology	3	0	0	3
3.	U19EC2012	IOT for system design	2	0	2	3
4.	U19EC2013	Industrial IoT and Networking	3	0	0	3
5.	U19EC2014	Real Time Operating System.	3	0	0	3
6.	U19EC2015	IOT design using Raspberry PI	3	0	0	3
7.	U19EC2016	ARM RISC architecture	3	0	0	3
8.	U19EC2017	Smart system design using MSB 430 controller	3	0	0	3
9.	U19EC2018	Project- Smart Sensors and IoT	0	0	6	3
Maximum of two SWAYAM courses in **Smart Sensors and IoT** vertical identified and approved by the department consultative Committee of the department. SWAYAM courses should have to cover at least 80% of the prescribe course.						

Vertical 3: Nanoscience for Modern Industries

S.No	Course Code	Course Name	L	T	P	C
1.	U19EC2019	Nano Electronics for Modern Industries	3	0	0	3
2.	U19EC2020	Synthesis & Characterization of Nanomaterials	3	0	0	3
3.	U19EC2021	PCB Design	2	0	2	3
4.	U19EC2022	Nano Sensors and Transducers	3	0	0	3
5.	U19EC2023	Nanotechnology in Food Preservation and Safety Management	3	0	0	3
6.	U19EC2024	PCB manufacturing	3	0	0	3
7.	U19EC2025	Nano Technology in the Textile and Agriculture industry	3	0	0	3
8.	U19EC2026	Nanomaterials for Energy and Environment Applications	3	0	0	3
9.	U19EC2027	Project- Nanoscience for Modern Industries	0	0	6	3
Maximum of two SWAYAM courses in **Nanoscience for Modern Industries** vertical identified and approved by the department consultative Committee of the department. SWAYAM courses should have to cover at least 80% of the prescribe course.						

Vertical 4: Signal analysis and computer vision

S.No	Course Code	Course Name	L	T	P	C
1.	U19EC2028	Image Analysis and Computer Vision	3	0	0	3
2.	U19EC2029	Machine Learning	2	0	2	3
3.	U19EC2030	Sparse Signal and Image processing	3	0	0	3
4.	U19EC2031	Deep Learning for image analysis	3	0	0	3
5.	U19EC921	Pattern Recognition	3	0	0	3
6.	U19EC2032	Artificial Intelligence of real-time Image Processing	3	0	0	3
7.	U19EC923	Natural Language Processing	3	0	0	3
8.	U19EC2033	Biomedical signal and Image Processing	3	0	0	3
9.	U19EC2034	Project- Signal analysis and computer vision	0	0	6	3
Maximum of two SWAYAM courses in **Signal analysis and computer vision** vertical identified and approved by the department consultative Committee of the department. SWAYAM courses should have to cover at least 80% of the prescribe course.						

Vertical 5: Semiconductor chip design and testing

S.No	Course Code	Course Name	L	T	P	C
1.	U19EC2035	Verilog HDL	2	0	2	3
2.	U19EC2036	VLSI Physical Design	3	0	0	3
3.	U19EC2037	Testing of VLSI circuits	3	0	0	3
4.	U19EC2038	Synthesis and Verification of VLSI circuits	3	0	0	3
5.	U19EC2039	System on Chip Design	3	0	0	3
6.	U19EC2040	Low-power IC Design	3	0	0	3
7.	U19EC2041	Validation and testing technology	3	0	0	3
8.	U19EC2042	Analog IC Design	3	0	0	3
9.	U19EC2043	Project- Semiconductor chip design and testing	0	0	6	3

Maximum of two SWAYAM courses in **Semiconductor chip design and testing** vertical identified and approved by the department consultative Committee of the department.
SWAYAM courses should have to cover at least 80% of the prescribe course.

SONA COLLEGE OF TECHNOLOGY, SALEM-5

Department of ECE

Minor Degree- Verticals & Courses

(Offered to UG students admitted during AY 2021- 2022 onwards, Regulation 2019)

Minor Vertical : Wearable Technologies

S.No	Course Code	Course Name	L	T	P	C
1	U19EC2044	Microcontroller and Embedded Systems	2	0	2	3
2	U19EC2045	Textile Science: Smart Fibers and Yarns	3	0	0	3
3	U19EC2046	Wearable Technology and IOT	3	0	0	3
4	U19EC2047	Wearable Biomedical Devices and Its Applications	3	0	0	3
5	U19EC2048	Introduction to Data Analytics	3	0	0	3
6	U19EC2049	Basics of Sensors and their Wearable Application	3	0	0	3
7	U19EC2050	Webpage and Mobile App Development for IoT	3	0	0	3
8	U19EC2051	Project -Wearable Technologies	0	0	6	3

Sona College of Technology, Salem

(An Autonomous Institution)

Courses of Study for B.E/B. Tech. Semester I under Regulations 2019 (CBCS)

Branch: Electronics and Communication Engineering

S.No	Course Code	Course Title	L	T	P	C	Category	Total Contact Hours
Theory								
1	U19ENG101B	English For Engineers - I	1	0	2	2	HS	45 (15L+30P)
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3	U19PHY103C	Engineering Physics	3	0	0	3	BS	45
4	U19CHE104C	Chemistry of Organic Electronics	4	0	0	4	BS	60
5	U19PPR105	Problem Solving using Python Programming	3	0	0	3	ES	45
6	U19BEE106B	Basic Electrical and Electronics Engineering	3	0	0	3	PC	45
Practical								
7	U19PPL111	Python Programming Laboratory	0	0	2	1	ES	30
8	U19BEEL113B	Basic Electrical and Electronics Engineering Laboratory	0	0	2	1	PC	30
9	U19GE101	Basic Aptitude - I	0	0	2	0	EEC	30
		Total Credits				**21**		
Optional Language Elective*								
10	U19OLE1101	French	0	0	2	1	HS	30
11	U19OLE1102	German						30
12	U19OLE1103	Japanese						30

*Students may opt for foreign languages viz., German/French/Japanese with additional one credit (Not accounted for CGPA calculation)

Approved By

	30/6/2022		
Chairperson, Science and Humanities BoS	**Chairperson, Electronics and Communication Engineering BoS**	**Member Secretary, Academic Council**	**Chairperson, Academic Council & Principal**
Dr. M. Renuga	**Dr. R.S. Sabeenian**	**Dr. R. Shivakumar**	**Dr. S. R. R. Senthil Kumar**

Copy to:-HOD/ Electronics and Communication Engineering, First Semester BE ECE Students and Staff, COE

L T P C
1 0 2 2

U19ENG101B – **English for Engineers – I**

First year I semester

Common to ECE

Course Outcome: At the end of course, the students will be able to

1. Use grammatical components effectively in both written and spoken communication
2. Develop speaking skills for self-introduction, delivering speeches and technical presentation.
3. Speak effectively in real time and business situations
4. Write email, formal letters and descriptions of graphics
5. Develop skills for writing reports and proposals, and for general purpose and technical writing.

	COURSE OUTCOMES	PROGRAMME OUTCOMES													
		1	2	3	4	5	6	7	8	9	10	11	12	Ps o1	Ps o2
1	Use grammatical components effectively in both written and spoken communication	2	1	1	1	1	2	3	2	2	3	3	3	3	3
2	Develop speaking skills for self-introduction, delivering speeches and technical presentation	3	2	2	3	3	3	3	2	3	3	3	3	3	3
3	Speak effectively in real time and business situations	3	3	2	3	3	3	3	2	3	3	3	3	3	3
4	Write email, formal letters and descriptions of graphics	1	1	1	2	2	1	2	2	1	3	1	1	1	1
5	Develop skills for writing reports and proposals, and for general purpose and technical writing.	2	1	1	3	2	2	3	3	3	3	2	3	3	3

UNIT –I

- General Vocabulary, Parts of speech
- Self-introduction, personal information, name, home background, study details, area of interest, hobbies, strengths and weaknesses, projects and paper presentations, likes and dislikes in food, travel, clothes, special features of home town.

- Instructions, Email, fixing an appointment, cancelling appointments, conference details, hotel accommodation, order for equipment, training programme details, paper submission for seminars and conferences
- Paragraph writing – Describing – defining – providing examples or evidences

UNIT II

- Tenses, active and passive voice
- Welcome address, vote of thanks, special address on specific topic.
- Checklists, letter writing, business communication, quotations, placing orders, complaints, replies to queries from business customers, inviting dignitaries, accepting and declining invitations

UNIT – III

- Prefixes and Suffixes
- Mini presentation in small groups of two or three, office arrangements, facilities, office functions, sales, purchases, training recruitment, advertising, applying for financial assistance, applying for a job, team work, discussion, presentation.
- Job application letter and resume, recommendations,

UNIT - IV

- Modal verbs and probability, concord
- Situational Role Play - between examiner and candidate, teacher and student, customer and sales manager, hotel manager and organiser, team leader and team member, bank manager and candidate, interviewer and applicant, car driver and client, industrialist and candidate, receptionist and appointment seeker, new employee and manager, employee and employee, p.a. and manager, schedule for training
- Note making, Proposal

UNIT – V

- If conditionals
- Asking for directions, seeking help with office equipment, clarifying an error in the bill, job details, buying a product, selling a product, designing a website, cancelling and fixing appointments, hotel accommodation, training facilities, dress code, conference facilities.
- Memo, technical report writing, feasibility reports, accident report, survey report

TOTAL: 45 hours

Speaking test will be conducted for 20 marks externally and evaluated along with English for Engineers – I in the End Semester Valuation.

TEXT BOOK:

Technical English I & II, Dr. M. Renuga et al. Sonaversity, 2016

Extensive Reading

1. The Story of Amazon.com- Sara Gilbert, published by Jaico
2. The Story of Google – Sara Gilbert, published by Jaico

Reference

Norman Whitby, Business Benchmark – Pre-Intermediate to Intermediate, Students Book, Cambridge University Press, 2006.

A Course in Communication Skills, P. Kiranmai Dutt, Geetha Rajeevan, C. L. N. Prakash, published by Cambridge University Press India Pvt. Ltd.

HOD
Humanities and Languages
Dr. M.RENUGA,
Professor & Head,
Department of Humanities & Languages

B. E. / ELECTRONICS AND COMMUNICATION ENGINEERING

SEMESTER – I	LINEAR ALGEBRA AND MULTIVARIABLE CALCULUS	L	T	P	C
U19MAT102B		3	1	0	4

COURSE OUTCOMES

At the end of the course, the students will be able to

1. apply the concepts of vector spaces and linear transformations in real world applications
2. apply the concepts of eigen values and eigen vectors of a real matrix and their properties in diagonalization and the reduction of a real symmetric matrix from quadratic form to canonical form
3. find the Taylor's series expansion, Jacobians and the maxima and minima of functions of two variables
4. apply appropriate techniques of multiple integrals to find the area and volume
5. apply the concepts of vector differentiation and integration to determine the line, surface and volume integrals.

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3		3								2	3	
CO2	3	3		3								2	3	
CO3	3	3		3								2	3	
CO4	3	3		3								2	3	
CO5	3	3		3								2	3	

UNIT – I VECTOR SPACES 12

Vector Space – Linear independence and dependence of vectors – Basis – Dimension – Linear transformations (maps) – Matrix associated with a linear map – Range and kernel of a linear map – Rank-nullity theorem (without proof).

UNIT – II EIGEN VALUES AND EIGEN VECTORS 12

Eigen values and eigen vectors of real matrices – Properties of eigen values and eigen vectors – Cayley-Hamilton theorem – Diagonalization of real symmetric matrices – Reduction of quadratic form to canonical form.

UNIT – III FUNCTIONS OF SEVERAL VARIABLES 12

Functions of several variables – Partial differentiation – Total derivative – Jacobians – Taylor's theorem for function of two variables – Maxima and minima of function of two variables without constraints – Constrained maxima and minima by Lagrange's method of undetermined multipliers.

UNIT – IV MULTIPLE INTEGRALS 12

Double integrals – Change of order of integration – Change of variables from Cartesian to polar coordinates – Area as double integrals in Cartesian coordinates – Triple integrals – Volume as triple integrals in Cartesian coordinates.

UNIT – V VECTOR CALCULUS 12

Vector differentiation: Scalar and vector valued functions – Gradient, directional derivative, divergence and curl – Scalar potential.

Vector integration: Line, surface and volume integrals – Statement of Green's, Stoke's and Gauss divergence theorems – Simple applications involving squares, rectangles, cubes and rectangular parallelopiped.

Theory: **45 Hours** Tutorial: **15 Hours** Total: **60 Hours**

TEXT BOOKS:

1. T. Veerarajan, "Linear Algebra and Partial Differential Equations", McGraw Hill Publishers, 1st Edition, 2018.
2. T. Veerarajan, "Engineering Mathematics for Semesters I & II", McGraw Hill Publishers, 1st Edition, 2019.

REFERENCE BOOKS:

1. S. Lipschutz and M. L. Lipson, "Linear Algebra", McGraw Hill Publishers, 6th Edition, 2018.
2. E. Kreyszig, "Advanced Engineering Mathematics", Wiley Publishers, 10th Edition, Reprint, 2017.
3. C. Prasad and R. Garg, "Advanced Engineering Mathematics", Khanna Publishers, 1st Edition, 2018.
4. B. V. Ramana, "Higher Engineering Mathematics", McGraw Hill Publishers, 29th Reprint, 2017.
5. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 44th Edition, 2018.

Prof. S. JAYABHARATHI
Head / Department of Mathematics
Sona College of Technology
Salem – 636 005

Dr. M. RENUGA
BoS - Chairperson
Science and Humanities
Sona College of Technology
Salem – 636 005

Course Code: U19PHY103C **L T P C**
Course Name: ENGINEERING PHYSICS **3 0 0 3 100**

(Common to I Semester B.E. Artificial Intelligence and Data Science, Electronics and Communication Engineering & B.Tech. Information Technology)

(ADS, ECE & IT)

COURSE OUTCOMES:

At the end of the course, the students will be able to,

CO1 Discuss the dual nature of matter and radiation and the application of wave nature of particles.

CO2 Describe the basic components of lasers.

CO3 Analyse the relation between arrangement of atoms and material properties.

CO4 Differentiate the electrical and thermal conductivity of metals.

CO5 Elucidate the classification and theory of semiconducting materials.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
COs, POs PSOs Mapping	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO – 1	3	2	-	-	-	-	-	-	-	-	2	2	-	3
CO – 2	3	2	-	-	-	-	-	-	-	-	2	2	-	3
CO – 3	3	2	-	-	-	-	-	-	-	-	2	2	-	3
CO – 4	3	2	-	-	-	-	-	-	-	-	2	2	-	3
CO - 5	3	2	-	-	-	-	-	-	-	-	2	2	-	3

Unit 1 Quantum Physics 9

Origin of quantum mechanics – Limitations of classical theory - Dual nature of matter and radiation.

Particle nature of radiation - Compton effect - Explanation based on quantum theory - Expression for Compton shift (no derivation).

Wave nature of matter - de Broglie waves - Schrödinger's time independent and time dependent wave equations - Physical significance of wave function - Energy and wave function of an electron trapped in one dimensional box.

Application of wave nature of particles - Electron microscope - Comparison of optical and electron microscope - Scanning electron microscope - Limitations of electron microscope.

Unit 2 Lasers 9

Basic terms - Energy level - normal population - induced absorption (pumping) - population inversion - meta stable state - spontaneous emission - stimulated emission.

Basic components of a laser - Active medium - pumping technique - optical resonator **Einstein's theory** - stimulated absorption - spontaneous emission and stimulated emission.

Types of lasers - Solid lasers (Nd:YAG) - Gas lasers (CO_2 laser) - semiconductor laser (homojunction and hetero junction laser).

Holography - Construction and reconstruction of hologram.

Unit 3 Crystal Physics 9

Importance of crystals - Types of crystals - Basic definitions in crystallography (Lattice – space lattice - unit cell - lattice parameters – basis - crystallographic formula) - Seven crystal systems and fourteen Bravais lattices – Lattice planes and Miller indices – Interplanar distance - d spacing in cubic lattice - Calculation of number of atoms per unit cell - Atomic radius - Coordination number and Atomic Packing factor for SC, BCC, FCC and HCP Structures - Polymorphism and allotropy.

Crystal imperfections - Point, line and surface defects – burger vector.

Unit 4 Conducting materials 9

Usage of conducting materials - basic definitions (electrical resistance - conductance - resistivity - conductivity).

Classical free electron theory of metals - Postulates of classical free electron theory - microscopic form of Ohm's law - Electrical conductivity - definition and expression for electrical conductivity - Thermal conductivity - definition and expression for thermal conductivity - Wiedemann - Franz law and Lorentz number - Success and failure of classical free electron theory.

Quantum free electron theory - Drawbacks of quantum free electron theory - origin of energy bands - band theory of solids (qualitative treatment only) - Fermi energy and Fermi distribution function - Effect of temperature on Fermi function - Density of energy states - carrier concentration in metals.

Unit 5 Semiconducting Materials 9

Properties of semiconductors - Classification of semiconductors - Intrinsic and extrinsic semiconductors - Elemental and compound semiconductors.

Intrinsic semiconductor - Two types of charge carriers - Energy band diagram of intrinsic semiconductors (at T= 0 K and T > 0 K) - Expression for number of electrons in conduction band - Expression for number of holes in valence band - Law of mass action and intrinsic carrier concentration - Fermi level - Variation of Fermi level with temperature - electrical conductivity - band gap determination.

Extrinsic semiconductors - Draw backs of intrinsic semiconductors – Types of extrinsic semiconductors – 'n'-type and 'p'-type semiconductors – Energy band diagram of 'n' type and 'p' type semiconductors (at T= 0 K and T > 0 K) – Carrier concentration of extrinsic semiconductors (Qualitative Treatment only) – Hall effect –Determination of Hall coefficient – Applications.

Lecture: 45, Tutorial: 00, Total: 45 Hours

Text Book:

1. M.N.Avadhanulu, 'Engineering Physics' S.Chand & Company Ltd, New Delhi (2015)
2. B. K. Pandey and S. Chaturvedi, Engineering Physics , Cengage Learning India Pvt. Ltd., Delhi, 2019

References:

1. Engineering Physics, Sonaversity, Sona College of Technology, Salem (Revised Edition 2018).
2. Rajendran, V, and Marikani A, 'Materials science' TMH Publications, (2004) New Delhi.
3. Palanisamy P.K, 'Materials science', SciTech Publications (India) Pvt. Ltd., Chennai, Second Edition (2007)
4. D. K. Bhattacharya, Poonam Tandon "Engineering Physics" Oxford University Press 2017.

Dr. C. Shanthi
HOD / Science
Dr. C. SHANTHI, M.Sc.,M.E.,Ph.D.,
Professor of Physics
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Sona College of Technology (Autonomous)
SALEM-636 005

I SEMESTER (ECE)

COURSE CODE	**U19CHE104C**	L T P C
COURSE NAME	**CHEMISTRY OF ORGANIC ELECTRONICS**	4 0 0 4

Course outcome:

At the end of the course the students will be able to

- **CO1** Outline the basic principles of organic electronic materials.
- **CO2** Analyze the types of various advanced materials and their uses.
- **CO3** Describe the construction, working principle of conducting polymeric materials.
- **CO4** Demonstrate the synthetic methods of conducting polymers.
- **CO5** Outline the modern applications of organic materials.

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
COs, POs PSOs Mapping	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO – 1	3	3												2
CO – 2	3	3												2
CO – 3	3	3												2
CO – 4	3	3												2
CO - 5	3	3												2

UNIT I: INTRODUCTION TO ORGANIC ELECTRONIC MATERIALS 12

Introduction to organic electronic materials and their basic properties; charge transport and energy structure of organic materials; Optical properties of organic electronic materials-energy levels, color change, light emission (fluorescence and phosphorescence) and absorption-electrochemical properties of organic electronic materials - Liquid crystalline small molecules and polymers-basic properties of liquid crystalline molecules.

UNIT II: ADVANCED MATERIALS FOR ORGANIC ELECTRONICS 12

Pentacene transistors – performance - Engineered pentacenes – Reversible functionalization – end - substituted derivatives – perifunctionalized pentacenes – Heteropentacenes - Various types of graphene nano ribbons (GNRs) - simple synthesis and structure property relationships - Electronic properties of graphene and GNRs - General applications of graphene-based materials.

UNIT III: INTRODUCTION TO CONDUCTING POLYMERIC MATERIALS 12

Conduction mechanism in conductive polymers e.g. Polyaniline (PANI) and Polypyrrole (PPY), polythiophene - Concept of Polarons and solitons. Doping process in conducting polymers- optoelectronic functions of conducting polymeric materials-Electro active (redox type) conducting polymers-Various general applications of conducting polymers.

UNIT IV: SYNTHESIS OF CONDUCTING POLYMERS **12**

Synthesis, structure, morphology, conductivity doping, theory and uses of Poly(sulfur nitride), polyacetylene, polyphenylene, poly(para-phenylene), poly(phenylenevinylenes), poly(phenylene sulfide), Polypyrrole and Polythiophene, Polyaniline, Stacked Phthalocyanine polymers - Polymers with transition metals in the side-group structure and their uses.

UNIT V: MODERN APPLICATIONS OF ORGANIC MATERIALS **12**

Construction working principle and applications of organic materials: Organic solar cells (OSCs) - dye sensitized solar cell, bulk heterojunction solar cell, perovskite solar cell – Organic light emitting diode (OLED) - Organic field effect transistor (OTFT) – Graphene nano ribbons (GNRs) - thermoelectric generators - basic principle - device configuration-general device fabrication techniques.

Total: 60 HOURS

Text Books:

1. Hagen Klauk, Organic Electronics: Materials, Manufacturing and Applications, Wiley – VCH. Weinheim, 2006.
2. C. Saravanan et al, "Chemistry of Organic Electronics", Sonaversity, Sona College of Technology, Salem, 2019.

Reference Books:

1. Kiichi Takemoto, Raphael M. Ottenbrite, MikiharuKamachi, "Functional Monomers and Polymers", CRC Press, New York.
2. Kaiser A B, Electronic properties of conjugated polymers, basics, models and applications, Springer verlag, Berlin.
3. Chilton J A and Goosey M T, Special polymers for electronics and optoelectronics, Kluwer Academic Pub. London.

Dr. C. Shanthi
HOD/Sciences
Dr. C. SHANTHI, M.Sc.,M.E.,Ph.D.,
Professor of Physics
Head, Department of Sciences
Sona College of Technology (Autonomous)

U19PPR105 PROBLEM SOLVING USING PYTHON PROGRAMMING 3 0 0 3

(Common to ADS, IT, CSE, ECE, EEE, BME, MCT, AIML & CSD)

COURSE OUTCOMES

At the end of course, the students will be able to

1. Develop algorithmic solutions to simple computational problems
2. Write simple Python programs
3. Write programs with the various control statements and handling strings in Python
4. Develop Python programs using functions and files
5. Analyze a problem and use appropriate data structures to solve it.

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	3	1	1	2	2	1	3	3	3
CO2	3	3	3	3	3	2	1	1	1	1	1	3	3	3
CO3	3	3	3	3	3	3	2	1	1	1	1	3	3	3
CO4	3	3	3	3	3	2	2	1	1	2	1	3	3	3
CO5	3	3	3	3	3	3	3	1	1	1	1	3	3	3

UNIT I - ALGORITHMIC PROBLEM SOLVING 9

Need for computer languages, Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion).

UNIT II - BASICS OF PYTHON PROGRAMMING 9

Introduction-Python Interpreter-Interactive and script mode -Values and types, variables, operators, expressions, statements, precedence of operators, Multiple assignments, comments, input function, print function, Formatting numbers and strings, implicit/explicit type conversion.

UNIT III - CONTROL STATEMENTS AND STRINGS 9

Conditional (if), alternative (if-else), chained conditional (if-elif-else). Iteration-while, for, infinite loop, break, continue, pass, else. Strings-String slices, immutability, string methods and operations.

UNIT IV - FUNCTIONS AND FILES 9

Functions - Introduction, inbuilt functions, user defined functions, passing parameters - positional arguments, default arguments, keyword arguments, return values, local scope, global scope and recursion. Files -Text files, reading and writing files.

J. Akilandeswari

Dr. J. AKILANDESWARI
PROFESSOR & HEAD
Department of Information Technology
SONA COLLEGE OF TECHNOLOGY

UNIT V - DATA STRUCTURES: LISTS, SETS, TUPLES, DICTIONARIES 9

Lists-creating lists, list operations, list methods, mutability list functions, searching and sorting, Sets-creating sets, set operations. Tuples-Tuple assignment, Operations on Tuples, lists and tuples, Tuple as return value- Dictionaries-operations and methods, Nested Dictionaries.

TOTAL: 45 HOURS

TEXT BOOK

1. Reema Thareja, "Problem Solving and Programming with Python", Oxford University Press, 2018.
2. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 (http://greenteapress.com/wp/think- python/)

REFERENCES

1. Ashok Namdev Kamthane, Amit Ashok Kamthane, "Programming and Problem Solving with Python" , Mc-Graw Hill Education, 2018.
2. Robert Sedgewick, Kevin Wayne, Robert Dondero, "Introduction to Programming in Python: An Inter-disciplinary Approach", Pearson India Education Services Pvt. Ltd., 2016.
3. Timothy A. Budd," Exploring Python", Mc-Graw Hill Education (India) Private Ltd., 2015.
4. Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012.
5. Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem Solving Focus", Wiley India Edition, 2013.

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PROFESSOR & HEAD
Department of Information Technology
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SALEM-636 005

U19BEE106B BASIC ELECTRICAL AND ELECTRONICS ENGINEERING 3 0 0 3

COURSE OUTCOMES:

At the end of the course, the students will be able to,

1. Realize the basic concepts of electrical quantities and components.
2. Understand the working of electrical machines.
3. Analyze the construction and characteristics of semiconductor devices.
4. Examine the BJT formation and its characteristics.
5. Enhance the knowledge on Special Devices

CO / PO, PSO Mapping

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	1	3	2	2	2	3	2	2		1	2	3	3	2
CO2	1	1	2	2	1	3	2	1		3	1	3	1	
CO3	1	3	2	2	2	3	2	2		3	2	3	3	2
CO4	1	2	2	3	2	3	2	1		3	2	3	3	2
CO5	1	2	2	3	2	3	2	1		3	2	3	3	2

UNITI: BASIC OF ELECTRICAL PERCEPTIONS 09

Definition of Electric Voltage, Current, Power, Energy, Ohms law, Limitations of Ohms law, Comparison of AC & DC Signals- Resistance in series and parallel combinations- comparison of series and parallel circuits- Series combination of capacitance and Inductance – Kirchhoff's Law – simple problems.

UNIT II : ELECTRICAL MACHINES 09

DC Generator: construction of DC Generator – working principle of DC Generator – EMF equation – DC Motor: Working principle of DC Motor –Transformer: Working principle of Transformer – EMF equation – Transformation ratio.

UNIT III: PN JUNCTION DIODE AND IT'S APPLICATIONS 09

Energy band theory-Conductor-Insulator-Semiconductor-Doping-formation of N-type and P-type materials-PN junction Diode-VI Characteristics- Zener diode- VI characteristics of Zener-Avalanche break down. - Zener effect-Zener diode as voltage regulator.

UNIT IV: BJT AND ITS APPLICATIONS 09

Bipolar Junction Transistor – construction-Working principle-Regions of transistor-CB, CE, CC Configurations and Characteristics —Application of transistor as a switch.

UNIT V: SPECIAL DEVICES 09

Construction & Characteristics of - Tunnel Diode-Varactor diode-Photo diode- Photo transistor- SCR-TRIAC-DIAC.

Total: 45 Hours

30.06.2022

30/06/2022

Dr.R.S.SABEENIAN, M.E.,MBA,Ph.D.,FIETE,
Professor and Head of Department
Electronics and Communication Engineering

TEXT BOOK

1. D P Kothari and I J Nagrath, "Basic Electrical and Electronics Engineering", Mc Graw Hills (India) Private Limited, 2014.

REFERENCES

1. D. Devaraj, S. K. Bhattacharya, "Basic Electrical and Electronics Engineering", Pearson India, 2016
2. AbhiChakrabarti, Sudipta Debnath, Soumitra Kumar Mandal, "Basic Electrical & Electronics Book ",Mc Graw Hill Education; Fifth Edition, 2016.
3. Ravish Singh, " Basic Electrical & Electronics Engineering", McGraw Hill Education, 2014

30/06/22
Chairperson

BOS-ECE

Dr.R.S.SABEENIAN, M.E.,MBA.,Ph.D.,FIETE,
Professor and Head of Department
Electronics and Communication Engineering
SONA COLLEGE OF TECHNOLOGY,
Salem-636 005. Tamilnadu, India.

U19PPL111 **PYTHON PROGRAMMING LABORATORY** 0 0 2 1

(Common to ADS, IT, CSE, ECE, EEE, BME, MCT, AIML & CSD)

COURSE OUTCOMES

At the end of course, the students will be able to

1. Implement the algorithms using basic control structures in Python
2. Develop Python programs to use functions, strings and data structures to solve different types of problems
3. Implement persistent storing information through file operations

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	3	2	1		1	2	2	1	2	3	3
CO2	3	3	3	3	2	2		1	2	2	1	2	3	3
CO3	3	3	3	3	2	2		1	2	2	1	3	3	3

LIST OF EXPERIMENTS

1. Draw flowchart using any open source software.
2. Implement programs with simple language features.
3. Implement various branching statements in python.
4. Implement various looping statements in python.
5. Develop python programs to perform various string operations like concatenation, slicing, indexing.
6. Implement user defined functions using python.
7. Implement recursion using python.
8. Develop python programs to perform operations on list and tuples
9. Implement dictionary and set in python
10. Implement python program to perform file operations.

TOTAL: 30 HOURS

J. Akil

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U19BEEL113B BASIC ELECTRICAL AND ELECTRONICS LAB 0 0 2 1

COURSE OUTCOMES:

At the end of the course, the students will be able to,

1. Identify the active, passive components and measuring instruments
2. Analyze the electrical quantity at any point of circuit.
3. Design the circuit based on PN junction diode and BJT.

CO / PO, PSO Mapping

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	3	3	2	2	2	1	2	2	3	3	2
CO2	3	3	3	3	3	2	3	2	2	2	3	3	3	3
CO3	3	3	3	3	3	2	3	2	1	2	3	3	3	3

List of Experiments

1. Identification of active and passive electronic components.
2. Study on CRO, Ammeter, Voltmeter, Multi-meter, Function Generator, and DSO.
3. Measurement of DC and AC power supply using measuring instruments.
4. Realization and design problems on ohms law.
5. Realization and design problems on KCL, KVL.
6. VI characteristics analysis of PN junction diode.
7. Input and output characteristics of BJT in CB configuration
8. Input and output characteristics of BJT in CE configuration
9. Input and output characteristics of BJT in CC configuration
10. Realization of transistor as switch.

TOTAL : 30 HOURS

30/06/22

Chairperson

BOS-ECE

Dr.R.S.SABEENIAN, M.E.,MBA.,Ph.D.,FIETE.,
Professor and Head of Department
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SONA COLLEGE OF TECHNOLOGY,
Salem-636 005, Tamilnadu, India.

30.06.2022

Semester-I U19GE101	Basic Aptitude – I (Common to All Departments)	L	T	P	C	Marks
		0	0	2	0	100

Course Outcomes U19GE101

At the end of the course the student will be able to:

1. Solve fundamental problems in specific areas of quantitative aptitude
2. Solve basic problems in stated areas of logical reasoning
3. Demonstrate rudimentary verbal aptitude skills in English with regard to specific topics

1.Quantitative Aptitude and Logical Reasoning	**Solving simple problems with reference to the following topics:** a. Numbers – HCF & LCM b. Decimal fractions c. Simplification d. Square roots & cube roots e. Surds & indices f. Ratio and proportion g. Averages h. Area and volume i. Coding and decoding & artificial language
2. Verbal Aptitude	**Demonstrating plain English language skills with reference to the following topics:** a. Synonyms b. Antonyms c. Verbal analogy d. Editing passages e. Sentence filler words

30 hours

S. Anita

Dr.S.Anita

Head/Training

Department of Placement Training
Sona College of Technology,
Salem-636 005.

Sona College of Technology, Salem – 636 005
(An Autonomous Institution)
Courses of Study for BE / B Tech Semester II under Regulations 2019 (CBCS)
Branch: Electronics and Communication Engineering

S. No	Course Code	Course Title	L	T	P	C	Category	Total Contact Hours
Theory								
1	U19TAM201	தமிழர் மரபு / Heritage of Tamils	1	0	0	1	HSMC	15
2	U19ENG201B	English for Engineers-II	2	0	0	2	HSMC	30
3	U19MAT202C	Transforms and Differential Equations	3	1	0	4	BSC	60
4	U19PHY203B	Physics for ECE	2	0	0	2	BSC	30
5	U19EGR206A	Engineering Graphics	2	0	2	3	ESC	60 (30L+30P)
6	U19EC201	Electronic Devices and Circuits	2	0	2	3	PCC	60 (30L+30P)
7	U19EC202	Circuit Theory	3	0	0	3	PCC	45
Practical								
8	U19WPL212	Workshop Practice	0	0	2	1	ESC	30
9	U19PCL208B	Physics and Chemistry Laboratory	0	0	4	2	BSC	60
10	U19GE201	Basic Aptitude - II	0	0	2	0	EEC	30
Total Credits						**21**		
Optional Language Elective*								
11	U19OLE1201	French	0	0	2	1	HSMC	30
12	U19OLE1202	German						
13	U19OLE1203	Japanese						

*Students may opt for foreign languages viz., German/French/Japanese with additional one credit (Not accounted for CGPA calculation)

Approved by

	30/06/2022		
Chairperson, Science and Humanities BoS	**Chairperson, Electronics and Communication Engineering BoS**	**Member Secretary, Academic Council**	**Chairperson, Academic Council & Principal**
Dr. M. Renuga	**Dr. R.S. Sabeenian**	**Dr. R. Shivakumar**	**Dr. S. R. R. Senthil Kumar**

Copy to:-HOD/ Electronics and Communication Engineering, Second Semester BE ECE Students and Staff, COE

U19TAM201 **HERITAGE OF TAMILS** **L T P C**
1 0 0 1

UNIT I LANGUAGE AND LITERATURE **3**

Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.

UNIT II HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE **3**

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

UNIT III FOLK AND MARTIAL ARTS **3**

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT IV THINAI CONCEPT OF TAMILS **3**

Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.

UNIT V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE **3**

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department ofArchaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

HOD

Dr. M.RENUGA,
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U19TAM201 தமிழர் மரபு **LTPC 1001**

அலகு I மொழி மற்றும் இலக்கியம்: 3

இந்திய மொழிக் குடும்பங்கள் – திராவிட மொழிகள் – தமிழ் ஒரு செம்மொழி – தமிழ் செவ்விலக்கியங்கள் – சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை – சங்க இலக்கியத்தில் பகிர்தல் அறம் – திருக்குறளில் மேலாண்மைக் கருத்துக்கள் – தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் – பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் – சிற்றிலக்கியங்கள் – தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி – தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு II மரபு – பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை – சிற்பக் கலை: 3

நடுகல் முதல் நவீன சிற்பங்கள் வரை – ஐம்பொன் சிலைகள்– பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் – தேர் செய்யும் கலை – சுடுமண் சிற்பங்கள் – நாட்டுப்புறத் தெய்வங்கள் – குமரிமுனையில் திருவள்ளுவர் சிலை – இசைக் கருவிகள் – மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் – தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு III நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்: 3

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு IV தமிழர்களின் திணைக் கோட்பாடுகள்: 3

தமிழகத்தின் தாவரங்களும், விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் – தமிழர்கள் போற்றிய அறக்கோட்பாடு – சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் – சங்ககால நகரங்களும் துறை முகங்களும் – சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி – கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு V இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு: 3

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு – இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் – சுயமரியாதை இயக்கம் – இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு – கல்வெட்டுகள், கையெழுத்துப்படிகள் – தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department ofArchaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

HOD

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L T P C
2 0 0 2

U19ENG201B - English for Engineers – II
First year II semester
ECE

Course Outcome: At the end of course, the students will be able to

1. Frame sentences correctly, both in written and spoken forms of language with accuracy and fluency.
2. Develop and demonstrate listening skills for academic and professional purposes.
3. Draw conclusions on explicit and implicit oral information.
4. Develop effective reading skills and reinforce language skills required for using grammar and building vocabulary.
5. Read for gathering and understanding information, following directions and giving responses.

	COURSE OUTCOMES	PROGRAMME OUTCOMES													
		1	2	3	4	5	6	7	8	9	10	11	12	Ps o1	Ps o2
1	Frame sentences correctly, both in written and spoken forms of language with accuracy and fluency	2	1	2	3	2	3	3	3	3	3	3	3	3	3
2	Develop and demonstrate listening skills for academic and professional purposes	2	2	2	3	2	3	3	3	3	3	3	3	3	3
3	Draw conclusions on explicit and implicit oral information	3	2	2	3	2	3	3	3	3	3	3	3	3	3
4	Develop effective reading skills and reinforce language skills required for using grammar and building vocabulary	3	3	2	3	2	3	3	3	3	3	3	3	3	3
5	Read for gathering and understanding information, following directions and giving responses.	3	3	2	3	2	3	3	3	3	3	3	3	3	3

UNIT –I **6**

- Cause and effect expressions, adjectives, comparative adjectives
- Listening to conversations, welcome speeches, lectures and description of equipment
- Listening to different kinds of interviews (face-to-face, radio, TV and telephone interviews)
- Understanding notices, messages, timetables, advertisements, graphs, etc.
- Reading passages for specific information transfer

UNIT – II 6

- Prepositions and dependent prepositions
- Understanding short conversations or monologues
- Taking down phone messages, orders, notes etc
- Listening for gist, identifying topic, context or function
- Reading documents for business and general contexts and interpreting graphical representations

UNIT – III 6

- Collocations
- Listening comprehension, entering information in tabular form
- Error correction, editing mistakes in grammar, vocabulary, spelling, etc.
- Reading passage with multiple choice questions, reading for gist and reading for specific information, skimming for comprehending the general idea and meaning and contents of the whole text

UNIT – IV 6

- Articles, adverbs
- Intensive listening exercises and completing the steps of a process.
- Listening exercises to categorise data in tables.
- Short reading passage: gap-filling exercise related to grammar, testing the understanding of prepositions, articles, auxiliary verbs, modal verbs, pronouns, relative pronouns and adverbs, short reading passage with multiple choice questions.

UNIT – V 6

- Pronouns
- Listening to extended speech for detail and inference
- Listening and developing hints
- gap-filling exercise testing the knowledge of vocabulary, collocations, dependent prepositions, grammatical structures
- Short reading passages for sentence matching exercises, picking out specific information in a short text

TOTAL: 30 hours

The listening test will be conducted for 20 marks and reading for 20 marks internally and evaluated along with English for Engineers – II in the End Semester Valuation.

Textbook:

Technical English I & II, Dr. M. Renuga et al. Sonaversity, 2016

Extensive Reading

1. Who Moved my Cheese? – Spencer Johnson-G. P. Putnam's Sons
2. Discover the Diamond in You – Arindham Chaudhari – Vikas Publishing House Pvt. Ltd.

Reference

1. Norman Whitby, Business Benchmark – Pre-Intermediate to Intermediate, Students Book, Cambridge University Press, 2006.
2. A Course in Communication Skills, P. Kiranmai Dutt, Geetha Rajeevan, C. L. N. Prakash, published by Cambridge University Press India Pvt. Ltd.

HOD

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B. E. / ELECTRONICS AND COMMUNICATION ENGINEERING

SEMESTER – II	TRANSFORMS AND DIFFERENTIAL EQUATIONS	L	T	P	C
U19MAT202C		3	1	0	4

COURSE OUTCOMES

At the end of the course, the students will be able to

1. apply the classical method to solve linear ordinary differential equations with constant coefficients.
2. apply the Laplace transforms technique and its properties to solve an ordinary differential equation.
3. express a periodic signal as an infinite sum of sine and cosine wave components using Fourier series.
4. apply the Fourier transform techniques to convert the signal in terms of the frequencies of the waves.
5. find the general and singular solutions of linear and nonlinear partial differential equations.

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3		3								2	3	
CO2	3	3		3								2	3	
CO3	3	3		3								2	3	
CO4	3	3		3								2	3	
CO5	3	3		3								2	3	
	3	3		3								2	3	

UNIT – I ORDINARY DIFFERENTIAL EQUATIONS 12

Linear higher order ordinary differential equations with constant coefficients – Cauchy's and Legendre's homogeneous linear ordinary differential equations – Method of variation of parameters.

UNIT – II LAPLACE TRANSFORMS 12

Laplace transform: Conditions for existence – Transform of elementary functions – Basic properties – Transform of derivatives and integrals – Transform of unit step function and impulse function – Initial and final value theorems – Transform of periodic functions.

Inverse Laplace transform: Standard results – Statement of convolution theorem and its applications – Solution of linear second order ordinary differential equations with constant coefficients using Laplace transform.

UNIT – III FOURIER SERIES 12

General Fourier series – Dirichlet's conditions – Change of intervals – Odd and even functions – Half range sine and cosine series – Root mean square – Parseval's identity – Harmonic analysis.

UNIT – IV FOURIER TRANSFORMS 12

Fourier transform pair – Properties – Fourier sine and cosine transforms pair – Properties – Transforms of simple functions – Parseval's identity.

UNIT – V PARTIAL DIFFERENTIAL EQUATIONS 12

Formation of partial differential equations – Lagrange's partial differential equation – Clairaut's form of partial differential equations – Higher order linear partial differential equation with constant coefficients.

Theory: **45 Hours** Tutorial: **15 Hours** Total: **60 Hours**

TEXT BOOKS:

1. T. Veerarajan, "Transforms and Partial Differential Equations", McGraw Hill Publishers, 3rd Edition, 2016.
2. T. Veerarajan, "Engineering Mathematics for Semesters I & II", McGraw Hill Publishers, 1st Edition, 2019.

REFERENCE BOOKS:

1. E. Kreyszig, "Advanced Engineering Mathematics", Wiley Publishers, 10th Edition, Reprint, 2017.
2. C. Prasad and R. Garg, "Advanced Engineering Mathematics", Khanna Publishers, 1st Edition, 2018.
3. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 44th Edition, 2018.
4. B. V. Ramana, "Higher Engineering Mathematics", McGraw Hill Publishers, 29th Reprint, 2017.

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Course Code: U19PHY203B **L T P C**
Course Name: Physics for ECE **2 0 0 2 100**

(for Electronics and Communication Engineering)

COURSE OUTCOMES:
At the end of the course, the students will be able to,

CO1 Illustrate the Divergence and curl of Electrostatic fields.

CO2 Explain polarization process in dielectric materials and their temperature and frequency dependence and the causes of dielectric breakdown.

CO3 Illustrate the Divergence and curl of magnetic field.

CO4 Explain the types of magnetic materials.

CO5 Discuss the novel properties of metallic glasses and nanomaterials.

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
COs, POs PSOs Mapping	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO – 1	3	2	-	-	-	-	-	-	-	-	2	2	-	3
CO – 2	3	2	-	-	-	-	-	-	-	-	2	2	-	3
CO – 3	3	2	-	-	-	-	-	-	-	-	2	2	-	3
CO – 4	3	2	-	-	-	-	-	-	-	-	2	2	-	3
CO - 5	3	2	-	-	-	-	-	-	-	-	2	2	-	3

Unit 1 Electrostatics **6**

Electric field - Coulomb's Law – Electric field intensity – Field due to discrete and continuous charges.

Divergence and curl of Electrostatic fields – Electric lines of forces – Electric flux – Gauss's law – Divergence of E – Applications of Gauss's law – Curl of E.

Unit 2 Dielectric Materials **6**

Basic definitions – Electric dipole – Electric dipole moment – Electric field – Electric displacement vector - Electrical susceptibility – Dielectric constant.

Dielectric polarization - Electronic, ionic, orientation and space charge polarization - Frequency and temperature dependence of polarization - Internal field – Clausius-Mosotti relation (no derivation) - Dielectric loss - Dielectric breakdown - Uses of dielectric materials (capacitor and transformer) .

Unit 3 Magnetostatics 6

Magnetic Lorentz force – Magnetic fields – Magnetic Lorentz force – Force experienced by current carrying conductor in magnetic field.

Biot - Savart Law – Steady currents – Magnetic field due to steady current.

Divergence and Curl of B – Straight line currents – Ampere's circuital law – Divergence and curl of B – Applications of Ampere's circuital law – Comparison of Magnetostatics and electrostatics.

Unit 4 Magnetic materials 6

Basic definitions - Magnetic moment - Magnetic field - Magnetic field intensity - Magnetic permeability - Magnetization - Intensity of magnetization - Magnetic susceptibility

Types of magnetic materials - Dia , Para , and Ferromagnetic materials - Domain theory and origin of domains – Anti ferromagnetic materials - Ferrites - Structure, properties and applications - hysteresis - Hard and soft magnetic materials.

Unit 5 New Engineering Materials: 6

Metallic glasses -Preparation, properties and applications.

Nanoscience and Nanotechnology - Significance of nanoscale - different types of nanostructures (0-D, 1-D, 2-D and 3-D) - Fabrication of nanomaterials - Ball milling and Chemical vapour deposition technique (CVD).

Carbon nanotubes - structure - properties and applications - fabrication - pulsed laser deposition method.

Lecture: 30, Tutorial: 00, Total: 30 Hours

Text Book:

1. M.N.Avadhanulu, 'Engineering Physics' S.Chand & Company Ltd, New Delhi (2015)
2. D. K. Bhattacharya, Poonam Tandon "Engineering Physics" Oxford University Press 2017.

References:

1. Engineering Physics, Sonaversity, Sona College of Technology, Salem (Revised Edition 2018).
2. B. K. Pandey and S. Chaturvedi, Engineering Physics , Cengage Learning India Pvt. Ltd., Delhi, 2019
3. Rajendran, V, and Marikani A, 'Materials science' TMH Publications, (2004) New Delhi.

4. Palanisamy P.K, 'Materials science', SciTech Publications (India) Pvt. Ltd., Chennai, Second Edition (2007)

30.6.2022

Dr. C. Shanthi
HOD / Science

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U19EGR206A – ENGINEERING GRAPHICS

L	T	P	C
2	0	2	3

Course Outcomes: Upon completion of this course the students will be able to

CO1 Predict the construction of various curves in civil elevation, plan and machine components.

CO2 Analyze the principles of projection of various planes by different angle to project points, lines and planes.

CO3 Draw the principles of projection of simple solid by the axis is inclined to one reference plane by change of position method.

CO4 Understand the interior details of complex components, machineries by sectioning the solid body. Study the development of surfaces for prisms and pyramids.

CO5 Draw the projection of three dimensional objects representation of machine structure and explain standards of orthographic views by different methods.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
COs, POs PSOs Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	2	2	1	1	1	1	1	3	2	2	3	2	2
CO 2	3	2	2	1	2	1	1	1	3	2	2	3	2	2
CO 3	3	2	2	1	2	1	1	1	3	2	2	3	2	2
CO 4	3	2	2	1	2	1	1	1	3	2	2	3	2	2
CO 5	3	2	2	1	1	1	1	1	3	2	2	3	2	2

UNIT I – PLANE CURVES (Manual drafting) 06

Curves used in engineering practices Conics – Construction of ellipse – Parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves.

UNIT II – PROJECTION OF POINTS, LINES AND PLANE SURFACES (CAD software) 12

Projection of points – Projection of straight lines located in the first quadrant – Determination of true lengths and true inclinations – Projection of polygonal surface and circular lamina inclined to one reference planes.

UNIT III – PROJECTION OF SOLIDS (CAD software) 12

Creation of 3D CAD models of pyramids, prisms and solids of revolutions-Sectional views - **(Not for Examination)**

Projection of simple solids like prisms – pyramids – cylinder and cone when the axis is inclined to one reference plane by change of position method.

UNIT IV – SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES (CAD software) 12

Sectioning of simple solids like prisms – pyramids, cylinder and cone in simple vertical position by cutting planes inclined to one reference plane and perpendicular to theother, (Obtaining true shape of section is not required). Development of lateral surfaces of simple and truncated solids – Prisms – pyramids –cylinders and cones.

UNIT V – Conversion of Isometric Views to Orthographic Views (Manual drafting) **12**

Representation of three dimensional objects – General Principles of Orthographic projection – Need for importance of multiple views and their placement – First angle projection – layout of views – Developing visualization skills through free hand sketching of multiple views from pictorial views of objects.

TOTAL: 60 Hours

TEXT BOOKS

1. P. Suresh et al., "Engineering Graphics and Drawing", Sonaversity, Sona College of Technology, Salem, Revised edition, 2012.
2. K.V. Natarajan Engineering Graphics by, Chennai, 17th edition 2003.

REFERENCES

1. Dhananjay A. Jolhe, Engineering Drawing with an introduction to AutoCAD, Tata McGraw Hill Publishing Company Limited, 2008.
2. Basant Agarwal and Agarwal C.M., Engineering Drawing, Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
3. K. R. Gopalakrishnana, Engineering Drawing (Vol. I & II), SubhasPublications, 1998.
4. Bertoline & Wiebe fundamentals of graphics communication III edition McGrawhill 2002

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COURSE OUTCOMES

At the end of the course, the student will be able to,

1. Design the different types of power supply.
2. Analyze the various transistor biasing techniques
3. Analyze the working principle of FET and MOSFET.
4. Calculate the cut-off frequencies and bandwidth of BJT amplifier circuits.
5. Analyze the mid-band frequency operation of BJT small signal amplifier.

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO	PSO1	PSO2
CO1	3	3	3	3	3		2			2	3	2	3	3
CO2	3	3	3	3	3		2			2	3	2	3	3
CO3	3	3	3	3	3		2			2	3	2	3	3
CO4	3	3	3	3	3		2			2	3	2	3	3
CO5	3	3	3	3	3		2			2	3	2	3	3

UNIT I POWER SUPPLIES AND RECTIFIERS **12**

Classification of power supplies, Rectifiers - Half-wave, full-wave and bridge rectifiers with resistive load. Regulators using IC 78xx. Analysis for V dc and ripple voltage with C, L, LC and CLC filters.

UNIT II TRANSISTOR BIASING **12**

BJT – Need for biasing – Stability factor - Fixed bias circuit, Load line and quiescent point - Stability factors – Different types of biasing circuits - Method of stabilizing the Q point - Advantage of Self bias (voltage divider bias) over other types of biasing- self bias as a constant current circuit.

UNIT III FIELD EFFECT TRANSISTORS **12**

JFETs – Drain and Transfer characteristics -Current Equations - Pinch off voltage and its significance-MOSFET- Characteristics- Threshold voltage -Channel length modulation, Characteristics – Comparison of MOSFET with JFET.

UNIT IV FREQUENCY RESPONSE OF AMPLIFIERS **12**

General shape of frequency response of amplifiers - Definition of cut-off frequencies and bandwidth - Low frequency analysis of amplifiers to obtain lower cut-off frequency Hybrid equivalent circuit of BJTs - High frequency analysis of BJT amplifiers to obtain upper cut-off frequency – Gain Bandwidth Product.

UNIT V MID-BAND ANALYSIS OF SMALL SIGNAL AMPLIFIERS **12**

CE, CB and CC amplifiers - Method of drawing small-signal equivalent circuit - Miller's theorem - Comparison of CB, CE and CC amplifiers and their uses – Methods of increasing input impedance using Darlington connection and bootstrapping.

Total: 60

TEXT BOOKS

1. Millman and Halkias, " *Integrated Electronics*", 2nd Edition, Tata Mc Graw Hill, 2016.
2. Anil K. Maini and Varsha Agrawal, "*Electronics Devices and Circuits*", First Edition, Wiley Publications, 2009.

REFERENCE BOOKS

1. S. Salivahanan, N. Suresh Kumar and A. Vallavaraj, " *Electronic Devices and Circuits*", 4nd Edition, TMH, 2017
2. Y.N. Bapat, "*Electronic devices and circuits, Discrete and Integrated*", 3rd Edition, Tata Mc Graw Hill, 2011
3. Marilyn Wolf, "Computers as Components - Principles of Embedded Computing System Design", 4th Edition —Morgan Kaufmann Publisher (An imprint from Elsevier), 2016

31/03/2023
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U19EC202 **CIRCUIT THEORY** L T P C

3 0 0 3

COURSE OUTCOMES

At the end of the course, the student will be able to,

6. Apply basic laws to calculate the voltage, current and power for electric circuits.
7. Identify the network topologies of circuits.
8. Analyze various dc circuits using network theorems.
9. Analyze the resonant circuits and coupled circuits.
10. Analyze the two port networks for various parameters.

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3		2			2	3	2	3	3
CO2	3	3	3	3	3		2			2	3	2	3	3
CO3	3	3	3	3	3		2			2	3	2	3	3
CO4	3	3	3	3	3		2			2	3	2	3	3
CO5	3	3	3	3	3		2			2	3	2	3	3

UNIT I **BASICS OF CIRCUIT ANALYSIS** **12**

Mesh and Nodal analysis – Star Delta Transformation Techniques –Concept of Duality – Dual Network – Graphs of a Network – Trees, Twig, Link and Branches – Incidence Matrix – Tie-Set Matrix Formation and Cut-Set Matrix Formation of a Graph.

UNIT II **- CIRCUIT THEOREMS** **12**

DC analysis : Superposition Theorem – Thevenin's Theorem – Norton's Theorem – Reciprocity Theorem – Maximum Power Transfer Theorem – Tellegen's Theorem.

UNIT III **SERIES RESONANT CIRCUITS AND COUPLED CIRCUITS** **12**

Resonances-Series Resonance – Impedance and Phase Angle of a Series Resonance Circuit – Voltages and Currents in a Series Circuit – Quality Factor. Coupled Circuits: Self-Inductance – Mutual Inductance – Dot Conversion – Coupling Coefficient.

UNIT IV **TRANSIENTS** **12**

DC Response of an R-L Circuit – DC Response of an R-C Circuit – DC Response of an R-L-C Circuit – Sinusoidal Response of R-L Circuit – Sinusoidal Response of R-C Circuit – Sinusoidal Response of R-L-C Circuit.

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UNIT V TWO PORT NETWORKS **12**

Two port Network – Open Circuit Impedance (Z) Parameters – Short Circuit Admittance (Y) Parameters –Transmission (ABCD) Parameters – Hybrid (h) Parameters –Inter Relationship of Different Parameters .

Total:45

TEXTBOOKS

1. A Sudhakar, Shyammohan S Palli, "Circuits and Networks Analysis and Synthesis", Mc-Graw Hill, 2019.

REFERENCE BOOKS

4. Ravish R Singh," Networks Analysis and Synthesis", Mc-Graw Hill Education, 2019
5. M.L. Soni and J.C. Gupta, A Course in "Electrical Circuits Analysis", Dhanpat Rai & Co, 2015
6. Abhijit Chakrabarti, "Circuit Theory Analysis and Synthesis", Dhanpat Rai & CO. (Pvt).Ltd, Educational and technical publishers.

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U19WPL212 - WORKSHOP PRACTICE

L	T	P	C
0	0	2	1

Course Outcomes: Upon completion of this course the students will be able to

CO1: Familiarize with the basic of tools and equipment's used in fitting, carpentry, welding and sheet metal.

CO2: Fabricate the different simple products in above trades.

CO3: Produce different joining of metals.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
COs, POs PSOs Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	2	3	2	1	3	3	2	3	2	3	3	2	2
CO 2	3	2	3	2	1	3	3	2	3	2	3	3	2	2
CO 3	3	2	3	2	1	3	3	2	3	2	3	3	2	2

LIST OF EXPERIMENTS

SECTION 1: FITTING

Tools and Equipment's- Practice in filling.

Making of Vee joint and square (T-fitting) joint.

SECTION 2: SHEET METAL

Tools and Equipment's- Practice

Making of Dust Pan and Funnel.

SECTION 3: WELDING

Tools and Equipment's – Practice

Arc welding of Butt joint and Lap Joint.

SECTION 4: CARPENTRY

Tools and Equipment's- Planning Practice

Making of Half Lap joint and Dovetail Joint.

TOTAL: 30 hours

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DEPT. OF MECHANICAL ENGG.
SONA COLLEGE OF TECHNOLOGY
JUNCTION MAIN ROAD, SALEM-5.

U19PCL208B	PHYSICS AND CHEMISTRY LABORATORY [For ECE]	L	T	P	C
		0	0	4	2

	Course Outcomes
	After successful completion of this course, the students should be able to
CO1:	Apply the principles of Optics, Electricity and Elasticity to determine the Engineering properties of materials.
CO2:	Identify hardness and suggest the quality of water suitable for domestic purpose and analyze the concentration of carbonate, bicarbonate and hydroxide present in the given sample of water.
CO3:	Determine the thickness and resistivity of the given copper turn used for house hold applications and determine the amount of pH of house hold water sample and suggest the remedial measures.

Pre-requisite: Capable of using Screw guage, Vernier calliper, Travelling microscope, Spectrometer, able to handle burette and pipette

CO/PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3			1		1					1			2
CO2	3			1		1					1			2
CO3	3			1		1					1			2

Course Assessment methods

Direct		Indirect
Mean of 1st half of Experiment (10)	Quiz on 2nd half (5)	Course end survey
Quiz on 1st half (5)	Internal test II (10)	
Internal test I (10)	RTPS (10)	
Mean of 2nd half of Experiment (10)	End semester Examination (40)	

List of Experiments (Physics part)

1	Determination of the thickness of a thin wire by forming interference fringes using air wedge apparatus.
2	Determination of dispersive power of the prism for various pairs of colors in the mercury spectrum using a spectrometer.
3	Determination of laser wavelength, particle size of lycopodium powder, acceptance angle and numerical aperture of an optical fibre using diode laser.
4	Determination of specific resistance of a given wire using Carey Foster's bridge.
5	Determination of band gap of the given semiconductor diode.
6	Determination of velocity of ultrasonic waves and compressibility of the given liquid using ultrasonic interferometer.
7	Determination of wavelength of the prominent colors in the mercury spectrum using a spectrometer.
8	Determination of the Young's modulus of the given material by non-uniform bending method.
9	Determination of coefficient of viscosity of the given liquid by Poiseuille's method.
10	Determination of rigidity modulus of the material using torsion pendulum.
List of Experiments (Chemistry part)	
11	Estimation of hardness of water sample by EDTA method.
12	Estimation of alkalinity of water sample by indicator method.
13	Estimation of copper in brass by EDTA method.
14	Estimation of HCl by pH metry.
15	Determination of iron content in water by spectrophotometric method.
16	Estimation of HCl by conductometry. (HCl vs NaOH)
17	Estimation of mixture of acids by conductometry. (HCl + CH_3COOH vs NaOH)
18	Estimation of ferrous ion by potentiometric titration.
19	Determination of Molecular weight of a polymer by viscosity measurements.
20	Estimation of chromium in waste water.
	Total Hours: 60 Hrs

30.6.2022

Dr. C. Shanthi
HOD / Sciences

r. C. SHANTHI, M.Sc.,M.E.,Ph.D.,
Professor of Physics
Head, Department of Sciences
na College of Technology (Autonomous)
SALEM-636 005.

Semester-II	Basic Aptitude – II - U19GE201 (Common to All Departments)	L	T	P	C	Marks
		0	0	2	0	100

Course Outcomes

At the end of the course the student will be able to:

1. Solve more elaborate problems than those in BA-I* in specific areas of quantitative aptitude
2. Solve problems of greater intricacy than those in BA-I in stated areas of logical reasoning
3. Demonstrate higher than BA-I level verbal aptitude skills in English with regard to specific topics

1.Quantitative Aptitude and Logical Reasoning	**Solving quantitative aptitude and logical reasoning problems with reference to the following topics:** a. Profit & loss b. Partnership c. Chain rule d. Numbers e. Ages f. Percentages g. Logarithms h. Geometry i. Direction sense j. Symbols and series
2.. Verbal Aptitude	**Demonstrating verbal aptitude skills in English with reference to the following topics:** a. Jumbled sentences b. Reconstructions of sentences (PQRS) c. Sentence fillers two words d. Idioms and phrases e. Spotting errors f. Writing captions for given pictures

S. Anita

Dr.S.Anita

Head/Training

Dr. S. ANITA
Professor and Head
Department of Training,
SONA COLLEGE OF TECHNOLOGY,
SALEM-636 005.

French Language A1 Level 2/A2
First year II semester

Course code: U19OLE1201 **0 0 2 1**

Course Outcomes : At the end of completion of this course, students will be able to,

1. Accept and refuse of an invitation, give some instruction of do's and don'ts, converse in commercial centres, write an invitation
2. Describe a city, locate a place in a city, ask further details, describe one's hometown
3. Talk about things around us, recite a past event, identify sign boards, express agree and disagree, express obligation and prohibition, sell an object in online
4. Talk about one's goals, express one's feelings, write a list of things to do, express an opinion, talk about weather, draft a mail response
5. Express one's interest and wish, describe a pet animal, express one's aversions, encourage others, write to ask for a help, narrate a past event, write a biography

Unit-I Gouter à la campagne **6 hours**

Hr 2: City shopping and services, conjugation: payer, manger and acheter, negative sentence

Hr 4: Imperative sentence, food and beverages, utensils, cutleries, corckeries

Hr 6: Quantitative articles, quantities, pronoun 'en', express appreciation, write an invitation

Unit-II Voyager dans sa ville **6 hours**

Hr 8: City and localities, Conjugation: prendre, adjectives of place, pronoun 'y'

Hr 10: Transport, leisure activities, preposition of place, degrees of comparison

Hr 12: Asking information about a new place, describe a city

Unit-III Faire du neuf avec du vieux **6 hours**

Hr 14: Things in a store, conjugation : faire, imparfait 2, passé composé

Hr 16: Things in a repairing shop, computer, relative pronouns: que and qui

Hr 18: Imperative negative, express obligation and interdiction, online sale and response

Unit-IV Changer d'air **6 hours**

Hr 20: Professions, conjugation: croire, voir, recent past tense

Hr 22: Traveling formalities, expressing about health condition, future tense

Hr 24: Pronoun COD, talk about weather condition, write about one's plans and projections

Unit-V Devenir éco-citoyen **6 hours**

Hr 26: Citizenship and solidarity, conjugation: connaitre and savoir, depuis vs pendant

Hr 28: Imparfait vs passé composé, nature and environment, indirect pronouns COI

Hr 30: Animals, conditional, talk on supporting others, write a biography

Total : 30 hours

Text Books

1. The course faculty will provide relevant audios, videos, handouts and notes.
2. Books : Saison (Méthode de français, cachier d'activités)
3. Reference books : La conjugaison, Dondon, Echo

Dr. M. Renuga
BoS – Chairperson,
Science & Humanities
HOD / H&L

Dr. M.RENUGA,
Professor & Head,
Department of Humanities & Languages,
Sona College of Technology,
SALEM - 636 ...

German Language Course

First year II semester

Course Code: U19OLE1202

L T P C
0 0 2 1

Course Outcomes: At the end of the course, students should be able to,

1. Use grammatical expressions appropriately in day-to-day conversation.
2. Make them frame simple sentences /questions.
3. Accentuate to start and sustain basic conversation
4. Helps them articulate thoughts in German
5. Identify the different forms of the verb.

UNIT – I **6**

- Nominative/accusative case, adjectives

UNIT – II **6**

- Modes of transportation, orientation, giving/understanding simple directions

UNIT – III **6**

- Food and beverages, Modal verbs, Separable verbs

UNIT – IV **6**

- Simple sentences using modal / separable verbs

UNIT – V **6**

- Articles of clothing

Total : 30 hours

Text Book
Netzwerk A1

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HOD / H&L

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Sona College of Technology,
SALEM - 636 .

Course Code: U19OLE1203 Japanese Language: Level – II 0 0 2 1
First year II semester

Course Outcomes: At the end of completion of this course, students will be able to,

1.0 Use verbs in polite conversation or for dissuasion and describe two different activities
2.0 Demonstrate the application of causative verbs and those that express ability or possibility, and describe experiences
3.0 Use plain-style expressions, those that state opinions, and verbs and adjectives that go with nouns
4.0 Express sentences that use 'when' and 'if' and those that describe how services are given and received
5.0 Read 126 letters of Kanji, and demonstrate adequate knowledge of the lessons learnt in Levels I and II to pass the Japanese Language Proficiency Test (JLPT) for the N5 Level

•••

Unit-I **6 hours**

Hr 1-2: Words and verbs expressing requests / Kanji 1-10

Hr 3-4: Asking for permission; making statements to prohibit something / Kanji 11-20

Hr 5-6: Describing two activities / Kanji 21-30

Unit-II **6 hours**

Hr 7-8: Verbs that express 'I have to ...' / Kanji 31-40

Hr 9-10: Verbs which express ability or possibility / Kanji 41-50

Hr 11-12: Describing experience / Kanji 51-60

Unit-III **6 hours**

Hr 13-14: Plain-style expressions / Kanji 61-70

Hr 15-16: Expressions like 'I think that …' / Kanji 71-80

Hr 17-18: Qualifying nouns with verbs and adjectives / Kanji 81-90

Unit-IV **6 hours**

Hr 19-20: Expressions using 'When …' / Kanji 91-100

Hr 21-22: Describing the giving and receiving of services / Kanji 101-110

Hr 23-24: Expressions using 'If …' / Kanji 111-126

Unit-V **6 hours**

Hr 25-26: Preparing for JLPT N5

Hr 27-28: Preparing for JLPT N5

Hr 29-30: Preparing for JLPT N5

Total : 30 hours

Text Books

1. The course faculty will provide handouts / notes / course material.
2. Books on Basic Japanese language available in the college library.

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BoS – Chairperson,
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ECE
III

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester III Regulations 2019
Branch: Electronics and Communication Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
Theory							
1.	U19MAT301C	Probability and Stochastic Processes	3	1	0	4	60
2.	U19EC301	Signals and Systems	3	1	0	4	60
3.	U19EC302	Digital Electronics	3	0	0	3	45
4.	U19EC303	Electronic circuits	3	0	0	3	45
5.	U19CS307	Programming in C	3	0	0	3	45
6.	U19TAM301	தமிழரும் தொழில்நுட்பமும் /Tamils and technology	1	0	0	1	15
7.	U19GE303	**Mandatory Course:** Essence of Indian Traditional knowledge	2	0	0	0	30
Practical							
8.	U19EC304	Digital Electronics laboratory	0	0	2	1	30
9.	U19EC305	Electronic Circuits and Simulation laboratory	0	0	2	1	30
10.	U19CS308	C programing laboratory	0	0	2	1	30
11.	U19GE301	Soft Skills and Aptitude – I	0	0	2	1	30
					Total Credits	**22**	**420**

Approved By

5/7/2023

Chairman, Electronics and Communication Engineering BoS
Dr.R.S.Sabeenian

Member Secretary, Academic Council
Dr.R.Shivakumar

Chairperson, Academic Council & Principal
Dr.S.R.R.Senthil Kumar

Copy to:-

HOD/Electronics and Communication Engineering, Third Semester BE ECE Students and Staff, COE

U19EC301 SIGNALS AND SYSTEMS (Common for ECE & BME) 3 1 0 4

Course Outcomes

At the end of each unit, the students will be able to

1) Classify the signals as continuous time and discrete time signals and classify systems based on their properties
2) Determine the response of LTI system using convolution sum for DT system and Convolution Integral for CT system
3) Apply Fourier series and Fourier Transform for periodic Signals
4) Analyze system using Laplace transform and realize the structure for CT system
5) Analyze system using Z transform and realize the structure for DT system

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	1	2	1				1	2	1	3	3
CO2	3	2	2	1		1		2		1	2	1	3	3
CO3	3	3	1		2	1	2	2		1	2	1	3	3
CO4	3	3	2	2		1		2		1	2	1	3	3
CO5	3	3	2	1	2	1	2	2		1	2	1	3	3

Unit I CLASSIFICATION OF SIGNALS AND SYSTEMS **12**

Continuous-Time and Discrete-Time signals–The Unit Impulse Unit Step, Unit Ramp Signals and other Basic Signals – Operation of Signals -Time Shifting – Time Reversal – Amplitude Scaling – Time Scaling – Signal Addition – Multiplications – Classification of signals- Continuous-Time and Discrete-Time Systems– Basic System Properties - Systems with and Without Memory – Causality – Stability – Time Invariance – Linearity

Unit II LINEAR TIME- INVARIANT SYSTEMS **12**

Continuous-Time LTI Systems: The Convolution Integral - graphical and analytical approach – Properties of Linear Time-Invariant Systems – Solution of Differential Equations. Discrete-Time LTI system: The Convolution sum-tabulation method-matrix multiplication method-graphical and analytical approach – Solution of Difference Equations.

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Unit III **ANALYSIS OF CT SIGNALS USING FOURIER SERIES & FOURIER TRANSFORM** **12**

Fourier Series Representation (Trigonometric and Exponential) of Continuous-Time Periodic Signals – Properties of Continuous-Time Fourier Series – Representation of Aperiodic Signals: The Continuous-Time Fourier Transform – The Fourier Transform for Periodic Signals – Properties of the Continuous-Time Fourier Transform.

Unit IV **ANALYSIS OF SIGNALS AND SYSTEMS USING LAPLACE TRANSFORM** **12**

The Laplace Transform – The Region of Convergence for Laplace Transform– The Inverse Laplace Transform using Partial fraction– Properties of the Laplace Transform– System Function and Block Diagram Representations-Direct Form I and Direct Form II.

Unit V **ANALYSIS OF SIGNALS AND SYSTEMS USING Z-TRANSFORM** **12**

The Z-Transform – The Region of Convergence for the Z-Transform –The Inverse Z-Transform using Partial fraction and Long division method– Properties of the Z-Transform – System Function and Block Diagram Representations-Direct Form I and Direct Form II.

TOTAL : 60 HOURS

Text Book

1) Alan V. Oppenheim, Alan S. Willsky, S. Hamid Nawab, "Signals and Systems", 2nd E, Prentice Hall India, 2010
2) A.Anand Kumar, "Signals and Systems", 3rd Edition, Prentice Hall India,2013

References

1) M .J. Roberts, "Signals & Systems Analysis using Transform Methods & MATLAB", Tata McGraw Hill, 2007
2) Haykin, Simon, and Barry Van Veen. "Signals and systems", John Wiley & Sons, 2007. 3. A. NagoorKani, "Signals & Systems", Tata McGraw Hill, 2010
3) John G. Proakis, Dimitris G. Manolakis, "Digital Signal Processing, Principles, Algorithms, and Applications", 4th E, PHI, 2007
4) Robert A. Gable, Richard A. Roberts, "Signals & Linear Systems", 3rd E, John Wiley, 1995
5) Edward W Kamen& Bonnie's Heck, "Fundamentals of Signals and Systems", Pearson Education, 2007

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Course Outcomes

At the end of the course, the student will be able to

1) Explain number systems, logic gates, logic functions and simplify Boolean expressions
2) Design and analyze combinational logic circuits
3) Design of sequential logic circuits
4) Design and implement shift registers and counters
5) Implement combinational circuits using Programmable Logic Devices

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	2	2	1	1		2	3	3	3
CO2	3	3	3	3	3	2	2	1	1		2	3	3	3
CO3	3	3	3	3	3	2	2	1	1		2	3	3	3
CO4	3	3	3	3	3	2	2	1	1		2	3	3	3
CO5	3	3	3	3	3	2	2	1	1		2	3	3	3

Unit I NUMBER SYSTEM, BOOLEAN ALGEBRA AND LOGIC GATES **9**

Review of Number systems – Boolean Algebra – Basic Theorems and Properties of Boolean Algebra – Boolean Functions – Canonical and Standard Forms – Digital Logic Gates - NAND and NOR Implementation –Simplification of Boolean functions using K-Map Method – Four Variable K-map – POS Simplification – Don't Care Conditions – Tabulation method– TTL – ECL – CMOS Logic Circuits.

Unit II COMBINATIONAL LOGIC CIRCUITS **9**

Analysis Procedures – Design Procedures – BCD to Excess-3–Parallel Adders and Subtractors – BCD Adder –Binary Multiplier – Magnitude Comparator – Decoders – Encoders – Multiplexers – Demultiplexers – Introduction to Verilog HDL – Verilog HDL code for 2 bit adder – 2:1 Multiplexer.

05/07/23

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Unit III **SEQUENTIAL LOGIC CIRCUITS** **9**

Flip-Flops – SR – D- JK-T– Master Slave JK Flip-Flop – Conversion of Flip Flops – Design of Clocked Sequential Circuits = State Diagram = State Table = State Reduction and Assignment

Unit IV **REGISTERS AND COUNTERS** **9**

Registers – Shift Registers – SISO – SIPO – PIPO — Synchronous Counters – Up-down Binary Counter – Ring Counter – Johnson Counters – Asynchronous Counters – Asynchronous Design Procedure – Race Free State Assignment – Hazards

Unit V **MEMORY AND PROGRAMMABLE LOGIC** **9**

Classification of memories: RAM - Static and Dynamic RAM, ROM - PROM, EPROM, EEPROM - Memory Decoding – Read/Write access - Implementation of combinational logic using PROM - Programmable Logic Array – Programmable Array Logic.

TOTAL : 45 HOURS

Text Book

1) M. Morris Mano and Michael D. Ciletti – '*Digital Design with an Introduction to the Verilog HDL*', 6th Edition, Pearson Education, 2018

References

1) John F Wakerly – '*Digital Design Principles and Practices*', 4th Edition, Prentice Hall India, 2008.
2) Schilling, Herbert Taub and Donald, 'Digital Integrated Electronics', Tata McGraw-Hill, 2008
3) A.Anandkumar, 'Fundamentals of digital circuits, 4th Edition, Prentice Hall India, Paper back'2016
4) Jayaram Bhasker, '*A Verilog HDL Primer*', 2nd E, BS publications, Paper back'2008.

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Course Outcomes

At the end of the course, the student will be able to

1) Design negative feedback amplifier circuits
2) Analyze tuned amplifiers circuits and describe the working of Signal Generators
3) Analyze the operation of multivibrators and wave shaping circuits
4) Design and analyze multistage amplifiers
5) Describe the types of power amplifiers

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2		3	3	1	2	2		3	3		3	2
CO2	3	2		3	3	1	2	2		3	3		3	2
CO3	3	2		3	3	1	2	2		3	3		3	2
CO4	3	2		3	3	1	2	2		3	3		3	2
CO5	3	2		3	3	1	2	2		3	3		3	2

Unit I FEEDBACK AMPLIFIERS 9

Classification of amplifiers – Feedback concept – Transfer gain with feedback – General characteristics of negative feedback –Negative feedback topologies -Voltage Series feedback – Current Series feedback – Voltage Shunt feedback – Current Shunt feedback - Input resistance – Output resistance – Method of identifying of feedback topology and feedback factor – Nyquist criterion for stability of feedback amplifiers

Unit II TUNED AMPLIFIERS ANDOSCILLATORS 9

Tuned amplifiers - Q factor – Single tuned – Double tuned – Stagger tuned – Class C tuned - Classification of Oscillators –Barkhausen criterion – General form of LC oscillators – Hartley oscillator-Colpitts oscillators - Clapp oscillators – Analysis of RC oscillators-RC phase shift oscillators-Wien bridge oscillators – Crystal oscillators – Frequency stability of oscillators.

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Unit III **WAVE SHAPING AND MULTIVIBRATOR CIRCUITS** **9**

RC and RL integrator and differentiator circuits - Diode clippers – series and parallel – Diode clampers = positive and negative - Schmitt trigger circuit = Collector coupled multivibrators – Astable multivibrator – Monostable multivibrator - Bistable multivibrator – waveform analysis

Unit IV **MULTISTAGE AMPLIFIERS** **9**

Different coupling schemes – General analysis of cascade amplifier - Bandpass of cascaded stages – RC coupled amplifier – Low frequency response of RC coupled stage – Effect of an emitter bypass capacitor on low frequency response – Transformer coupled amplifier – Direct coupled amplifier – Differential amplifier.

Unit V **LARGE SIGNAL AMPLIFIERS** **9**

Classification based on biasing condition - Class A large signal amplifiers – Transformer coupled audio power amplifier – Efficiency – Push-Pull amplifiers – Class B amplifiers – efficiency - Class AB operation – Class D amplifier – Class S amplifier

TOTAL : 45 HOURS

Text Book

1) Salivahanan, Suresh Kumar and Vallavaraj, "Electronic Devices and Circuits", TMH, 3rd edition 2012.

References

1) Dr.Sanjay Sharma – "Electronic Principles"- S.K.Kataria and sons-third edition 2014
2) J. Millman and A.Grabel, "Micro Electronics", second edition, 2009
3) A.S.Sedra and K.C. Smith, "Micro Electronic Circuits", Oxford press, fourth edition, 1998
4) J . Millman and Halkias, "Integrated Electronics", second edition, 2010

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Course Outcomes

After successful completion the course, the student will be able to

1) Write simple C programs using console input and output functions
2) Write C programs using arrays, decision making and looping statements
3) Design and develop simple application using functions and pointers
4) Design and develop real-time applications using structures and unions
5) Design and develop real-time applications using file operation

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	3	1	1	2	1	1	2	3	3
CO2	3	3	3	3	2	3	1	1	2	1	1	2	3	3
CO3	3	3	3	3	2	3	1	1	2	1	1	2	3	3
CO4	3	3	3	3	2	3	1	1	2	1	1	2	3	3
CO5	3	3	3	3	2	3	1	1	2	1	1	2	3	3

Unit I BASICS OF C PROGRAMMING **9**

Introduction to programming paradigms - Structure of C program - C programming: Data Types – Storage classes – Constants – Enumeration Constants – Keywords – Operators: Precedence and Associativity - Expressions - Input/Output statements, Assignment statements – Decision making statements - Switch statement - Looping statements – Pre-processor directives - Compilation process

Unit II ARRAYS AND STRINGS **9**

Introduction to Arrays: Declaration, Initialization – One dimensional array – Two dimensional arrays – multi-dimensional array- String – string built-in functions – Sorting- Searching

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Unit III FUNCTIONS AND POINTERS 9

Introduction to functions: Function prototype, function definition, function call-Call by Value-Call by reference = Recursion = user defined functions versus built-in functions- Pointers – Pointer operators –Pointer arithmetic – Arrays and pointers – pointers to an array – function pointer-indirect pointer.

Unit IV STRUCTURES 9

Structure – Structure definition - Nested structures – Pointer and Structures – Array of structures – Self- referential structures – bit fields- Union-Dynamic memory allocation - Singly linked list – typedef.

Unit V FILE PROCESSING 9

Files – Types of file- File Primitives- File access mode- Sequential file access - Random file access -Command line arguments-introduction to TSR programs

TOTAL : 45 HOURS

Text Book

1) Ben Clemens "21st Century C ", Second Edition ,Oreilly Media Inc,2014
2) Deitel and Deitel, "C How to Program", Pearson Education, New Delhi, 2011.

References

1) Kernighan,B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2006.
2) Yashavant P. Kanetkar. "Let Us C", BPB Publications, 14th edition, 2016.
3) Byron S Gottfried, "Programming with C", Schaum's Outlines, Second Edition, Tata McGraw-Hill, 2006.
4) Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.
5) E. Balagurusamy, "Programming in ANSI C", seventh edition, Tata McGraw Hill, 2016.

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U19GE303 ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE 2 0 0 0

Course Outcomes

At the end of the course, the student will be able to

1) Analyze the basics of Indian traditional knowledge in modern scientific perspectives
2) Explain the basics of Vedic science and its applications in modern days
3) Discuss the introduction and objectives of modern science
4) Describe the contribution of Noble laurates for India's achievements in Science and Technology
5) Analyze the various traditional practices for holistic health care of human beings

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PS 03
CO1	2	2	2	-	-	2	-	-	-	-	-	-	-	-	2
CO2	2	2	2	-	-	2	-	-	-	-	-	-	-	-	2
CO3	3	2	2	-	-	2	-	-	-	-	-	-	-	-	2
CO4	3	2	2	-	-	2	-	-	-	-	-	-	-	-	2
CO5	2	2	2	-	-	2	-	-	-	-	-	-	-	-	2

Unit I **6**

- Introduction to Vedas
- Traditional methodology of Veda – Sat Angas
- Types of Vedas and their application
- Sub Veda – Ayurveda - their modern day application

Unit II **6**

- Basics of Applied Vedic Science
- Modern day application of Vedas and procedure
- Ancient Indian Scientific thoughts
- Introduction to the Vedic language "Sanskrit"

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Unit III Modern Science 6

- Introduction – modern science
- Objectives – modern science
- Architecture in ancient India

Unit IV Technology 6

- India's contribution to science and technology (from ancient to modern)
- Nobel laureates of Indian origin and their contribution
- India in space
- Latest achievement from Jan – 2017

Unit V Yoga and Holistic Health Care 6

- Fundamentals of yoga and holistic health
- Human biology
- Diet and nutrition
- Life management
- Contemporary yogic models – case study

TOTAL : 30 HOURS

References

1) V. Sivaramakrishna (Ed.), Cultural Heritage of India-Course Material, Bharatiya Vidya Bhavan,Mumbai, 5th Edition, 2014
2) Swami Jitatmanand, Modern Physics and Vedant, Bharatiya Vidya Bhavan
3) RN Jha, Science of Consciousness Psychotherapy and Yoga Practices, Vidyanidhi Prakasham, Delhi, 2016
4) Roshan Dalal The Vedas: An Introduction to Hinduism's Sacred Texts, Penguin Books 2014. ISBN13: 9780143066385
5) Raja Ram Mohan Roy, Vedic Physics, Mount Meru Publication ISBN : 9781988207049

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Course Outcomes

At the end of the course, the student will be able to

1) Design and implement combinational circuits using logic gates and breadboards
2) Design and implement counter circuits using Flip flops and breadboards
3) Design and implement Shift Registers using Flip flops and breadboards

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	2	2	1	1		2	3	3	3
CO2	3	3	3	3	3	2	2	1	1		2	3	3	3
CO3	3	3	3	3	3	2	2	1	1		2	3	3	3

List of Experiments

1) **Design and implementation of**

   Half Adder and Full Adder, Half Subtractor and Full Subtractor
   4-bit Parallel Adder cum Subtractor
   BCD adder
   Magnitude Comparator

2) **Design and implementation of**

   Code Converters – Binary to Gray and Gray to Binary
   BCD to Excess 3 and Excess 3 to BCD

3) **Design and implementation of**

   4:1 / 8:1 Multiplexer
   1:4 / 1:8 Demultiplexer
   Decoder – BCD to Seven Segment
   Encoder – 4×2 Priority Encoder
   Parity Generator and Checker

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4) **Design and implementation of**

3-bit Asynchronous Counter
3-bit Synchronous Counter
4-bit Ring Counter
4-bit Johnson Counter

5) Design and implementation of Shift Registers – SISO, SIPO and PIPO.

TOTAL : 30 HOURS

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U19EC305 **ELECTRONIC CIRCUITS AND SIMULATION LABORATORY** 0 0 2 1

Course Outcomes

After successful completion of this course, the students should be able to

1) Realize feedback amplifiers and power amplifiers from various parameters
2) Design and test Oscillator, multi-vibrator and wave shaping circuits using BJT
3) Obtain the frequency response from single stage, two stage amplifiers and differential amplifier

Pre-requisite

Electronic Devices and Circuits

CO/PO, PSO Mapping

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	3	2	2	2	2	2	3	3	3	3
CO2	3	3	2	3	3	2	2	2	2	2	3	3	3	3
CO3	3	3	2	3	3	2	2	2	2	2	3	3	3	3

List of Experiments

1) Design the current series feedback amplifier and calculate the parameters (Gain, Input impedance, Output Impedance, Bandwidth) with and without feedback condition.
2) Design the Voltage shunt feedback amplifier and calculate the parameters (Gain, Input impedance, Output Impedance, Bandwidth) with and without feedback condition.
3) Design RC Phase shift oscillator and obtain the waveform for the frequency of 5 KHz.
4) Design Wien Bridge oscillator and obtain the waveform for the frequency of 10 KHz
5) Design LC oscillator(Hartley and Colpitts) and obtain the waveform for the frequency of 250 KHz.
6) Construct differentiator and integrator circuit by using passive element. Obtain waveform for following input signal
   i) Sine Waveform
   ii) Square Waveform
   iii) Triangular Waveform
7) Design and construct the following passive clipper and clamper circuit. Obtain the output waveform
   i) Series Clipper
   ii) Shunt Clipper
   iii) Combinational Clipper
   iv) Clamping Circuit

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8) Design multi-vibrators (Astable ,Monostable and Bistable) using BJT and Obtain the output waveform for the time period of 250 µs.
9) Obtain the frequency response of a two stage RC coupled amplifier
10) Design and test a differential amplifier in
    i) Common Mode
    ii) Difference Mode
11) Design Class A amplifier and Class B power amplifiers. Observe the output waveform and measure its efficiency
12) Simulation using PSPICE:
    i) RC phase shift, Hartley, Colpitts oscillators
    ii) Integrator, differentiator
    iii) Clippers and Clampers
    iv) Astable multi-vibrator, Monostable multi-vibrator

TOTAL : 30 HOURS

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U19CS308 C PROGRAMMING LABORATORY 0 0 2 1

Course Outcomes

After successful completion of this course, the students should be able to

1) Design and develop simple programs using branching, looping statements
2) Develop programs using functions, arrays, structures and string handling
3) Write programs using pointers and dynamic memory allocation and file handling

CO/PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	-	-	-	-	2	-	3	3	3	2
CO2	3	3	2	2	-	-	-	-	2	-	3	3	3	2
CO3	3	3	2	3	-	-	-		2	-	3	3	3	3

List of Experiments

1) Programs using Input, Output, and assignment statements
2) Programs using Branching statements
3) Programs using Looping statements
4) Programs using Functions
5) Programs using Arrays
6) Programs using Structures
7) Programs using Strings
8) Programs using Pointers (both data pointers and function pointers)
9) Programs using dynamic memory allocation
10) Programs using Recursion
11) Programs using Files

TOTAL : 30 HOURS

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Course Outcomes

After successful completion of this course, the students should be able to

1) Demonstrate capabilities in specific soft-skill areas using hands-on and/or case-study approaches
2) Solve problems of greater intricacy in stated areas of quantitative aptitude and logical reasoning
3) Demonstrate higher levels of verbal aptitude skills in English with regard to specific topics.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
COs, POs PSOs Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO – 1	1	2	2	2	1	3	3	3	3	1	1	3	2	2
CO – 2	3	3	1	1	2	3	2	3	3	2	2	3	3	3
CO – 3	1	2	1	2	1	1	1	3	3	3	1	3	3	3

Soft Skills

Demonstrating soft-skill capabilities with reference to the following topics

a) Attitude building
b) Dealing with criticism
c) Innovation and creativity
d) Problem solving and decision making
e) Public speaking
f) Group discussions

Quantitative Aptitude and Logical Reasoning

Solving problems with reference to the following topics:

a) Vedic Maths: Fast arithmetic, multiplications technique, Criss cross, Base technique, Square root, Cube root, Surds, Indices, Simplification
b) Numbers: Types, Power cycle, Divisibility, Prime factors & multiples, HCF & LCM, Remainder theorem, Unit digit,Tens digit, highest power.
c) Averages: Basics of averages and weighted average.
d) Percentages: Basics of percentage and Successive percentages
e) Ratio and proportion: Basics of R &P, Alligations, Mixture and Partnership
f) Profit ,Loss and Discount: Basic & Advanced PLD
g) Data Interpretation: Tables, Bar diagram, Venn diagram, Line graphs, Pie charts, Case lets, Mixed varieties, Network diagram and other forms of data interpretation
h) Syllogism: Six set syllogism using Venn diagram and tick and cross method

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Verbal Aptitude	**Demonstrating English language skills with reference to the following topics:** a) Verbal analogy b) Tenses c) Prepositions d) Reading comprehension e) Choosing correct / incorrect sentences f) Describing pictures g) Error spotting

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B. E. / ELECTRONICS AND COMMUNICATION ENGINEERING

SEMESTER – III	PROBABILITY AND STOCHASTIC PROCESSES	L	T	P	C
U19MAT301C		3	1	0	4

COURSE OUTCOMES

At the end of the course, the students will be able to

1. apply the concepts of probability, random variable and their properties to generate the moments.
2. fit the suitable distribution and its properties to the real world problems and interpret the results.
3. apply the concepts of joint probability distribution and its properties to find the covariance and transformation of random variables.
4. make a probabilistic model for characterizing a random signal.
5. find the expected frequency of the random process and analyze the response of random inputs to linear time invariant systems.

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3		3								2	3	
CO2	3	3		3								2	3	
CO3	3	3		3								2	3	
CO4	3	3		3								2	3	
CO5	3	3		3								2	3	

UNIT – I ONE DIMENSIONAL RANDOM VARIABLE 12

One dimensional random variable (Discrete and continuous) – Probability mass function, probability density function, moments, moment generating function and their properties.

UNIT – II THEORETICAL DISTRIBUTIONS 12

Binomial, Poisson, Uniform, Exponential and Normal distributions - Function of one dimensional random variable – Applications.

UNIT – III TWO DIMENSIONAL RANDOM VARIABLES 12

Joint distributions – Marginal and conditional distributions – Covariance – Correlation – Transformation of two dimensional random variables – Central limit theorem (for independent and identically distributed random variables).

UNIT – IV RANDOM PROCESSES **12**

Classification – First order, second order, strictly stationary, wide sense and ergodic processes – Poisson process.

UNIT – V SPECTRAL DENSITIES AND LINEAR SYSTEMS WITH RANDOM INPUTS **12**

Auto correlation functions – Cross correlation functions – Properties – Power spectral density – Cross spectral density – Properties.

Linear time invariant system – System transfer function – Linear systems with random inputs – Auto correlation and cross correlation functions of input and output.

Theory: **45 Hours** Tutorial: **15 Hours** Total: **60 Hours**

TEXT BOOKS:

1. T. Veerarajan, "Probability, Statistics and Random Processes with Queueing Theory and Queueing Networks", McGraw Hill Publishers, 4th Edition, 7th Reprint, 2018.
2. P. Z. Peebles Jr., "Probability, Random Variables and Random Signal Principles", McGraw Hill Publishers, 4th Edition, 37th Reprint, 2016.

REFERENCE BOOKS:

1. S. C. Gupta and V. K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons Publishers, 11th Edition, Reprint, 2019.
2. R. A. Johnson and C. B. Gupta, "Miller and Freund's, Probability and Statistics for Engineers", Pearson Publishers, 9th Edition, 2018.
3. S. Ross, "A First Course in Probability", Pearson Publishers, 9th Edition, 2019.
4. P. G. Hoel, S. C. Port and C. J. Stone, "Introduction to Probability Theory", Universal Book Stall Publishers, Reprint, 2003.
5. W. Feller, "An Introduction to Probability Theory and its Applications – Volume – I", Wiley Publishers, 3rd Edition, 2008.
6. S. S. Haykin and B. Van Veen, "Signals and Systems," Wiley Publishers, 2nd Edition, 2007.

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U19TAM301 தமிழரும் தொழில்நுட்பமும் L T P C
1 0 0 1

அலகு I நெசவு மற்றும் பானைத் தொழில்நுட்பம்: 3

சங்க காலத்தில் நெசவுத் தொழில் – பானைத் தொழில்நுட்பம் – கருப்பு சிவப்பு பாண்டங்கள் – பாண்டங்களில் கீறல் குறியீடுகள்.

அலகு II வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்: 3

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு– சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் – சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் – மாமல்லபுரச் சிற்பங்களும், கோவில்களும் – சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் – நாயக்கர் காலக் கோயில்கள் – மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் – செட்டிநாட்டு வீடுகள் – பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ–சாரோசெனிக் கட்டிடக் கலை.

அலகு III உற்பத்தித் தொழில் நுட்பம்: 3

கப்பல் கட்டும் கலை – உலோகவியல் – இரும்புத் தொழிற்சாலை – இரும்பை உருக்குதல், எஃகு – வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் – நாணயங்கள் அச்சடித்தல் – மணி உருவாக்கும் தொழிற்சாலைகள் – கல்மணிகள், கண்ணாடி மணிகள் – சுடுமண் மணிகள் – சங்கு மணிகள் – எலும்புத்துண்டுகள் – தொல்லியல் சான்றுகள் – சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

அலகு IV வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்: 3

அணை, ஏரி, குளங்கள், மதகு – சோழர்காலக் குமுழித் தூம்பின் முக்கியத்துவம் – கால்நடை பராமரிப்பு – கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் – கடல்சார் அறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்குளித்தல் – பெருங்கடல் குறித்த பண்டைய அறிவு – அறிவுசார் சமூகம்.

அலகு V அறிவியல் தமிழ் மற்றும் கணித்தமிழ்: 3

அறிவியல் தமிழின் வளர்ச்சி -கணித்தமிழ் வளர்ச்சி – தமிழ் நூல்களை மின்பதிப்பு செய்தல் – தமிழ் மென்பொருட்கள் உருவாக்கம் – தமிழ் இணையக் கல்விக்கழகம் – தமிழ் மின் நூலகம் – இணையத்தில் தமிழ் அகராதிகள் – சொற்குவைத் திட்டம்.

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, TamilNadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

HOD 1/9/23.

Dr. M.RENUGA,
Professor & Head,
Department of Humanities & Languages,
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SALEM - 63[illegible]

U19TAM301 **TAMILS AND TECHNOLOGY** **L T P C**
1 0 0 1

UNIT I WEAVING AND CERAMIC TECHNOLOGY **3**

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

UNIT II DESIGN AND CONSTRUCTION TECHNOLOGY **3**

Designing and Structural construction House & Designs in household materials during Sangam Age -Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.

UNIT III MANUFACTURING TECHNOLOGY **3**

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads -Glass beads - Terracotta beads - Shell beads/ bone beats - Archeological evidences - Gem stone types described inSilappathikaram.

UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY **3**

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.

UNIT V SCIENTIFIC TAMIL & TAMIL COMPUTING **3**

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries –Sorkuvai Project.

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, TamilNadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Ramakrishna) (Published by: RMRL) – Reference Book.

HOD 1/9/23

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U19GE303 ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE 2 0 0 0

Course Outcomes

At the end of the course, the students will be able to,

1. Analyze the basics of Indian traditional knowledge in modern scientific perspectives.
2. Explain the basics of Vedic science and its applications in modern days.
3. Discuss the introduction and objectives of modern science.
4. Describe the contribution of Noble laurates for India's achievements in Science and Technology.
5. Analyze the various traditional practices for holistic health care of human beings.

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	-	-	2	-	-	-	-	-	-	-	2
CO2	2	2	2	-	-	2	-	-	-	-	-	-	-	2
CO3	3	2	2	-	-	2	-	-	-	-	-	-	-	2
CO4	3	2	2	-	-	2	-	-	-	-	-	-	-	2
CO5	2	2	2	-	-	2	-	-	-	-	-	-	-	2

Unit I 6

- Introduction to Vedas
- Traditional methodology of Veda – Sat Angas
- Types of Vedas and their application
- Sub Veda – Ayurveda - their modern day application

Unit II 6

- Basics of Applied Vedic Science
- Modern day application of Vedas and procedure
- Ancient Indian Scientific thoughts
- Introduction to the Vedic language "Sanskrit"

UNIT – III- Modern Science 6

- Introduction – modern science
- Objectives – modern science
- Architecture in ancient India

UNIT – IV Technology 6

- India's contribution to science and technology (from ancient to modern)
- Nobel laureates of Indian origin and their contribution
- India in space
- Latest achievement from Jan – 2017

UNIT – V- Yoga and Holistic Health Care 6

- Fundamentals of yoga and holistic health
- Human biology
- Diet and nutrition
- Life management
- Contemporary yogic models – case study

Reference Books

1. V. Sivaramakrishna (Ed.), Cultural Heritage of India-Course Material, Bharatiya Vidya Bhavan,Mumbai, 5th Edition, 2014
2. Swami Jitatmanand, Modern Physics and Vedant, Bharatiya Vidya Bhavan
3. RN Jha, Science of Consciousness Psychotherapy and Yoga Practices, Vidyanidhi Prakasham, Delhi,2016.
4. Roshan Dalal The Vedas: An Introduction to Hinduism's Sacred Texts, Penguin Books 2014. ISBN13: 9780143066385
5. Raja Ram Mohan Roy, Vedic Physics, Mount Meru Publication ISBN : 9781988207049

Total: 30 hours

M. Raja	**Dr. C. Shanthi**	**Dr. M. Renuga**
Course Coordinator / Sciences	HOD / Sciences	Chairperson BOS, Science and Humanities

III-Sem

Semester-III	U19GE301-SOFT SKILLS AND APTITUDE – I	L T P C Marks 0 0 2 1 100

Course Outcomes
At the end of the course the student will be able to:

1. Demonstrate capabilities in specific soft-skill areas using hands-on and/or case-study approaches
2. Solve problems of greater intricacy in stated areas of quantitative aptitude and logical reasoning
3. Demonstrate good vocabulary skills, analyse comprehension and critical reasoning passages, spot errors and utilize language skills to describe pictures effectively.

1.Soft Skills	**Demonstrating soft-skill capabilities with reference to the following topics:** a. Attitude building b. Dealing with criticism c. Innovation and creativity d. Problem solving and decision making e. Public speaking f. Group discussions
2. Quantitative Aptitude and Logical Reasoning	**Solving problems with reference to the following topics:** a. Vedic Maths: Fast arithmetic, multiplications technique, Criss cross, Base technique, Square root, Cube root, Surds, Indices, Simplification. b. Numbers: Types, Power cycle, Divisibility, Prime factors & multiples, HCF & LCM, Remainder theorem, Unit digit,Tens digit, highest power. c. Averages: Basics of averages and weighted average. d. Percentages: Basics of percentage and Successive percentages. e. Ratio and proportion: Basics of R &P, Alligations, Mixture and Partnership. f. Profit ,Loss and Discount: Basic & Advanced PLD g. Data Interpretation: Tables, Bar diagram, Venn diagram, Line graphs, Pie charts, Case lets, Mixed varieties, Network diagram and other forms of data interpretation. h. Syllogism: Six set syllogism using Venn diagram and tick and cross method
3. Verbal Aptitude	**Demonstrating English language skills with reference to the following topics:** a. Verbal analogy b. Tenses c. Prepositions d. Reading comprehension e. Choosing correct / incorrect sentences f. Describing pictures g. Error spotting

S. Anita 31/4/2023.

Dr.S.Anita
Head/Training

Dr. S. ANITA
Professor and Head
Department of Training,
SONA COLLEGE OF TECHNOLOGY,
SALEM-636 005.

ECE
IV

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester IV Regulations 2019
Branch: Electronics and Communication Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
Theory							
1	U19EC401	Engineering Electromagnetics	3	0	0	3	45
2	U19EC402	Linear Integrated Circuits	3	0	0	3	45
3	U19EC403	Digital Signal Processing	3	0	0	3	45
4	U19EC404	Analog Communication Systems	3	0	0	3	45
5	U19CS406	Data Structures	3	0	0	3	45
6	U19GE402	**Mandatory Course :** Environment and Climate Science	2	0	0	0	30
Practical							
7.	U19EC405	Linear Integrated Circuits Laboratory	0	0	2	1	30
8.	U19EC406	Digital Signal Processing Laboratory	0	0	2	1	30
9.	U19CS407	Data Structures Laboratory	0	0	2	1	30
10.	U19GE401	Soft Skills and Aptitude – II	0	0	2	1	30
Total Credits						**19**	**375**

Approved By

06/01/2024

Chairperson, Electronics and Communication Engineering BoS
Dr.R.S.Sabeenian

Member Secretary, Academic Council
Dr.R.Shivakumar

Chairperson, Academic Council & Principal
Dr.S.R.R.Senthil Kumar

Copy to:-

HOD/Electronics and Communication Engineering, Fourth Semester BE ECE Students and Staff, COE

U19EC401 ENGINEERING ELECTROMAGNETICS 3 0 0 3

Course Outcomes

At the end of each unit, the students will be able to

1) Apply the concepts of coordinate system to analyze the geometrical parameters of objects and field quantities
2) Apply the concepts of electrostatics to evaluate the capacitance of parallel plate, coaxial and spherical capacitors.
3) Apply the concepts of magnetostatics to evaluate the inductance of solenoid, toroid and coaxial transmission line
4) Analyze electromagnetic wave propagation in various guiding medium
5) Apply EMI and EMC concepts to solve different implications of EM radiation in practical applications.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	3	2	3	2	2	1	3	3	3	2
CO2	3	3	3	3	3	2	3	2	2	1	3	3	3	2
CO3	3	3	3	3	3	2	3	2	2	1	3	3	3	2
CO4	3	3	3	3	3	2	3	2	2	1	3	3	3	2
CO5	3	3	3	3	3	3	3	2	2	1	3	3	3	2

Unit I INTRODUCTION TO COORDINATE SYSTEMS 9

Introduction-Cartesian Co-ordinate System – Vector Components and Unit Vector- Cylindrical Coordinate System – Spherical Coordinate System – transformation of vectors from rectangular coordinates to cylindrical coordinates, cylindrical coordinates to rectangular coordinates, rectangular coordinates to spherical coordinates, spherical coordinates to rectangular coordinates, cylindrical coordinates to spherical coordinates, spherical coordinates to cylindrical coordinates- Curl and Divergence- Divergence theorem and Stokes theorem.

Unit II STATIC ELECTRIC FIELD 9

Energy Expended in Moving a Point Charge in an Electric Field– Definition of Potential Difference and Potential – Potential Gradient – Potential Field of a Point Charge – Electric field intensity for Dipole – Gauss law for static field- Boundary Conditions for Perfect Dielectric Material – Capacitance – Capacitance for parallel sheet, coaxial and spherical geometries – Derivation of Poisson's and Laplace's Equation.

22/12/23
Dr.R.S.SABEENIAN, M.E.,MBA.,Ph.D.,FIETE,
Professor and Head of Department
Electronics and Communication Engineering

Unit III STATIC MAGNETIC FIELD 9

Introduction to magneto statics- Inductance- Inductance of a solenoid-inductance of a Toroid-Energy stored in an inductor- Inductance of a coaxial cable- Inductance of a two wire transmission line-Energy density in a magnetic field- Boundary conditions for a magnetic field- scalar and magnetic vector potential.

Unit IV TIME VARYING FIELDS AND PLANE WAVE 9

Faraday's Law – Displacement Current – Maxwell's Equation in Point Form – Maxwell's Equation in Integral Form - Poynting's Theorem- EM waves-plane wave-uniform plane wave- derivation of a wave equation for a free space in terms of E & H-Wave equation for a conducting medium-Wave Propagation in good conductor-Skin Effect.

Unit V PRACTICAL IMPLICATIONS OF EM RADIATION 9

Introduction to EMI and EMC- The Case Study of Electromagnetic Exposure in Railways, the case study of EMI on medical equipment, A Case Study of EMI Elimination and Ground Noise Reduction Using Ground Noise Filters, a case study on EMI in Printed circuit boards.

TOTAL : 45 HOURS

Text Books

1) Matthew N. O. Sadiku and S. V. Kulkarani, "*Principles of Electromagnetics*", 6th Edition Oxford University Press, 2015

References

1) W. H. Hayt and J. A. Buck, "*Engineering Electromagnetics*", TATA McGraw-Hill, 9th Edition, 2019
2) David K Cheng, " Field and wave Electromagnetics", Pearson edition, 2004.
3) John D. Kraus and Daniel A. Fleisch, "*Electromagnetics with Applications*", 5th Edition, McGraw Hill International Editon, 1999
4) E. C. Jordan and K. G. Balmain, "*Electromagnetic waves and Radiating Systems*", Prentice Hall, Inc., Englewood Cliffs, New Jersey, 1968

22/12/23
Dr.R.S.SABEENIAN, M.E.,MBA.,Ph.D.,FIETE,
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ectronics and Communication Engineering
ONA COLLEGE OF TECHNOLOGY,
Salem-636 005. Tamilnadu, India.

U19EC402 LINEAR INTEGRATED CIRCUITS 3 0 0 3

Course Outcomes

At the end of each unit, the students will be able to

1) Analyze and understand the fundamental operations of Analog ICs
2) Design analog circuits using Op-Amps.
3) Describe the working of Signal Generators.
4) Explain the working of Voltage Reference and Regulator circuits.
5) Analyze the operation of Analog to Digital and Digital to Analog Converters

CO / PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	2	2	1		2	2	2	3	3
CO2	3	3	3	3	2	2	2	1		2	2	2	3	3
CO3	3	3	3	3	2	2	2	1		2	2	2	3	3
CO4	3	3	3	3	2	2	2	1		2	2	2	3	3
CO5	3	3	3	3	2	2	2	1		2	2	2	3	3

Unit I STATIC AND DYNAMIC OP AMP LIMITATIONS 9

Simplified Op Amp circuit diagram – Constant current source(current mirror) –Widlar current source–Wilson current source– Input Bias and Offset Currents – Input Offset Voltage–Input Offset Error Compensation –Open loop response – Closed loop response – Input and output Impedances – ,Internal frequency Compensation– External frequency Compensation. Active filters – The Transfer function – First-order Active filters – Standard Second order Responses

Unit II OPERATIONAL AMPLIFIER FUNDAMENTALS AND APPLICATIONS 9

Amplifier Fundamentals – The Operational Amplifier – Ideal Op Amp – Basic Op Amp configurations – Non inverting Amplifier – Voltage follower – Inverting Amplifier – Ideal Op Amp circuit Analysis – Summing Amplifier – Difference Amplifier – Differentiator – Integrator– Negative Feedback– Feedback in Op Amp circuits – The Loop Gain – Circuits with Resistive feedback – Current to Voltage converters – Voltage to Current converters – Differential Amplifiers, Instrumentation Amplifiers.

22/12/23
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Unit III OPAMP NONLINEAR CIRCUITS AND SIGNAL GENERATORS 9

Voltage comparators – Comparator Applications – Schmitt Triggers – Precision Rectifiers – Analog switches – Peak Detectors – Sample-and-Hold Amplifiers – Log/ Antilog amplifiers – Signal Generators – Sine wave generators – Multivibrators – Astable Multivibrators – Monostable Multivibrators – Monolithic Timers(555) – 555 Timer as an Astable Multivibrator – 555 Timer as an Monostable Multivibrator – Triangular wave generators – Saw tooth wave generators

Unit IV VOLTAGE REFERENCES, REGULATORS AND ANALOG MULTIPLIERS 9

Performance specifications – Voltage References – Band gap voltage references – Voltage Reference Applications – Linear regulators – protections – Monolithic voltage regulators – Linear regulator Applications – Switching regulators – basic topologies – Efficiency – Monolithic switching regulator – Voltage mode control – Current mode control – Analog multiplier –Analysis of four quadrants and Variable transconductance multiplier..

Unit V D-A AND A-D CONVERTERS, PHASE LOCKED LOOP 9

Performance specifications – D-A conversion techniques – Weighted resistor DACs – R-2R Ladders – Current mode R-2R Ladder – Voltage mode R-2R Ladder – Multiplying DAC Applications – A-D conversion techniques – Successive approximation converters – Flash converters – integrating type converters – Over sampling converters – Phase locked loops, Monolithic PLL, Special ICs-Isolation Amplifier IC and Opto Coupler IC

TOTAL : 45 HOURS

Text Book

1) D.Roy Choudhry,Shail jain –"Linear Integrated Circuits"-New age Pub,2018..
2) Sergio Franco –"Design with Operational Amplifiers and Analog Integrated Circuits"-Tata Mc Graw Hill, -2015

References

1) S.Salivahanan and V.S.Kanchana Bhaskaran-"Linear Integrated Circuits "-Tata Mc Graw –Hill - 2018
2) Ramakant A.Gayakwad,"Op-Amp and Linear ICs"- Prentice Hall/Pearson Education-2015
3) Gray and Meyer-"Analysis and Design of Analog Integrated Circuits", Wiley international, 2009

22/12/23

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Course Outcomes

At the end of each unit, the students will be able to

1) Describe DFT , FFT and to perform its computations
2) Design FIR digital filters using various techniques..
3) Design IIR digital filters using different techniques..
4) Analyse the finite word length effects in signal processing
5) Describe the fundamentals of digital signal processors.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	2	1			2	2	3	3	3	2
CO2	3	3	3	3	3	1			2	2	3	3	3	2
CO3	3	3	3	3	3	1			2	2	3	3	3	2
CO4	3	3	2	3	3	1			2	2	3	3	3	2
CO5	3	1	2	1	3	1			2	2	3	3	3	2

Unit I DISCRETE FOURIER TRANSFORM AND FFT 9

Introduction to DFT – Efficient computation of DFT- Properties of DFT – FFT algorithms – Radix-2 FFT algorithms – Decimation in Time – Decimation in Frequency algorithms –Fast convolution- overlap save method and overlap add method..

Unit II INFINITE IMPULSE RESPONSE DIGITAL FILTERS 9

Review of design of analog Butterworth and Chebychev Filters – Design of IIR digital filters using impulse invariance technique – Design of IIR digital filters using bilinear transformation – pre warping – Frequency transformation in digital domain – Realization cascade and parallel form

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Unit III FINITE IMPULSE RESPONSE DIGITAL FILTERS 9

Amplitude and phase responses of FIR filters – Linear phase filters – Windowing techniques for design of linear phase FIR filters: Rectangular- Hamming- Hanning- Gibbs phenomenon –Principle of frequency sampling technique. Realization of FIR filters- Linear and cascade form.

Unit IV FINITE WORD LENGTH EFFECTS 9

Quantization noise – derivation for quantization noise power- comparison – truncation and rounding error – input quantization error-coefficient quantization error – limit cycle oscillations-dead band- Overflow error-signal scaling.

Unit V DIGITAL SIGNAL PROCESSORS 9

Architectural Features – Von Neumann architecture- Harvard architecture- Bus Architecture and Memory- Multiplier- Shifter- MAC Unit- ALU- Addressing Modes – Address Generation Unit - pipelining- Overview of instruction set of TMS320C54XX. Introduction of TMS320C6748 Processor

TOTAL : 45 HOURS

Text Book

1) John G Proakis- Dimtris G Manolakis-" *Digital Signal Processing Principles-Algorithms and Application"*- Pearson/PHI- 4th Edition- 2014.
2) B.Venkataramani & M-Bhaskar- "*Digital Signal Processor Architecture- Programming and Application"*- TMH 2017.

References

1) Allan V.Openheim, Ronald W.Sehafer & John R.Buck, "*Discrete Time Signal Processing"*- second edition Pearson/Prentice Hall, 2014.
2) P.Ramesh Babu, "*Digital Signal Processing*"-SCITECH-2017
3) S.K.Mitra, "*Digital Signal Processing- A Computer based approach*"- Tata McGraw-Hill- 2006- New Delhi
4) S.Salivahanan, A.Vallavaraj, Gnanapriya, "*Digital Signal processing"* - McGraw Hill / TMH,2019

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U19EC404 ANALOG COMMUNICATION SYSTEMS 3 0 0 3

Course Outcomes

At the end of the course, the student will be able to

1) Describe the generation and detection methods of various AM systems
2) Explain the Modulation and demodulation methods of FM systems
3) Classify the types of noise and its effect on communication system..
4) Analyze the noise performance of various Analog modulation systems
5) Know the purpose of information theory and the significance of source coding

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	2	3	1	1	2	2	3	3	2
CO2	3	3	3	3	3	2	3	2	2	2	2	3	3	2
CO3	3	3	3	3	3	2	3	1	1	2	2	3	3	2
CO4	3	3	3	3	3	2	3	1	2	2	2	3	3	2
CO5	3	3	3	3	3	2	3	2	1	2	2	3	3	2

Unit I AMPLITUDE MODULATION SYSTEMS **09**

Principles of Amplitude Modulation – Mathematical Expression for Single Tone AM – Powe Relations in AM – Types of AM – DSBSC-SSBSC and VSB – Generation and Detection Methods – Comparison of Various AM Systems – AM transmitters - Low Level and High Level Modulation – AM Receivers – TRF, Super-heterodyne Radio Receiver.

Unit II ANGLE MODULATION SYSTEMS **09**

Phase and Frequency Modulation – Principles of FM – Expression for Single Tone FM – Frequency Analysis of FM – Transmission Bandwidth of FM – NBFM and WBFM Generation Methods – Direct Method and Indirect (Armstrong) Method of FM Generation – FM Demodulators – FM Transmitters and Receivers

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Unit III NOISE THEORY 09

Noise – Thermal Noise and Shot Noise – Narrow Band Noise and its Representation using InPhase and Quadrature Components – Noise Figure and its Expression in Terms of SNR – Overall Noise Figure Calculation for Cascaded Amplifiers – Friss Formula – Noise Temperature – Noise Bandwidth – Equivalent Noise Resistance.

Unit IV PERFORMANCE OF CW MODULATION SYSTEMS 09

Channel SNR – Output SNR – Figure of Merit – Noise in DSBSC and SSBSC Systems using Coherent Detection – Noise in AM System using Envelope Detection – Noise Performance Analysis in FM System – FM Threshold Effect – Threshold Improvement in Discriminators – Pre-Emphasis and De-Emphasis in FM – Noise Performance Comparison between CW Modulation Systems.

Unit V INFORMATION THEORY AND CODING 09

Amount of Information – Entropy – Information Rate – Source Coding Theorem, Code variance, Redundancy – Shannon-Fano Coding – Huffman Coding , Channel Capacity – BCC – BEC – BSC – Channel capacity Theorem (Shannon's Theorem) — Bandwidth – SNR Trade-Off – Mutual Information

.

TOTAL : 45 HOURS

Text Book

1) Simon Haykins, "Communication Systems", John Wiley & Sons, 4th Edition, 2016..
2) R.P. Singh and S.D. Sapre, "Communication Systems– Analog and Digital", Tata McGrawHill,3rd Edition, 2014

References

1) Wayne Tomasi, "Electronic Communication Systems", 5/e, Pearson Education, 2011.
2) H.Taub, D L Schilling, G Saha, "Principles of Communication", 3/e, 2011.
3) Dr. Sanjay Sharma, "Analog Communication systems", S.K. Kataria & sons, 6th edition, 2013

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U19CS406 DATA STRUCTURES 3 0 0 3

Course Outcomes

At the end of the course, the student will be able to

1) Implement abstract data types for linear data structures
2) Solve real world problems using stack and queue linear data structures.
3) Apply various non-linear tree data structures in real time applications
4) Design algorithms to solve common graph problems
5) Analyze various searching, sorting and hashing techniques

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1
CO2	2	2	1	2	3	2	2	1	2	1	2	2	1	2	1
CO3	3	2	3	1	3	1	1	1	2	1	1	1	1	2	1
CO4	2	3	3	3	3	1	2	2	1	1	1	2	2	1	1
CO5	2	2	1	2	2	1	2	2	1	1	1	2	2	1	1

Unit I LINEAR DATA STRUCTURES – LISTS 9

Abstract Data Types (ADTs) – List ADT – Array-based implementation – Linked list implementation - Singly linked lists - Circularly linked lists - Doubly-linked lists – Applications of lists

Unit II LINEAR DATA STRUCTURES – STACKS, QUEUES 9

Stack ADT – Operations– Evaluating arithmetic expressions - Conversion of Infix to postfix expression – Queue ADT – Operations – Circular Queue – Double ended queue – Applications of Stacks and queues..

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Unit III NON LINEAR DATA STRUCTURES – TREES 9

Trees – Traversals – Binary Trees – Expression trees – Applications of trees – Binary search trees - AVL Trees – B-Tree – Heap – Applications of heap -Tries.

Unit IV NON LINEAR DATA STRUCTURES – GRAPHS 9

Graphs - Representation of graph – Graph traversals – Breadth-first traversal – Depth-first traversal – Minimum Spanning Trees: Prim's algorithm, Kruskal's algorithm – Shortest path algorithms: Dijkstra's algorithm- Applications of Graphs: Topological Sort

Unit V SEARCHING, SORTING AND HASHING TECHNIQUES 9

Searching - Linear Search – Binary Search, Sorting – Bubble sort– Insertion sort – Merge sort, Hashing - Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing..

TOTAL : 45 HOURS

Text Book

1) Mark Allen Weiss, "Data structures and Algorithm Analysis in C", Pearson Education, New Delhi, Second Edition, 2012.

References

1) Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest , Clifford Stein, "Introduction to Algorithms" ,3rd Edition, MIT Press, 2010
2) Jean Paul Tremblay and Sorenson, "An Introduction to Data Structures with Applications", McGraw Hill Publishing Company, New Delhi, Second Edition, 2007.
3) Yedidyah Langsam, Moshe J Augenstein and Aaron M Tanenbaum, "Data Structures using C and C++", Prentice Hall of India/ Pearson Education, New Delhi, 2006.
4) Ellis Horowitz, SartajSahni, Susan Anderson-Freed, "Fundamentals of Data Structures in C", Silicon Press, New Jersey, Second Edition, 2005

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U19EC405 LINEAR INTEGRATED CIRCUITS LABORATORY 0 0 2 1

Course Outcomes

At the end of the course, the student will be able to

1) Design circuits using Op-amp, PLL and Timer ICs for various applications.
2) Design analog filters using Op-amp
3) Design voltage regulators using IC 723.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3					3	1			3	1
CO2									3	1			3	1
CO3	3	3	3	3					3	1			3	1

List of Experiments

1) Design of Inverting and Non-Inverting amplifier using Opamp (IC 741).
2) Design of Integrator and Differentiator using Opamp (IC 741).
3) Design of Differential amplifier to find CMRR using Opamp (IC 741).
4) Design of Astable and Monostable multivibrator using Opamp IC 741.
5) Design of Schmitt triggers using Opamp (IC 741).
6) Design of Low pass and High pass filters using Opamp (IC 741)..
7) Design of Band pass filters using Opamp (IC 741).
8) Design of RC phase shift and Wein bridge oscillators using Opamp(IC 741).
9) Design of Astable and Monostable multivibrators using IC 555
10) Design of low and high voltage regulator using IC 723
11) Real time case study involving design of IOT data logger, WiFi applications by interfacing with microcontrollers

TOTAL : 30 HOURS

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Course Outcomes

At the end of the course, the student will be able to

1) Perform convolution, sampling and FFT operations using MATLAB and DSP Processor.
2) Design FIR and IIR filters using MATLAB and DSP Processor
3) Perform arithmetic operations and generation of signals using DSP Processor

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3				3	1		3	3	1
CO2	3	3	3	3	3				3	1		3	3	1
CO3	3	3	3	3	3				3	1		3	3	1

List of Experiments

Using MATLAB

1) Generation of Discrete time signals
2) Linear and Circular convolution
3) Auto and Cross Correlation
4) Sampling and effect of Aliasing
5) Design of FIR Filters
6) Design of IIR Filters
7) DFT and FFT
8) Up sampling and Down sampling

Using TMS320C54 Processor

1) Arithmetic operations using DSP
2) Sampling of input signal and display
3) Implementation of FIR Filters
4) Implementation of IIR Filters
5) Linear convolution
6) Generation of Signals
7) Calculation of FFT
8) Study of TMS320C6748 Processor

TOTAL : 30 HOURS

22.12.2023

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U19CS407 **DATA STRUCTURES LABORATORY** 0 0 2 1

Course Outcomes

At the end of the course, the student will be able to

1) Design and develop simple programs using data structures
2) Apply non-linear data structures for various real time applications
3) Design shortest path algorithm for various real life applications

List of Experiments

1) Implementation of Lists ,Stacks and Queues
2) Implementation of Binary Tree and Traversal Techniques
3) Implementation of Binary Search Trees
4) Implementation of AVL Trees
5) Implementation of B-trees
6) Implementation of graphs using BFS and DFS.
7) Implementation of Prim's algorithm
8) Implementation of Kruskal's algorithm
9) Implementation of Dijkstra's algorithm
10) Implementation of Hashing and Collision Resolution Technique
11) Implementation of Heap
12) Implement of Sorting and searching Techinques

TOTAL : 30 HOURS

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COURSE CODE	**U19GE402**	L T P C
COURSE NAME	**MANDATORY COURSE:**	
	ENVIRONMENT AND CLIMATE SCIENCE	2 0 0 0

Course outcome:

Upon completion of this course the students will be able to

CO1 Describe the importance of the acute need for environmental awareness and discuss significant aspects of natural resources like forests, water and food resources.

CO2 Illustrate the concepts of an ecosystem and provide an overview of biodiversity and its conservation.

CO3 Analyze the causes, effects of various environmental pollution and their appropriate remedial measures.

CO4 Provide solutions to combat environmental issues like global warming, acid Rain, ozone layer depletion.

CO5 Analyze the effect of climate change in various sectors and their remedial measures.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
COs, POs PSOs Mapping	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO – 1	3	2				2	2							-
CO – 2	2	-												-
CO – 3	3	2				2	2							2
CO – 4	3	2				2	2							2
CO - 5	3	2				2	2							2

Unit I INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES L 6

Definition, Scope and Importance Forest Resources: - Use and over - exploitation, deforestation, Case Studies, Water Resources: - Use and Over-Utilization of Surface and ground water, Floods, Drought, Food Resources- Effects of Modern Agriculture, Fertilizer- Pesticide Problems–Role of an Individual in Conservation of Natural Resources.

Unit II ECOSYSTEMS AND BIODIVERSITY L 6

Structure and Function of an Ecosystem– Energy Flow in the Ecosystem -Food Chains, Food Webs and Ecological Pyramids. Introduction to Biodiversity –Value of Biodiversity: Consumptive Use, Productive Use, Social, Ethical, Aesthetic and Option Values –India as a Mega-Diversity Nation –– Threats to Biodiversity: Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts – Endangered and Endemic Species of India – Conservation of Biodiversity: In-Situ and Ex-Situ conservation of Biodiversity.

Unit III ENVIRONMENTAL POLLUTION L 6

Definition – Causes, Effects and Control Measures of:-(A) Air Pollution(B) Water Pollution (C) Soil Pollution (D) Marine Pollution (E) Noise Pollution (F) Thermal Pollution, Solid Waste Management-Effects and Control Measures of Acid Rain,– Role of an Individual in Prevention of Pollution.

Unit IV FUNDAMENTALS OF CLIMATE CHANGE L 6

Sustainable Development- - Climate Change-Causes and effects of Global Warming - Effect of global warming in food supply, plants, sea, coral reef, forest, agriculture, economy- Kyoto Protocol in reduction of greenhouse gases - Ozone Layer Depletion-mechanism, effects and control measures Montreal Protocol to protect ozone layer depletion -Rain Water Harvesting - .Effect of climate change due to air pollution Case study - CNG vehicles in Delhi.

Unit V EFFECT OF CLIMATE CHANGE L 6

Fungal diseases in forests and agricultural crops due to climatic fluctuations - Growing energy needs - effect of climate change due to non-renewable energy resources. Renewable energy resources in the prevention of climatic changes- Effect of climatic changes in ground water table, garments, monuments, buildings, consumption of energy, agriculture and in electric power sector - Carbon credit - carbon footprint - disaster management -Role of an individual to reduce climate change.

Total Number of hours: 30

Learning Resources

Text Book:

1. Miller, T.G. Jr., "Environmental Science", Wadsworth Pub. Co. 2018 2. Anubha Kaushik and Kaushik,
2. "Environmental Science and Engineering" New Age International Publication, 4thMulticolour Edition, New Delhi, 2014.

Reference Books:

1. S. Radjarejesri et al., "Environmental Science" Sonaversity, Sona College of Technology, Salem, 2018.
2. Masters, G.M., "Introduction to Environmental Engineering and Science", Pearson Education Pvt., Ltd., 2nd Edition, 2004.
3. Erach, B., "The Biodiversity of India", Mapin Publishing P.Ltd.,Ahmedabad, India.
4. ErachBharucha, "Textbook of Environmental Studies for Undergraduate Courses", 2005, University Grands Commission, Universities Press India Private Limited, Hyderguda, Hyderabad – 500029.

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Semester – IV	U19GE401 - SOFT SKILLS AND APTITUDE – II	L	T	P	C	Marks
		0	0	2	1	100

Course Outcomes
At the end of the course the student will be able to:

1. Demonstrate capabilities in additional soft-skill areas using hands-on and/or case-study approaches
2. Solve problems of increasing difficulty than those in SSA-I in given areas of quantitative aptitude and logical reasoning and score 65-70% marks in company-specific internal tests
3. Demonstrate greater than SSA-I level of verbal aptitude skills in English with regard to given topics and score 65-70% marks in company-specific internal tests

1.Soft Skills	**Demonstrating soft-skill capabilities with reference to the following topics:** a. SWOT b. Goal setting c. Time management d. Stress management e. Interpersonal skills and Intrapersonal skills f. Presentation skills g. Group discussions
2. Quantitative Aptitude and Logical Reasoning	**Solving problems with reference to the following topics:** a. Equations: Basics of equations , Linear, Quadratic Equations of Higher Degree and Problem on ages. b. Logarithms, Inequalities and Modulus c. Sequence and Series: Arithmetic Progression, Geometric Progression, Harmonic Progression, and Special Series. d. Time and Work: Pipes & Cistern and Work Equivalence. e. Time, Speed and Distance: Average Speed, Relative Speed, Boats & Streams, Races and Circular tracks and Escalators. f. Arithmetic and Critical Reasoning: Arrangement, Sequencing, Scheduling, Network Diagram, Binary Logic, and Logical Connection. g. Binary Number System.- Binary to decimal, Octal, Hexadecimal
3. Verbal Aptitude	**Demonstrating English language skills with reference to the following topics:** a. Critical reasoning b. Theme detection c. Verbal analogy d. Prepositions e. Articles f. Cloze test g. Company specific aptitude questions

Total: 30 Hours

18/12/2023

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