

SONA COLLEGE OF TECHNOLOGY, SALEM-5

(An Autonomous Institution)

B.E-Electrical and Electronics 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)

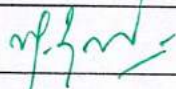
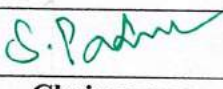
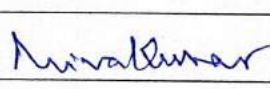
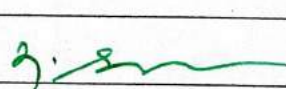
Courses of Study for B.E/B. Tech. Semester I under Regulations 2019 (CBCS) Branch:

Electrical and Electronics 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	U19MAT102A	Linear Algebra and Calculus	3	1	0	4	BS	60
3	U19CHE104D	Chemistry for Electrical Engineers	3	0	0	3	BS	45
4	U19PPR105	Problem Solving using Python Programming	3	0	0	3	ES	45
5	U19EGR106	Engineering Graphics	2	0	2	3	ES	60 (30L+30P)
Laboratory								
6	U19CHL109	Chemistry Laboratory	0	0	3	1.5	BS	45
7	U19PPL111	Python Programming Laboratory	0	0	2	1	ES	30
8	U19WPL112	Workshop Practice	0	0	2	1	ES	30
9	U19GE101	Basic Aptitude - I	0	0	2	0	EEC	30
Total Credits						18.5		
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

			
Chairperson, Science and Humanities BoS	Chairperson, Electrical and Electronics Engineering BoS	Member Secretary, Academic Council	Chairperson, Academic Council & Principal
Dr. M. Renuga	Dr. S. Padma	Dr. R. Shivakumar	Dr. S. R. R. Senthil Kumar

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30.06.2022

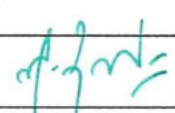
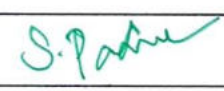

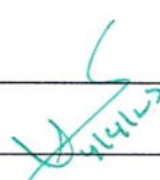
B.E/B. Tech Regulations-2019

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

S.N	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	1	0	2	2	HSMC	45 (15L+30P)
3	U19MAT202C	Transforms and Differential Equations	3	1	0	4	BSC	60
4	U19PHY203C	Physics for Electrical Engineers	3	1	0	4	BSC	60
5	U19EE201	Electric Circuits and Electron Devices	3	1	0	4	PCC	60
6	U19EE202	Measurements and Instrumentation	3	0	0	3	PCC	45
Practical								
7	U19PHL210	Physics Laboratory	0	0	3	1.5	BSC	45
8	U19EE203	Electric Circuits and Electron Devices Laboratory	0	0	3	1.5	PCC	45
9	U19GE201	Basic Aptitude - II	0	0	2	0	EEC	30
Total Credits						21		
Optional Language Elective*								
10	U19OLE1201	French	0	0	2	1	HSMC	30
11	U19OLE1202	German						
12	U19OLE1203	Japanese						

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

Approved by

			
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Dr. M. Renuga	Dr. S. Padma	Dr. R. Shivakumar	Dr. S. R. R. Senthil Kumar

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03.03.2023

B.E/B.Tech Regulations-2019

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

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
Theory							
1	U19EE301 /	Network Analysis and Synthesis	3	1	0	4	60 /
2	U19EE302 /	Analog Electronics	3	0	0	3	45 /
3	U19EE303 /	Electromagnetic Fields	3	1	0	4	60 /
4	U19EE304 /	Electrical Machines – I	3	0	0	3	45 /
5	U19EE305 /	Applied Thermodynamics	3	0	0	3	45 /
6	U19CS309 /	Object Oriented Programming in C++	3	0	0	3	45 /
7	U19TAM301 /	தமிழரும் தொழில்நுட்பமும் / / Tamils and Technology	1	0	0	1	15 /
8	U19GE302 /	Mandatory Course: Environment and Climate Science	2	0	0	0	30 /
Practical							
9	U19EE306 /	Analog Electronics Laboratory	0	0	2	1	30 /
10	U19EE307 /	Electrical Machines Laboratory – I	0	0	2	1	30 /
11	U19CS310 /	Object Oriented Programming in C++ Laboratory	0	0	2	1	30 /
12	U19GE301 /	Soft Skills and Aptitude – I	0	0	2	1	30 /
Total Credits						25 /	

Approved By

S. Padma

Chairperson, Electrical and Electronics Engineering BoS
Dr.S.Padma

Dr. R. Shivakumar
Member Secretary, Academic Council
Dr.R.Shivakumar

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

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HOD/Electrical and Electronics Engineering, Third Semester BE EEE Students and Staff, COE

05.07.2023

Regulations-2019

EEE
IV

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

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
Theory							
1	U19MAT401B	Probability and Statistical Methods	3	1	0	4	60
2	U19EE401	Signals and Systems	2	1	0	3	45
3	U19EE402	Electrical Machines – II	3	0	0	3	45
4	U19EE403	Power Electronics and Drives	3	0	0	3	45
5	U19EE404	Digital Electronics and Microcontroller	3	0	0	3	45
6	U19CS408	Data Structures	3	0	2	4	75
7	U19GE403	Mandatory Course - Essence of Indian Traditional Knowledge	2	0	0	0	30
Practical							
8	U19EE405	Electrical Machines Laboratory – II	0	0	2	1	30
9	U19EE406	Power Electronics and Drives Laboratory	0	0	2	1	30
10	U19EE407	Digital Electronics and Microcontroller Laboratory	0	0	3	1.5	45
11	U19GE401	Soft Skills and Aptitude - II	0	0	2	1	30
Total Credits						24.5	

Approved By

S. Padma
Chairperson, Electrical and Electronics Engineering BoS
Dr.S.Padma

M. Shivakumar
Member Secretary, Academic Council
Dr.R.Shivakumar

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

Copy to:-

HOD/Electrical and Electronics Engineering, Sixth Semester BE EEE Students and Staff, COE

Sona College of Technology, Salem-5**List of Professional Electives B.E/B.Tech under Regulation 2019****Department:-EEE**

S.No	Course Code	Course Name	L	T	P	C
1.	U19EE901	Computer Architecture	3	0	0	3
2.	U19EE902	Introduction to Database Technology	3	0	0	3
3.	U19EE903	Deep Learning	3	0	0	3
4.	U19EE904	Machine Learning	3	0	0	3
5.	U19EE905	Computer Networking	3	0	0	3
6.	U19EE906	Java Programming	3	0	0	3
7.	U19EE907	Big Data Analytics for Electrical Engineers	3	0	0	3
8.	U19EE908	Operating Systems	3	0	0	3
9.	U19EE909	Cyber Security	3	0	0	3
10.	U19EE910	Communication Engineering	3	0	0	3
11.	U19EE911	Electromagnetic Waves	3	0	0	3
12.	U19EE912	Computational Electromagnetics	3	0	0	3
13.	U19EE913	Digital Control Systems	3	0	0	3
14.	U19EE914	Advanced Electrical Drives	3	0	0	3
15.	U19EE915	Flexible AC Transmission Systems	3	0	0	3
16.	U19EE916	Power System Operation and Control	3	0	0	3
17.	U19EE917	Wind and Solar Energy Systems	3	0	0	3
18.	U19EE918	Renewable Energy Sources	3	0	0	3
19.	U19EE919	Power Quality Engineering	3	0	0	3
20.	U19EE920	HVDC Transmission Systems	3	0	0	3
21.	U19EE921	High Voltage Engineering	3	0	0	3
22.	U19EE922	Industrial Electrical Systems	3	0	0	3
23.	U19EE923	Electrical Energy Conservation and Auditing	3	0	0	3
24.	U19EE924	Smart Grid	3	0	0	3
25.	U19EE925	Line-Commutated and Active PWM Rectifiers	3	0	0	3
26.	U19EE926	Automotive Electrical Technology	3	0	0	3
27.	U19EE927	PLC and Industrial Automation	3	0	0	3
28.	U19EE928	Electric Vehicle Technology	3	0	0	3
29.	U19EE929	Electrical System Design	1	0	4	3

SONA COLLEGE OF TECHNOLOGY, SALEM-5
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
LIST OF PROFESSIONAL ELECTIVES FOR HONOURS Degree

Date:03.05.2023

S.No	Vertical 1: Power Engineering	Vertical 2: Power Electronics and Drives	Vertical 3: Embedded Systems and IoT	Vertical 4: Energy Engineering	Vertical 5: Electric Mobility	Vertical 6: Intelligent Techniques
1.	Flexible AC Transmission Systems	Electromagnetic Waves	Communication Engineering	Wind and Solar Energy Systems	Automotive Electrical Technology	Computer Architecture
2.	Power System Operation and Control	Computational Electromagnetics	Digital Control Systems	Renewable Energy Sources	Electric Vehicle Technology	Introduction to Database Technology
3.	HVDC Transmission Systems	Advanced Electrical Drives	Introduction to Embedded Systems	Electrical Energy Conservation and Auditing	Automotive Embedded Systems	Deep Learning
4.	High Voltage Engineering	Power Quality Engineering	Embedded Systems Design	Smart Grid	Electrical Vehicles and Power Management	Machine Learning
5.	Smart Grid	Industrial Electrical Systems	High Speed Digital Design	Energy Storage Systems	Sensors and Actuators	Computer Networks
6.	Electrical System Design	Line-Commutated and Active PWM Rectifiers	PCB Hardware Design	Energy Conservation in Industrial Utilities	Electric and Hybrid Vehicles	Java Programming
7.	Power System Transients	Industrial Drives and Automation	Introduction to Automotive Embedded Systems and AUTOSAR	Advanced Energy Storage Technologies	Energy Storage Systems	Big Data Analytics for Electrical Engineers
8.	EHVAC Transmission Systems	Nanotechnology Fundamentals and its Applications	Introduction to IoT	Distributed Generation and Microgrid	Advanced Energy Storage Technologies	Operating Systems
9.	Distributed Generation and Microgrid	Power Converter Analysis and Design	Introduction to Industry 4.0 and Industrial Internet of Things		Automobile Chassis and Body Engineering	Cyber Security
10.	Deregulation and Restructured Power Systems	Micro-electromechanical Systems	Introduction and Programming with IoT Boards			PLC and Industrial Automation
11.			Sensors-Concepts and Techniques			Block Chain Technology
12.			IoT Devices			
13.			Microcontroller Based System Design			
14.			Automotive Embedded Systems			

SONA COLLEGE OF TECHNOLOGY, SALEM-5

Department of Electrical and Electronics Engineering

Honours Degree- Verticals & Courses

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

Vertical 1: Power Engineering

S. No.	Course Code	Course Name	L	T	P	C
1	U19EE915	Flexible AC Transmission Systems	3	0	0	3
2	U19EE916	Power System Operation and Control	3	0	0	3
3	U19EE920	HVDC Transmission Systems	3	0	0	3
4	U19EE921	High Voltage Engineering	3	0	0	3
5	U19EE924	Smart Grid	3	0	0	3
6	U19EE929	Electrical System Design	1	0	4	3
7	U19EE2001	Power System Transients	3	0	0	3
8	U19EE2002	EHVAC Transmission Systems	3	0	0	3
9	U19EE2003	Distributed Generation and Microgrid	3	0	0	3
10	U19EE2004	Deregulation and Restructured Power Systems	3	0	0	3

Vertical 2: Power Electronics and Drives

S. No.	Course Code	Course Name	L	T	P	C
1	U19EE911	Electromagnetic Waves	3	0	0	3
2	U19EE912	Computational Electromagnetics	3	0	0	3
3	U19EE914	Advanced Electrical Drives	3	0	0	3
4	U19EE919	Power Quality Engineering	3	0	0	3
5	U19EE922	Industrial Electrical Systems	3	0	0	3
6	U19EE925	Line-Commutated and Active PWM Rectifiers	3	0	0	3
7	U19EE2005	Industrial Drives and Automation	3	0	0	3
8	U19EE2006	Nanotechnology Fundamentals and its Applications	3	0	0	3
9	U19EE2007	Power Converter Analysis and Design	3	0	0	3
10	U19EE2008	Micro-electromechanical Systems	3	0	0	3

Vertical 3: Embedded Systems and IoT

S. No	Course Code	Course Name	L	T	P	C
1	U19EE910	Communication Engineering	3	0	0	3
2	U19EE913	Digital Control Systems	3	0	0	3
3	U19EE2009	Introduction to Embedded Systems	3	0	0	3
4	U19EE2010	Embedded Systems Design	3	0	0	3
5	U19EE2011	High Speed Digital Design	3	0	0	3
6	U19EE2012	PCB Hardware Design	3	0	0	3
7	U19EE2013	Introduction to Automotive Embedded Systems and AUTOSAR	3	0	0	3
8	U19EE2014	Introduction to IoT	3	0	0	3
9	U19EE2015	Introduction to Industry 4.0 and Industrial Internet of Things	3	0	0	3
10	U19EE2016	Introduction and Programming with IoT Boards	3	0	0	3
11	U19EE2017	Sensors-Concepts and Techniques	3	0	0	3
12	U19EE2018	IoT Devices	3	0	0	3
13	U19EE2019	Microcontroller Based System Design	3	0	0	3
14	U19EE2020	Automotive Embedded Systems	3	0	0	3

Vertical 4: Energy Engineering

S. No.	Course Code	Course Name	L	T	P	C
1	U19EE917	Wind and Solar Energy Systems	3	0	0	3
2	U19EE918	Renewable Energy Sources	3	0	0	3
3	U19EE923	Electrical Energy Conservation and Auditing	3	0	0	3
4	U19EE924	Smart Grid	3	0	0	3
5	U19EE2021	Energy Storage Systems	3	0	0	3
6	U19EE2022	Energy Conservation in Industrial Utilities	3	0	0	3
7	U19EE2023	Advanced Energy Storage Technologies	3	0	0	3
8	U19EE2003	Distributed Generation and Microgrid	3	0	0	3

Vertical 5: Electric Mobility

S. No.	Course Code	Course Name	L	T	P	C
1	U19EE926	Automotive Electrical Technology	3	0	0	3
2	U19EE928	Electric Vehicle Technology	3	0	0	3
3	U19EE2020	Automotive Embedded Systems	3	0	0	3
4	U19EE2024	Electrical Vehicles and Power Management	3	0	0	3
5	U19EE2025	Sensors and Actuators	3	0	0	3
6	U19EE2026	Electric and Hybrid Vehicles	3	0	0	3
7	U19EE2021	Energy Storage Systems	3	0	0	3
8	U19EE2023	Advanced Energy Storage Technologies	3	0	0	3
9	U19EE2027	Automobile Chassis and Body Engineering	3	0	0	3

Vertical 6: Intelligent Techniques

S. No.	Course Code	Course Name	L	T	P	C
1	U19EE901	Computer Architecture	3	0	0	3
2	U19EE902	Introduction to Database Technology	3	0	0	3
3	U19EE903	Deep Learning	3	0	0	3
4	U19EE904	Machine Learning	3	0	0	3
5	U19EE905	Computer Networks	3	0	0	3
6	U19EE906	Java Programming	3	0	0	3
7	U19EE907	Big Data Analytics for Electrical Engineers	3	0	0	3
8	U19EE908	Operating Systems	3	0	0	3
9	U19EE909	Cyber Security	3	0	0	3
10	U19EE927	PLC and Industrial Automation	3	0	0	3
11	U19EE2028	Block Chain Technology	3	0	0	3

SONA COLLEGE OF TECHNOLOGY, SALEM-5

Department of Electrical and Electronics Engineering

Minor Degree- Verticals & Courses

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

Minor Vertical : Embedded Systems and IoT

S. No.	Course Code	Course Name	L	T	P	C
1	U19EE2010	Embedded Systems Design	3	0	0	3
2	U19EE2011	High Speed Digital Design	3	0	0	3
3	U19EE2012	PCB Hardware Design	3	0	0	3
4	U19EE2013	Introduction to Automotive Embedded Systems and AUTOSAR	3	0	0	3
5	U19EE2014	Introduction to IoT	3	0	0	3
6	U19EE2015	Introduction to Industry 4.0 and Industrial Internet of Things	3	0	0	3
7	U19EE2016	Introduction and Programming with IoT Boards	3	0	0	3
8	U19EE2017	Sensors-Concepts and Techniques	3	0	0	3
9	U19EE2018	IoT Devices	3	0	0	3
10	U19EE2020	Automotive Embedded Systems	3	0	0	3

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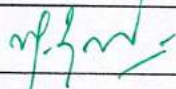
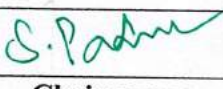
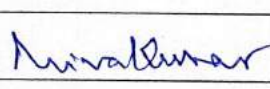
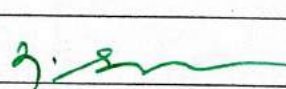
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3	U19CHE104D	Chemistry for Electrical Engineers	3	0	0	3	BS	45
4	U19PPR105	Problem Solving using Python Programming	3	0	0	3	ES	45
5	U19EGR106	Engineering Graphics	2	0	2	3	ES	60 (30L+30P)
Laboratory								
6	U19CHL109	Chemistry Laboratory	0	0	3	1.5	BS	45
7	U19PPL111	Python Programming Laboratory	0	0	2	1	ES	30
8	U19WPL112	Workshop Practice	0	0	2	1	ES	30
9	U19GE101	Basic Aptitude - I	0	0	2	0	EEC	30
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11	U19OLE1102	German						30
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30.06.2022

B.E/B. Tech Regulations-2019

U19ENG101B- English for Engineers – I

First year I semester

Common to EEE

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												Ps o1	Ps o2
		1	2	3	4	5	6	7	8	9	10	11	12		
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,
Sona College of Technology,
SALEM - 636 005.

B. E. / ELECTRICAL AND ELECTRONICS ENGINEERING

SEMESTER - I	LINEAR ALGEBRA AND CALCULUS	L	T	P	C
UI9MAT102A		3	1	0	4

COURSE OUTCOMES

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

1. find the rank of the matrix and solve linear system of equations by direct and indirect methods
2. apply the concepts of vector spaces and linear transformations in real world applications
3. 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
4. find the Taylor's series expansion, Jacobians and the maxima and minima of functions of two variables
5. apply appropriate techniques of multiple integrals to find the area and volume.

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	2		3	2						2	2	3	3
CO2	3	2		3	2						2	2	3	3
CO3	3	2		3	2						2	2	3	3
CO4	3	2		3	2						2	2	3	3
CO5	3	2		3	2						2	2	3	3

UNIT - I LINEAR SYSTEM OF EQUATIONS 12

Rank of a matrix – Solution of linear system of equations by matrix method, Gauss elimination, Gauss-Jordan, Gauss-Jacobi and Gauss-Seidel methods.

UNIT - II 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 - III 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 – IV MULTIVARIABLE CALCULUS 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 – V 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.

Theory: **45 Hours**

Tutorial: **15 Hours**

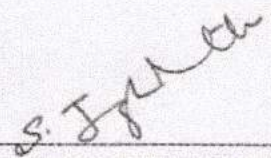
Total: **60 Hours**

TEXT BOOKS:

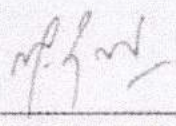
1. T. Veerarajan, "Linear Algebra and Partial Differential Equations", McGraw Hill Publishers, 1st Edition, 2018.
2. T. Veerarajan, "Engineering Mathematics for Semesters I & II", McGraw Hill Publishers, 1st Edition, 2019.

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

I SEMESTER (EEE)

COURSE CODE	U19CHE104D	L T P C
COURSE NAME	CHEMISTRY FOR ELECTRICAL ENGINEERS	3 0 0 3

Course outcome:

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

- CO1** Analyze the types of polymers, polymerization reactions, polymerization techniques and fabrication methods of polymers for engineering applications.
- CO2** Describe the construction, working principle and applications of energy storage devices for electronic appliances.
- CO3** Discuss the principles, advantages and applications of organic electronic materials in electronic devices.
- CO4** Explain the electrochemical processes carried out in electronic industries.
- CO5** Outline the principle and process of fabrication of Integrated Circuits.

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												3

UNIT I: POLYMERS AND COMPOSITES**9**

Nomenclature of Polymers – Functionality – Types of Polymerization-Addition-Condensation and Copolymerization – Classification of Polymers – Free Radical mechanism of addition polymerization - Tacticity in polymers – Methods of Polymerization-bulk-solution-emulsion and suspension – Plastics – Moulding constituents of plastic – Moulding of plastics into articles-Intrusion, Compression and Blow moulding – Thermoplastic and Thermosetting Resins – Engineering Plastics-Nylon 6,6-Polycarbonate and Polyurethane-preparation-properties and applications – Composites-Constituents of composites – Types of composites – Rubbers-types-applications-vulcanization of rubber.

UNITII: MODERN ENERGY DEVICES FOR ELECTRONIC APPLIANCES**9**

Reversible and Irreversible Cells – Batteries-Types of Batteries – Battery Characteristics-Voltage-Current-Capacity-Electricity Storage Density-Power-Discharge Rate-Cycle Life-Energy Efficiency and Shelf Life – Fabrication and Working of Alkaline Battery-Lead-Acid Battery-Ni-Cd-Lithium Ion Batteries and Solar cells – Fuel Cells – Hydrogen-Oxygen fuel cell – Nano Batteries- Construction-Working-Advantages and Applications.

UNIT III: CHEMISTRY OF ORGANIC ELECTRONIC MATERIALS**9**

Organic semiconducting materials – working principle and advantages over inorganic semiconducting materials – p-type and n-type organic semiconducting materials – Pentacene Fullerenes-C-60 – Organic dielectric material-definition-working principle and examples – Polystyrene – PMMA – Organic light emitting polymer – structure-properties and applications of Polythiophene – Conducting polymers, types and applications – Organic Light Emitting Diodes (Oleds) – construction-working principle and applications – Organic Solar Cells-working principle and applications organic transistors- construction-working principle and applications in electronic Industries.

UNIT IV: ELECTROCHEMICAL PROCESSES IN ELECTRONIC INDUSTRIES**9**

Electroplating – Principle and process – plating parameters- current and energy efficiency – Electroplating of Cu, Ni, and Cr. Fundamentals of electroless deposition – Ni and Cu electroless plating, fabrication of PCB's – Electrochemical etching of copper from PCBs – Anodizing – Definition, Principle and working methodology of aluminium anodizing process – Chemical sensors – optical and heat sensors – definitions and applications.

UNIT V: FABRICATION OF INTEGRATED CIRCUITS**9**

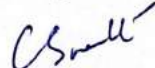
Introduction – Classification – IC chip size and circuit complexity – Fundamentals of monolithic IC technology – Basic planar process – Silicon wafer preparation, Epitaxial growth, X-ray and electron beam lithography, Diffusion, Isolation techniques, Metallization, Assembly processing and packaging – Fabrication of a typical circuit – Active and passive components of ICs – Transistors only.

TOTAL: 45 HOURS**Text Books:**

1. P.C.Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., New Delhi , 2010.
2. M. Raja *et al.*, "Chemistry For Electrical and Electronics Engineers" Sonaversity, Sona College of Technology, Salem, New Edition, 2019.

Reference Books:

1. Gowariker V.R. , Viswanathan N.V. and Jayadev Sreedhar, "Polymer Science", New Age International P (Ltd.), Chennai, 2006
2. Electroplating, Anodizing and Metal treatment", Hand book, NIIR board, 2004.
3. Hagen Klauk, "Organic Electronics: Materials, Manufacturing and Applications", Wiley-VCH, 2006.
4. D. Roy Choudhuryshail Jain, "Linear Integrated Circuits", New age international publishers, 2000.


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)
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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	PO9	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.


Dr. J. AKILANDESWARI
 PROFESSOR & HEAD
 Department of Information Technology
 SONA COLLEGE OF TECHNOLOGY
 SALEM - 636 005

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.


DR. J. AKILANDESWARI
PROFESSOR & HEAD
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SALEM - 636 005

COURSE CODE U19EGR106
COURSE NAME 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** Analyze 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

CONCEPTS AND CONVENTIONS (Not for Examination)

L 3 P 0

Importance of graphics in engineering applications, Use of drafting instrument, BIS conventions and specifications - Size, layout and folding of drawing sheets, Lettering and dimensioning.

COMPUTER AIDED DRAFTING (Not for Examination)

L 3 P 0

Importance 2d Drafting, sketching, modifying, transforming and dimensioning.

UNIT I PLANE CURVES (Manual drafting)

L 4 P 2

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)**

L 9 P 3

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)**

L 9 P 3

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)**

L 9 P 3

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 the other, (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)**

L 9 P 3

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 Number of hours: 60

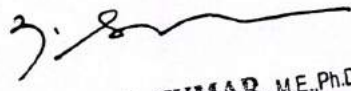
Learning Resources

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.

Reference Books

1. Dhananjay A. JoIhe, 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), Subhas Publications, 1998.
4. Bertoline & Wiebe fundamentals of graphics communication III edition McGrawhill 2002.


Dr. D. SENTHIL KUMAR, M.E., Ph.D
PROFESSOR & HEAD
DEPT. OF MECHANICAL ENGG.
SONA COLLEGE OF TECHNOLOGY
JUNCTION MAIN ROAD, SALEM-5.

U19CHL109		CHEMISTRY LABORATORY (Common to EEE and MECH)										L	T	P	C
												0	0	3	1.5
Course Outcomes															
After successful completion of this course, the students should be able to															
CO1:	Analyse the given water sample to determine the amount of hardness and alkalinity.														
CO2:	Determine the molecular weight of various polymers, analyse the quality of brass by estimating copper and estimate the amount of calcium oxide in the given cement sample. Calculate the amount of chromium present in the given sample of water,														
CO3:	Estimate the amount of DO in water and evaluate the amount of iron content in the given sample using spectrophotometry														
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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
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 1 st half of Experiment (10)						Quiz on 2 nd half (5)						Course end survey			
Quiz on 1 st half (5)						Internal test II (10)									
Internal test I (10)						RTPS (10)									

Mean of 2 nd half of Experiment (10)	End semester Examination (40)	
List of Experiments (Physics part) (Any five experiments from the below list)		
1	Estimation of hardness of water sample by EDTA method.	
2	Estimation of alkalinity of water sample by indicator method.	
3	Estimation of copper in brass by EDTA method.	
4	Estimation of chloride ion present in the sample water by argentometric method.	
5	Estimation of HCl by pH metry.	
6	Determiration of iron content in water by spectrophotometric method.	
7	Estimation of HCl by conductometry. (HCl vs NaOH)	
8	Estimation of mixture of acids by conductometry. (HCl + CH ₃ COOH vs NaOH)	
9	Estimation of ferrous ion by potentiometric titration.	
10	Determiration of Molecular weight of a polymer by viscosity measurements.	
11	Determiration of Dissolved Oxygen of water by Winkler's method.	
12	Estimation of chromium in waste water.	
		Total Hours: 45 Hrs

C. Shanthi

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)
SALEM-636 005

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	PO9	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

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Dr. J. AKILANDESWARI
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 SALEM - 636 005

COURSE CODE U19WPL112
COURSE NAME 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

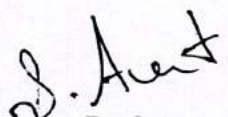
Tools and Equipment's- Planning Practice
 Making of Half Lap joint and Dovetail Joint.

Total Number of hours: 30

- I Jan
30

Semester-I U19GE101	Basic Aptitude – I (Common to All Departments)	L	T	P	C	Marks
Course Outcomes						
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


Dr.S.Anita

Head/Training

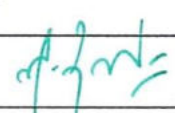
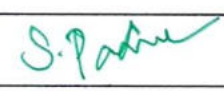

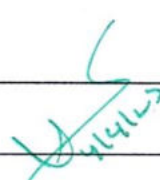
Department of Placement Training
Sona College of Technology,
Salem-636 005.

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

S.N	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	1	0	2	2	HSMC	45 (15L+30P)
3	U19MAT202C	Transforms and Differential Equations	3	1	0	4	BSC	60
4	U19PHY203C	Physics for Electrical Engineers	3	1	0	4	BSC	60
5	U19EE201	Electric Circuits and Electron Devices	3	1	0	4	PCC	60
6	U19EE202	Measurements and Instrumentation	3	0	0	3	PCC	45
Practical								
7	U19PHL210	Physics Laboratory	0	0	3	1.5	BSC	45
8	U19EE203	Electric Circuits and Electron Devices Laboratory	0	0	3	1.5	PCC	45
9	U19GE201	Basic Aptitude - II	0	0	2	0	EEC	30
Total Credits						21		
Optional Language Elective*								
10	U19OLE1201	French	0	0	2	1	HSMC	30
11	U19OLE1202	German						
12	U19OLE1203	Japanese						

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

Approved by

			
Chairperson, Science and Humanities BoS	Chairperson, Electrical and Electronics Engineering BoS	Member Secretary, Academic Council	Chairperson, Academic Council & Principal
Dr. M. Renuga	Dr. S. Padma	Dr. R. Shivakumar	Dr. S. R. R. Senthil Kumar

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

03.03.2023

B.E/B.Tech Regulations-2019

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 of Archaeology & 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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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 திருவள்ளூர் சிலை - இசைக் கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாத்தஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு III நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்:

3

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஓயிலாட்டம், 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, கையெழுத்துப்படிக்கள் - தமிழ்ப் புத்தகங்களின் அச்ச 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. பொருளை - 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 of Archaeology & 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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U19ENG201B - English for Engineers – II
First year II semester
EEE

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												Ps o1	Ps o2
		1	2	3	4	5	6	7	8	9	10	11	12		
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

9

- 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

9

- 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

9

- 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

9

- 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

9

- 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

(Theory: 15 hours: Practical: 30 hours) TOTAL: 45 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. / ELECTRICAL AND ELECTRONICS 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	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2		3	2						2	2	3	3
CO2	3	2		3	2						2	2	3	3
CO3	3	2		3	2						2	2	3	3
CO4	3	2		3	2						2	2	3	3
CO5	3	2		3	2						2	2	3	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:**

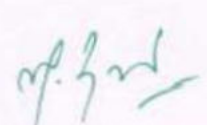
1. T. Veerarajan, "Transforms and Partial Differential Equations", McGraw Hill Publishers, 3rd Edition, 2016.
2. T. Veerarajan, "Engineering Mathematics for Semesters I & II", McGraw Hill Publishers, 1st Edition, 2019.

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.



Prof. S. JAYABHARATHI
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Salem – 636 005



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

Course Code: U19PHY203C **L T P C**
Course Name: Physics for Electrical Engineers **3 1 0 4 100**

(for Electrical and Electronics Engineering)

COURSE OUTCOMES:

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

- CO1** Discuss the dual nature of matter and radiation and its applications.
- CO2** Differentiate electrical and thermal conductivity of metals.
- CO3** Elucidate the classification and theory of semiconducting materials.
- CO4** Explain the basics of electron devices and their applications.
- CO5** Elucidate the principle of optical fiber communication and their applications.

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

12

Particle nature of radiation: Drawbacks of classical theory - Origin of quantum mechanics - Dual nature of matter and radiation - Particle nature of radiation - Black body radiation - Planck Hypothesis - Planck radiation formula (no derivation) – 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 - Transmission electron microscope – Scanning electron microscope- Limitations of electron microscope

Unit 2 Conducting materials

12

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 3 Semiconductor Physics

12

Fundamentals of semiconductors: 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 $T = 0\text{ K}$ and $T > 0\text{ K}$) – 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– Draw backs of intrinsic semiconductors

Extrinsic semiconductors: Types of extrinsic semiconductors – 'n'-type and 'p'-type semiconductors – Energy band diagram of 'n' type and 'p' type semiconductors (at $T = 0\text{ K}$ and $T > 0\text{ K}$) – carrier concentration of extrinsic semiconductors (Qualitative Treatment only) – variation of Fermi level with temperature and impurity concentration – Hall effect – Determination of Hall coefficient – Applications.

Unit 4 PN junction diode and optoelectronic devices

12

Theory of diode: Formation of p-n junction - p-n junction diode - p-n junction diode under forward bias - p-n junction diode under reverse bias - Half wave rectifier - full wave rectifier - bridge rectifier - Zener diode

Display devices: Photo diodes- types of photo diodes - Photo detector - PIN diode - Avalanche photo diode - Light emitting diode (LED) – Liquid Crystal Display (LCD) principle, construction and working - Solar cell- principle – construction- working - Photo

conductive cell – structure and operation, V I characteristics of photo transistor, Opto coupler, DIAC, TRIAC & CCD

Unit 5 Fiber optics

12

Fiber optics - Significance of optical fibers - Basic terms (reflection, refraction, refractive index, Snell's law, total internal reflection) – Derivation for acceptance angle, numerical aperture and fractional index change - Classification of fibers (based on materials, number of modes and refractive index profile)

Optical fiber communication: Block diagram of optical fiber communication - Advantages of optical fiber communication - Fiber optic sensors (Temperature and displacement sensors).

Lecture: 45, Tutorial: 15, Total: 60 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, Sona College of Technology, Salem (Revised Edition 2016).
2. Physics for Electrical and Electronics Engineering, Sonaversity, Sona College of Technology, Salem (Revised Edition 2016).
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)

Ch-15
30.6.2022

Dr. C. Shanthi
HOD / Science

Dr. C. SHANTHI, M.Sc., M.E., Ph.D.,
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Course Outcomes: At the end of the course, the students will be able to

1. discuss the DC and AC fundamentals of electric circuits.
2. solve the complex circuits using mesh analysis, nodal analysis and network theorems.
3. analyse resonance circuits and solve problems on three phase balanced and unbalanced loads.
4. discuss the configurations and analyse the performance of BJT, UJT JFET, MOSFET and IGBT.
5. analyse the applications of electron 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	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	1	2	1	2	1	1	3	3	2
CO2	3	3	3	3	3	1	2	1	2	1	1	3	3	2
CO3	3	3	3	3	3	1	2	1	2	1	1	3	3	2
CO4	3	1	2	1	3	2	2	1	2	1	2	3	3	2
CO5	3	3	3	2	3	1	2	2	2	1	1	3	3	2

UNIT I - DC AND AC FUNDAMENTALS

12

DC fundamentals – resistance in series and parallel circuits - star – delta conversions – voltage and current divisions, source transformations - problems.

AC fundamentals – RMS and average values of sinusoidal waveform - RL, RC and RLC series circuits-problems.

UNIT II - NETWORK ANALYSIS AND THEOREMS

12

Mesh current and node voltage analysis - Superposition theorem -Thevenin's and Norton's theorems – Maximum power transfer theorem – Reciprocity theorem - problems (only DC networks).

UNIT III - RESONANCE AND THREE PHASE CIRCUITS

12

Series and parallel resonance – Frequency response – quality factor and bandwidth- three phase balanced and unbalanced systems – analysis of three phase 3-wire and 4- wire circuits with star and delta connected loads– power and power factor measurements in three phase circuits by two wattmeter method-problems.

UNIT IV - TRANSISTOR

12

Principle of operation of NPN and PNP transistors-transistor as an amplifier-study of CE, CB and CC configurations and characteristics-comparison-relationship between amplification factors - operation and characteristics of UJT, JFET and MOSFET– working principle of IGBT - comparison of BJT with JFET and MOSFET.

Dr. S. PADMA, M.E., Ph.D.
Head of the Department
Department of EEE

Sona College of Technology
SALEM-636 005

S. Padma
31.3.23

UNIT V - ELECTRON DEVICES AND THEIR APPLICATIONS

12

Construction and characteristics of SCR and its two transistor analogy –SCR triggering methods- construction and operation of DIAC and TRIAC - comparison of SCR with DIAC and TRIAC - SCR as rectifier and inverter (single phase) - chopper – types of chopper- control strategies of chopper - cycloconverter.

TOTAL: 60 Hours

TEXT BOOKS

1. Sudhakar A and Shyam Mohan SP, "Circuits and Network Analysis and Synthesis", McGraw Hill Education (India) Private Limited, New Delhi (2015).
2. Padma S, Senthil Kumar M, Sabeenian R.S and Paramasivam M.E, "Electric Circuits and Electron Devices" Sonaversity(2008).

REFERENCES

1. Arumugam M and Premakumaran N, "Electric Circuit Theory", Khanna Publishers, 12th edition, (2017).
2. Chakrabarti A, "Circuit Theory Analysis and synthesis", DhanpathRai& Sons, 7th edition, New Delhi,(2018).
3. Salivahanan S, Suresh Kumar N and "Electronic Devices and Circuits", McGraw Hill Education (India) Private Limited, 4th edition, New Delhi (2016).
4. Bimbhra P.S, "Power Electronics", Khanna Publishers, 6th edition, New Delhi (2018).

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31-3-23

Dr. S. PADMA, M.E., Ph.D

Head of the Department
Department of EEE,

Sona College of Technology,
SALEM-636 005

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

1. discuss the static and dynamic characteristics and define various errors.
2. derive torque equation for different types of meters.
3. calculate R, L, and C using bridges.
4. explain types of transducers storage and display devices.
5. explain data acquisition systems using transducers and sensors.

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	2	1	3	3	3	2	2	2	1	2	3	3	2
CO2	3	3	2	2	2	3	2	1	2	1	1	2	3	2
CO3	3	3	2	2	2	3	2	1	2	1	1	2	3	2
CO4	3	1	2	1	3	2	2	1	2	1	2	3	3	2
CO5	3	1	2	1	3	2	2	1	2	1	2	3	3	2

UNIT I - INTRODUCTION

9

Functional elements of an instrument – static characteristics: true value, static error, static correction, reproducibility, drift, repeatability, noise, signal to noise ratio, accuracy and precision, sensitivity, linearity, threshold, dead zone, resolution. Dynamic characteristics: speed of response, fidelity, lag, and dynamic error – errors: gross error, systematic error and random error – statistical evaluation of measurement data – standards and calibration.

UNIT II - ELECTRICAL ANDELECTRONICS INSTRUMENTS

9

Principle and operation of analog voltmeters and ammeters: moving iron: attraction and repulsion type instruments. Moving coil instruments; PMMC, dynamometer type, torque equation – single phase dynamometer type watt meter: torque expression, errors – single phase induction type energy meters – measurement of power using instrument transformers – single phase electro-dynamometer power factor meters and Weston frequency meter.

UNIT III - BRIDGES & INTERFERENCE TECHNIQUES

9

DC bridges: Wheatstone bridge, Kelvin double bridge – AC bridges: Anderson, Schering, Wein - interference & screening – grounding techniques – Measurement of earth resistance.

UNIT IV - DIGITAL INSTRUMENTS ANDDISPLAYDEVICES

9

Digital voltmeter: ramp, integrating and successive approximation – Digital multi- meter – Dot matrix display, LED and LCD display, digital energy meter, Digital Storage Oscilloscope (DSO) – digital printers and plotters – Recorders: X-Y graphic recorders - Special instruments: measurement of solar radiation and Wind velocity.

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UNIT V - TRANSDUCERS AND SENSORS

9

Transducers – selection of transducers – resistive, capacitive and inductive transducers – measurement of temperature – RTD, thermistors and thermocouples – piezoelectric transducers – digital transducers – optical encoders – Introduction to data acquisition – Sensors: Temperature, Infrared.

TOTAL: 45 Hours

TEXT BOOKS

1. A.K.Sawhney, "A Course in Electrical & Electronic Measurements & Instrumentation", Dhanpat Rai and Co, 7th Edition, 2015.
2. R.K.Rajput, "Electrical Measurements and Measuring Instruments", S.Chand and Company Pvt. Ltd., Second Edition, 2013.

REFERENCES

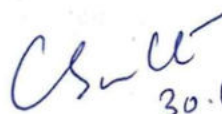
1. E.O.Doebelin, "Measurement Systems – Application and Design", Tata McGraw Hill Publishing company, 2003.
2. D.V.S. Moorthy, "Transducers and Instrumentation", Prentice Hall of India Pvt Ltd, 2007.
3. J. B. Gupta, "A Course in Electronic and Electrical Measurements", S. K. Kataria & Sons, Delhi, 2003.

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31.3.23

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U19PHL210		PHYSICS LABORATORY										L	T	P	C
												0	0	3	1.5
Course Outcomes															
After successful completion of this course, the students should be able to															
CO1:	Apply the principles of Optics, Thermal Physics and Elasticity to determine the Engineering properties of materials.														
CO2:	Apply the principles of Optics and Electricity to determine the Engineering properties of PN junction devices.														
CO3:	Determine the resistivity of the given copper turn used for house hold applications														
Pre-requisite: Capable of using Screw gauge, Vernier calliper, Travelling microscope and Spectrometer															
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	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 1 st half of Experiment (10)						Quiz on 2 nd half (5)						Course end survey			
Quiz on 1 st half (5)						Internal test II (10)									
Internal test I (10)						RTPS (10)									
Mean of 2 nd half of Experiment (10)						End semester Examination (40)									

List of Experiments	
1	Determination of coefficient of viscosity of liquid by Poiseuille's method.
2	Determination of velocity of ultrasonic waves and compressibility of the given liquid using ultrasonic interferometer.
3	Determination of the thermal conductivity of a bad conductor using Lee's Disc apparatus.
4	Determination of dispersive power of the prism for various pairs of colors in the mercury spectrum using a spectrometer.
5	Determination of laser wavelength using diode laser.
6	Determination of particle size of lycopodium powder using diode laser.
7	Determination of acceptance angle and numerical aperture of an optical fibre using diode laser
8	Determination of the thickness of a thin wire by forming interference fringes using air wedge apparatus.
9	Determination of specific resistance of a given wire using Carey Foster's bridge.
10	Determination of band gap of the given semiconductor diode.
11	V-I Characteristics of PN junction diode
12	V-I Characteristics of Zener diode
13	Performance analysis of half wave rectifier.
14	Performance analysis of bridge rectifier.
Total Hours: 45 Hrs	


 30.6.2022
Dr. C. SHANTHI, M.Sc., M.E., Ph.D.,
 Professor of Physics
 Head, Department of Sciences
 Sona College of Technology (Autonomous)
 SALEM-636 005.

U19EE203 ELECTRIC CIRCUITS AND ELECTRON DEVICES LABORATORY

L	T	P	C
0	0	3	1.5

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

1. calculate electrical parameters of DC circuits using basic circuit laws and to determine the loop currents and nodal voltages of DC circuits.
2. apply various circuit theorems to solve complex DC networks.
3. analyze the performance characteristics of switching devices, converter circuits, relaxation oscillator and controlled rectifier.

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	2	3	3	3	3	2	2	2	3	3	3	3	3	3
CO2	2	3	3	3	3	2	2	2	3	3	3	3	3	3
CO3	2	3	3	3	3	2	2	2	3	3	3	3	3	3

List of Experiments

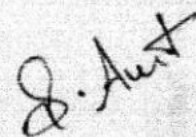
1. Verification of Ohm's Law and Kirchhoff's Laws
2. Calculation of Mesh currents and Node voltages
3. Verification of Superposition Theorem
4. Verification of Thevenin's and Norton's Theorems
5. Verification of Maximum Power Transfer Theorem
6. Analysis of RLC series and parallel circuits
7. Measurement of power and power factor by two wattmeter method
8. Analysis of I/O characteristics of BJT with CE configuration
9. Performance analysis of relaxation oscillator
10. Performance analysis of JFET and MOSFET
11. Performance analysis of DIAC and TRIAC
12. Analysis of single phase controlled rectifier

TOTAL : 45 Hours

S. Padma
31.3.23

Dr. S. PADMA, M.E., Ph.D
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Sona College of Technology,
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: <ol style="list-style-type: none"> 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: <ol style="list-style-type: none"> 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 	



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

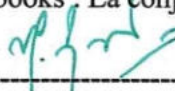
Hr 28: Imparfait vs passé composé, nature and environment, indirect pronouns COI

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, cahier 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 - 636 001.

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**

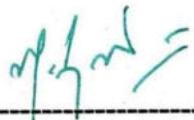
- Simple sentences using modal / separable verbs

UNIT – V **6**

- Articles of clothing

Total : 30 hours

Text Book
Netzwerk A1



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

Dr. M. RENUGA,
Professor & Head,
Department of Humanities & Languages,
Sona College of Technology,
SALEM - 636 001

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

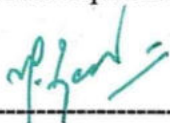
Hr 27-28: Preparing for JLPT N5

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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HOD / H&L

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SALEM - 636 005.

EEE
111

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

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
Theory							
1	U19EE301 /	Network Analysis and Synthesis	3	1	0	4	60 /
2	U19EE302 /	Analog Electronics	3	0	0	3	45 /
3	U19EE303 /	Electromagnetic Fields	3	1	0	4	60 /
4	U19EE304 /	Electrical Machines – I	3	0	0	3	45 /
5	U19EE305 /	Applied Thermodynamics	3	0	0	3	45 /
6	U19CS309 /	Object Oriented Programming in C++	3	0	0	3	45 /
7	U19TAM301 /	தமிழரும் தொழில்நுட்பமும் / / Tamils and Technology	1	0	0	1	15 /
8	U19GE302 /	Mandatory Course: Environment and Climate Science	2	0	0	0	30 /
Practical							
9	U19EE306 /	Analog Electronics Laboratory	0	0	2	1	30 /
10	U19EE307 /	Electrical Machines Laboratory – I	0	0	2	1	30 /
11	U19CS310 /	Object Oriented Programming in C++ Laboratory	0	0	2	1	30 /
12	U19GE301 /	Soft Skills and Aptitude – I	0	0	2	1	30 /
Total Credits						25 /	

Approved By

S. Padma

Chairperson, Electrical and Electronics Engineering BoS
Dr.S.Padma

Dr. R. Shivakumar
Member Secretary, Academic Council
Dr.R.Shivakumar

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

Copy to:-

HOD/Electrical and Electronics Engineering, Third Semester BE EEE Students and Staff, COE

05.07.2023

Regulations-2019

COURSE OUTCOMES:

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

- Analyse the transient response of circuits.
- Define various network topologies and analyse circuits.
- Solve and analyse one port and two port networks.
- Analyse coupled circuits and design of filters.
- Synthesize RL, RC and LC networks

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	1	3	1		2	2					3	2
CO2	3	2	2	3	1		1	2					3	2
CO3	3	2	2	2				1					3	2
CO4	3	3	3	3	1	2	1	1					3	3
CO5	3	3	3	3	1		1	1					3	3

UNIT I CIRCUIT TRANSIENT ANALYSIS

12

Introduction – transient response of RL & RC for step input and sinusoidal input – transient response of RLC series circuit for step input using Laplace transform method – problems.

UNIT II NETWORK TOPOLOGY

12

Introduction – graph of a network – definitions associated with graph – incidence matrix – loop matrix – cut set matrix – KVL – KCL – network equilibrium equations – applications to network solutions.

UNIT III ONE PORT AND TWO PORT NETWORKS

12

One port network – driving point impedance and admittance – two port network – Z parameters – Y parameters – ABCD parameters – h parameters – inter relationship between parameters – interconnection of two port networks – equivalent networks (T & π networks) – problems.

UNIT IV COUPLED CIRCUITS AND FILTERS

12

Coupled circuits: Inductive coupling in series and parallel circuits – tuned circuits – single and double tuned coupled circuits – problems.

Filters: Types - Characteristics of ideal filters – low pass and high pass filters – attenuation and phase shift constants – design of constant-k and m-derived filters – problems.

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Dr.S.PADMA, M.E., Ph.D.,
 Professor and Head,
 Department of EEE,
 Sona College of Technology
 Salem - 636 005. Tamil Nadu
 Regulations - 2019

Introduction – Hurwitz polynomials – properties of Hurwitz polynomials – PR functions – necessary and sufficient conditions of PR function – synthesis of RL, RC and LC functions – problems.

Lecture: 45, Tutorial: 15, Total: 60 Hours

TEXT BOOKS:

1. Ravish R Singh, “Electrical Networks”, McGraw Hill, 2011.
2. Shyam Mohan S.P., Sudhakar A, “Circuits and Network Analysis & Synthesis”, Tata McGraw Hill, 5th edition, 2015.

REFERENCES BOOKS

1. Chakrabarti A, “Circuits Theory (Analysis and Synthesis)”, Dhanpath Rai & Sons, 2013.
2. Arumugam M and Premkumar N, “Electric Circuit Theory”, Khanna & Publishers, 2006.
3. Soni M.L and Gupta J.C, “Electrical circuit Analysis”, Dhanpat Rai and Sons, Delhi, 1990.
4. Kuo F.F., “Network Analysis and Synthesis”, Wiley International Edition, Second Edition, 1996.


Dr.S.PADMA, M.E., Ph.D.,
Professor and Head,
Department of EEE,
Sona College of Technology
Salem-636 005. Tamil Nadu.

COURSE OUTCOMES

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

- Analyze the small signal model for the configurations of transistor and FET.
- Discuss and analyze the various types of large signal and feedback amplifiers.
- Design various types of multistage amplifiers and oscillators.
- Infer the DC and AC characteristics of op-amp and its effect on output and their compensation techniques.
- Elucidate and design circuits for various applications of op-amp.

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	3	2		2	2			1		3	2
CO2	3	3	3	2	3		2	2			2		3	2
CO3	1	3	3	1	2		1	2			2		3	2
CO4	3	3	2	2	3		2	2			2		3	2
CO5	3	3	2	3	2		2	3			3		3	3

UNIT I TRANSISTOR ANALYSIS

9

Transistor as an amplifier- h-parameters – forward A_i , Z_i , reverse A_v and Y_o – BJT h-model – Analysis of h-parameters for CE, CB, CC configurations – RF amplifier – Bias stability – dc load line, ac load line, operating point, stability factor, thermal runaway – Methods of transistor biasing – Bias compensation – Small signal analysis of CS amplifier.

UNIT II LARGE SIGNAL AND FEEDBACK AMPLIFIERS

9

Differential amplifier – Common mode and Difference mode analysis - analysis of Class A,B,C and AB Power amplifiers -- Feedback Amplifiers - Concept of feedback, General characteristics of negative feedback amplifiers - Effect of feedback on I/O resistance- types of negative feedback amplifiers – stability of feedback amplifier.

UNIT III MULTISTAGE AMPLIFIERS AND OSCILLATORS

9

Introduction – different coupling schemes in amplifiers – operation, advantages and disadvantages of RC coupled, transformer coupled, cascade, direct coupled and darlington amplifiers - Condition for Oscillations - RC phase shift Oscillators with transistor and FET- Hartley and Colpitts Oscillators - Wein-Bridge Oscillator - Crystal Oscillator- Frequency and Amplitude Stability Oscillators.

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UNIT IV CHARACTERISTICS OF OP-AMP

9

Block diagram of operational amplifier, packing characteristics, ideal op-amp – ideal operational amplifier – differential mode, common mode, CMRR – ideal op-amp characteristics – practical op-amp characteristics – open loop and closed loop configuration of ideal and practical op-amp as an inverting amplifier, non-inverting amplifier, voltage follower, DC characteristics, AC characteristics – frequency response, slew rate, frequency compensation.

UNIT V APPLICATIONS OF OP-AMP

9

summing amplifier – adder, subtractor, low pass and high pass filters, three op-amp instrumentation amplifier, log and antilog amplifiers, waveform generator (triangular, saw tooth and stair case waveforms), sample and hold circuit, differentiator, integrator, comparators & its characteristics, Schmitt trigger, peak detector, precision rectifiers.

Lecture: 45, Tutorial: 0, TOTAL: 45 Hours

TEXT BOOKS

1. S Salivahanan, N Sureshkumar and A Vallavaraj, “Electronic Devices and Circuits”, Tata Mcgraw Hill, 6th reprint 2015.
2. D.Roy Choudhry, Shail Jain, “Linear Integrated Circuits”, New Age International Pvt. Ltd., 4th Edition ,2012.

REFERENCE BOOKS

1. David A Bell, “Electronic Devices and Circuits”, Oxford University Press, Fifth edition, 2010.
2. Ramakant A.Gayakwad, “Op-amp and Linear ICs”, Prentice Hall, 4th Edition, 2010.
3. J Millman, CC Halkias and SathyabrathaJit , “Electronic Devices and Circuits”, Tata Mcgraw Hill, 2nd Ed, 2012.
4. Robert F. Coughlin, Frederick F. Driscoll, “Operational Amplifiers and Linear Integrated Circuits”, PHI, 2015.



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COURSE OUTCOMES

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

- Describe the Electromagnetic quantities in spatial distribution of different coordinate systems.
- Describe the behavior of Electric field intensity and Electric flux density due to various charge distributions.
- Apply the principles of magnetostatics to magnetic field, boundary condition and inductance.
- Understand the concepts related to faraday's law, induced emf and Maxwell's equation.
- Illustrate the concepts of electromagnetic wave equation, wave propagation and Poynting theorem.

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	2	2	3	1		2		3			2	1
CO2	3	3	3	1		1		3		1			2	1
CO3	3	3	3	1		1		2		1			2	1
CO4	3	3	3	2		1		3		1			2	1
CO5	3	3	3	1		1		2		1			2	1

UNIT I VECTOR CALCULAS 12

Scalar and vector fields - Coordinate systems; cartesian, cylindrical and spherical coordinate systems - relationship between coordinate systems - types of integral related to EMF - Gradient - Curl - Divergence theorem – Stoke's theorem – simple problems.

UNIT II ELECTROSTATICS 12

Coulombs' law - Electric field intensity, electric flux density and electric potential due to various charge distributions - Electric field intensity due to infinite line charge, charged circular ring, infinite sheet of charge - Gauss's law and applications - Electric dipole - Boundary conditions - Poisson's and Laplace's equations - Capacitance; capacitance of parallel conductors, capacitance of an isolated sphere, concentric spheres and coaxial cables – simple problems.

UNIT III MAGNETOSTATICS 12

Lorentz law of force - Biot-savart law - Ampere's circuital law - Magnetic field intensity and magnetic flux density - B and H due to finite length of conductor, at any point along the axis of circular coil, at any point along the axis of solenoid, at the centre of toroidal coil - Magnetic dipole - Magnetization - Boundary conditions at the magnetic surface - Magnetic torque - Inductance; self and mutual inductance, inductance of solenoid and toroid, coaxial cable, two transmission lines – simple problems.

UNIT IV ELECTRODYNAMIC FIELDS

12

Faraday's law of electromagnetic induction - Coefficient of coupling - Point form of Gauss's law - Maxwell's equation (differential and integral form) - Conduction current - Displacement current – Current densities - Equation of continuity - Energy stored in electric and magnetic fields; energy density - Relation between field theory and circuit theory – simple problems.

UNIT V ELECTROMAGNETIC WAVES

12

Derivation of Electromagnetic wave equations - Wave equations for free space - Wave parameters; velocity, intrinsic impedance - Wave propagation in a lossless medium, wave propagation in a conducting medium, wave propagation in good dielectrics and good conductors - Skin effect - Poynting theorem – simple problems.

Lecture: 45, Tutorial: 15, Total: 60 Hrs.

TEXTBOOKS

1. Matthew N.O. Sadiku, "Principles of Electromagnetics", 5th Edition, International Version, Oxford University Press 2015.
2. W.H.Hayt J.A.Buck and M.Jallel Akhtar, "Engineering Electromagnetics", 8th Edition, McGraw Hill Education (India) Private Limited, Special Indian Edition 2014.

REFERENCEBOOKS

1. K A Gangadhar, 'Electromagnetic Field Theory', Khanna Publishers; Eighth Reprint :2015.
2. Kraus/Fleisch, "Electromagnetics with Applications", 5th Edition, McGraw Hill Education (India) Edition 2010.
3. S C Mahapatra, Sudipta Mahapatra, "Principles of Electromagnetics", Mc Graw Hill Education (India) Private Limited, New Delhi, 2nd Edition 2015.
4. S.P.Ghosh, Lipika Datta, 'Electromagnetic Field Theory', First Edition, McGraw Hill Education (India) Private Limited, second reprint 2015.



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COURSE OUTCOMES:

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

- Explain the fundamentals of energy conversion and single-phase transformer.
- Classify different types of polyphase connections of transformer and find the efficiency of transformer.
- Explain the constructional details and principle of operation of DC generator and analyse its performance.
- Explain the constructional details and principle of operation of DC motor and analyse its performance.
- Calculate the efficiency of DC machines using direct and indirect testing.

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	2	2	1	2	2		1			1	3	1
CO2	3	3	2	2	1	2	2		1			1	3	1
CO3	3	3	2	2	1	2	2		1			1	3	1
CO4	3	3	3	3	1	2	2		1			1	3	2
CO5	3	3	3	3	3	2	2		1			1	3	1

UNIT I MAGNETIC CIRCUITS AND SINGLE PHASE TRANSFORMER 9


Principles of Electromechanical energy conversion – Single Phase Transformer – principle of operation – construction – classification of transformers –EMF equation – transformation ratio – transformer on no-load and load – phasor diagrams – equivalent circuit – voltage regulation – auto transformer – applications – simple problems.

UNIT II THREE PHASE TRANSFORMER AND TESTING 9

Three-phase transformers – principle – construction – three phase transformer connections – star, zig-zag, open-delta, Scott connection– three-phase to single-phase conversion – parallel operation – testing of transformers – polarity test, load test – phasing out test – Sumpner's test – condition for maximum efficiency, all day efficiency - applications – simple problems.

UNIT III DC GENERATORS 9

Principle of operation, constructional details, armature windings, EMF equation- voltage build up process- methods of excitation – separate, shunt, series and compound excitations – no-load and load characteristics – armature reaction – commutation –inter poles, compensating windings – applications – simple problems.


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UNIT IV DC MOTORS

9

Principle of operation –types of motors - torque equation – electrical and mechanical characteristics of DC shunt, series and compound motors – power flow – starting and braking of DC Shunt motors – starting and braking of DC Series motors - introduction to soft starter - speed control – applications – simple problems.

UNIT V TESTING OF DC MACHINES

9

Losses and efficiency in DC machines – condition for maximum efficiency – testing of DC machines – brake test, Swinburne’s test and Hopkinson’s test – Field’s test - separation of losses – simple problems.


Lecture: 45 Hours; Tutorial: 0 Hours; Total: 45 Hours

TEXT BOOKS

1. D.P. Kothari and I.J. Nagrath, “Electric Machines”, McGraw Hill Publishing Company Ltd, Fourth Edition, 2014.
2. B.L. Theraja and A.K. Theraja, “A Text Book of Electrical Technology”, S.Chand Publisher, Vol 2, 2014.

REFERENCE BOOKS

1. Samarajit Ghosh, “Electrical Machines”, Pearson Education, second edition, 2012.
2. Stephen J Chapman, “Electric Machinery Fundamentals”, Tata McGraw-Hill Education Private Ltd, Fifth Edition, 2012.
3. M.Ramamoorthy, O. Chandra Sekhar, “Electrical Machines”, PHI Learning Pvt.Ltd., 2018.
4. S.K.Sahdev, “ Electrical Machines”, Cambridge University Press,2018.


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COURSE OUTCOMES

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

- Discuss the thermodynamic properties of system and apply zeroth and First Law of Thermodynamics to solve engineering problems.
- Determine the thermal efficiency of steam power plant and discuss the various components of thermal power plant
- Explain the types of Refrigeration system and calculate the cooling, heating and humidifier capacities for various air-conditioning components by using psychrometric charts.
- Analyze the performances of hydraulic turbines.
- Evaluate the performance of centrifugal pumps and identify the various types of pumps and compressor for specific application.

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	3	2	3	2	1	2	1	2	1	2	2
CO2	3	3	2	2	3	2	3	1	3	2	3	2	3	3
CO3	3	3	3	3	2	2	2	1	3	1	2	2	2	2
CO4	3	3	2	3	2	2	3	1	3	2	3	1	3	2
CO5	3	2	3	3	2	2	2	1	3	1	3	2	2	2

UNIT I FUNDAMENTALS OF THERMODYNAMICS 9

Introduction to Thermodynamics – Concept of a System – Types of Systems – Thermodynamic Equilibrium – Properties - State - Process and Cycle – Zeroth Law – Energy Interactions – Heat and Work – Types of Work – First Law: Cycle and Process – Heat and work Interactions in a Closed System for Various Processes – Limitations of First Law - Non-flow and flow processes.

UNIT II STEAM POWER PLANT AND ITS COMPONENTS 9

Thermal Power Plant Layout – Four Circuits – Rankine Cycle – Steam properties- quality of steam - simple problems. Boilers: -Classification- Fire Tube vs Water Tube boilers-Babcock & Wilcox – Cochran Boilers.

Steam Turbines: Impulse and. Reaction Turbines –Condensers: Types – Jet & Surface Condensers. Cooling Towers - Dust collector – Draught system.

UNIT III REFRIGERATION SYSTEM AND AIR CONDITIONING 9

Refrigeration – ton of refrigeration - Vapour compression refrigeration system - cycle, p-h chart, Vapour absorption system- comparison- properties of refrigerants.

Air conditioning - types of Air conditioning system and working principles- - Study on psychrometric charts, psychrometric processes - Properties of Air (DBT, %RH, WB, DPT, and enthalpy) - simple Problems.

UNIT IV HYDRAULIC TURBINES **9**

Hydraulic turbines - classification and working principle. Pelton wheel turbine - Francis turbine - Kaplan turbine - Velocity triangle - work done – Efficiencies - Performance calculations.

UNIT V PUMPS & COMPRESSOR **9**

Centrifugal pumps– working principle - Velocity triangle - work done- Efficiencies- Performance calculations. Reciprocating pump- working principle – Comparison
Compressor - Classification- Applications - Reciprocating compressor and Rotary Compressor– working principle – Comparison.

Lecture: 45 Hours; Tutorial: 0 Hours; Total: 45 Hours

TEXT BOOKS

1. R.K.Rajput, “Thermal Engineering” ,Laxmi Publications, New Delhi, Sixth edition, 2005.
2. Bansal, R.K., Fluid Mechanics and Hydraulics Machines, (9th edition), Laxmi publications (P) Ltd, New Delhi, 2017.
- 3.

REFERENCE BOOKS

1. Sarkar B.K., “Thermal Engineering”, Tata McGraw-Hill, New Delhi New Delhi, 2001
2. Arora C.P., “Refrigeration and Air conditioning”, Tata McGraw-Hill, New Delhi, 2000.
3. Rudramoorthy R, “Thermal Engineering”, Tata McGraw Hill Book Company, New Delhi, 2003
4. P. L. Ballaney, “Thermal Engineering: Engineering Thermodynamics and Energy Conversion Techniques”, Khanna Publishers, 5th Edition, 2010.



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COURSE OUTCOMES

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

- Explain fundamental programming concepts such as variables, conditional statements, looping constructs.
- Apply derived data types and methods (procedures), inline function, friend function in applications.
- Describe how the class mechanism supports encapsulation and information hiding.
- Apply operator overloading and inheritance in solving real time problems.
- Write C++ programs for applications using files and exceptions.

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	2	3	3	2	3	2	3			3	3	3
CO2	3	3	2	3	3	2	3	2	3			3	3	3
CO3	3	3	2	3	3	2	3	2	3			3	3	3
CO4	3	3	2	3	3	2	3	2	3			3	3	3
CO5	3	3	2	3	3	2	3	2	3			3	3	3

UNIT I INTRODUCTION TO OOPS AND C++

9

Introduction to Object Oriented Programming and C++: Object oriented concepts and its characteristics - History of C++ - Applications of C++ - Structure of C++ - Tokens – Keywords – Identifiers - Basic data types - Input and output statements - C++ Operators and control statements.

UNIT II DERIVED DATA TYPES AND FUNCTIONS

9

Derived data types: Arrays – Structures - Unions - Type casting - Symbolic constants - Scope resolution operator -Functions: Function Prototyping - Function components - Passing parameters – Call by value - Call by reference - Inline function - Default arguments - Overloaded function- Introduction to friend function.

UNIT III CLASSES AND OBJECTS


9

Classes and Objects: Class specification - Member function definition - Access qualifiers - Instance creation - Static data members and member functions - Array of objects - Objects as arguments - Returning objects – Constructors - Parameterized Constructors - Overloaded Constructors - Constructors with default arguments - Copy constructors – Destructors.

UNIT IV OPERATOR OVERLOADING AND INHERITANCE

9

Operator Overloading - Operator function – Overloading unary and binary operator – Inheritance Introduction – Types of Inheritance - Constructors in derived class - Abstract classes - Runtime Polymorphism– Array of pointers to base class – Virtual functions - Pure virtual functions – Virtual Destructors.


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Streams: Streams in C++ - Stream classes - Formatted and unformatted data – Manipulators - File streams - File pointer and manipulation - File open and close - Sequential and random access - Name Space.

Exception Handling: Principle of exception handling - Exception handling mechanism - Multiple catch statements - Nested try statements.


Lecture: 45 Hours; Tutorial: 0 Hours; Total: 45 Hours

TEXT BOOK

1. Robert Lafore, "Object-Oriented Programming in C++" Pearson Education, 4 Edition, 2008.
2. K R Venugopal, RajkumarBuyya "Mastering C++" Tata McGraw Hill, New Delhi, Second edition 2015.

REFERENCES

1. H. M. Deitel, P. J. Deitel, "C++ How to Program", Fifth Edition, Deitel& Associates, Inc.
2. Nicholas A. Solter, Scott J. Kleper, "Professional C++", 3rd Edition, Wiley Publishing,
3. Ira Pohl, "Object Oriented Programming using C++", Pearson Education, Second Edition Reprint 2004.
4. S. B. Lippman, Josee Lajoie, Barbara E. Moo, "C++ Primer", Fourth Edition, Pearson Education, 2005.
5. B. Stroustrup, "The C++ Programming language", 3rd edition, Pearson Education, 2004.
6. E. Balaguruswamy, "Object-Oriented Programming with C++" Tata McGraw Hill, New Delhi, Sixth edition 2015.
7. B. Stroustrup, "The C++ Programming language", 3rd edition, Pearson Education, 2004.
8. E. Balaguruswamy, "Object-Oriented Programming with C++" Tata McGraw Hill, New Delhi, Sixth edition 2015.


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COURSE OUTCOMES:

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

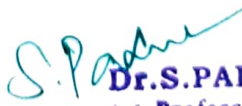
- Design different amplifier circuits and verify their output waveforms.
- Verify the output waveforms of various types of oscillators.
- Construct circuits for various applications using op-amp and verify their output waveforms.

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	3	2	1	1				2		3	3
CO2	3	3	3	3	3	1	1				2		3	3
CO3	3	3	3	3	3	1	1				2		3	3

LIST OF EXPERIMENTS

1. Design the differential Amplifier
2. Verify the output of feedback Amplifier
3. Verify the output waveforms of Hartley and Colpitts Oscillator
4. Verify the output waveforms of Phase shift and Wein-bridge Oscillator.
5. Design of inverting and non-inverting amplifiers.
6. Design of instrumentation amplifier using op-amp.
7. Design of integrator and differentiator (IC741).
8. Designs of Schmitt trigger using op-amp.
9. Design of precision rectifiers using op-amp.
10. Design of adder and subtractor.
11. Design of clipper and clamper circuits using op-amp.

Total: 30 Hours


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COURSE OUTCOMES:

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


- Analyse the characteristics and determine the efficiency of DC machines.
- Pre-determine the losses on no-load and determine the efficiency and regulation of transformer.
- Control the speed of shunt motor to above and below rated speed using rheostat.

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	2	2	1		1		1			1	3	1
CO2	3	3	2	2	1		1		1			1	3	1
CO3	3	3	2	2	1		1		1			1	3	1

List of Experiments

1. Analyse the open circuit and load characteristics of separately excited DC shunt generator.
2. Analyse the load characteristics of DC compound generator.
3. Analyse the load characteristics of DC shunt motor.
4. Analyse the load characteristics of DC series motor.
5. Analyse the load characteristics of DC compound motor.
6. Speed control on a DC shunt motor by field and armature control method.
7. Analyse the characteristics of DC motor by Swinburne's test and Hopkinson's test on DC motor-generator set.
8. Analyse the load characteristic of single-phase transformer.
9. Predetermine the efficiency of transformer by Sumpner's test and open circuit and short circuit tests.
10. Analyse the no-load losses in single-phase transformer by separation method.
11. Determine the efficiency of Scott connected transformer using load test.

Total: 30 Hours


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COURSE OUTCOMES

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

- Apply the control structures and functions in C++ to solve problems.
- Develop applications using object oriented concepts.
- Demonstrate the concept of file and exception handling mechanism.

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	1	3	3	1	1		2	3	3			3	2	3
CO2	3	2	3	2	2		3	3	3			3	2	3
CO3	3	3	3	3	3		3	3	3			3	2	3

LIST OF EXPERIMENTS

1. Simple C++ programs to implement various control structures
 - a. if statement
 - b. switch case statement and do while loop
 - c. for loop
 - d. while loop
2. Programs to implement single and multi-dimensional arrays.
3. Programs to implement Structures.
4. Programs to understand Functions
 - a. Built-in and user defined functions
 - b. Functions with default arguments
 - c. Inline functions
 - d. Overloaded Functions
5. Programs to understand different function call mechanism.
 - a. call by reference
 - b. call by value
6. Programs to understand friend function & friend class.
 - a. friend function
 - b. friend class
7. Programs to understand constructors, destructors and this pointer.
8. Programs to overload unary & binary operators as member function & non-member function.
 - a. unary operator as member function
 - b. binary operator as non-member function
9. Programs to implement inheritance and it types.
10. Programs to implement run-time polymorphism.
11. Programs to demonstrate file manipulation.
12. Programs to apply exception handling.

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TOTAL: 30 Hours

அலகு I நெசவு மற்றும் பானைத் தொழில்நுட்பம்:

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

அலகு II வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்:

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 இந்நதோ-சாரோசெனிக் கட்டிடக் கலை.

அலகு III உற்பத்தித் தொழில் நுட்பம்:

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:

அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குழுவித் 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:

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. கணிணித் 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 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

Dr. M. RENUGA,
Professor & Head,

Department of Humanities & Languages,
Anna College of Technology
SALEM - 636

UNIT I WEAVING AND CERAMIC TECHNOLOGY

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 beads - Archeological evidences - Gem stone types described inSilappathikaram.

UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY

3

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoempu 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. கணிணித் 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.
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12. Journey of Civilization Indus to Vaigai (R.Ramakrishna) (Published by: RMRL) – Reference Book.


HOD 19/12/23

Dr. M. RENUGA,
Professor & Head,
Department of Humanities & Languages,
Anna College of Technology,
SALEM - 631

COURSE CODE U19GE302

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

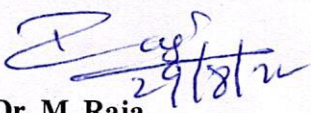
Fungal diseases in forests and agricultural crops due to climatic fluctuations - Growing energy needs - effect of climate change due to non-renewable energy resources. Renewable energy resources in the prevention of climatic changes- Effect of climatic changes in ground water table, garments, monuments,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

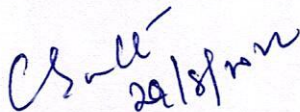
Total Number of hours: 30**Learning Resources****Text Book:**

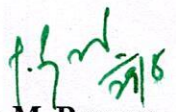
1. Miller, T.G. Jr., "Environmental Science", Wadsworth Pub. Co. 2018
2. Anubha Kaushik and Kaushik, "Environmental Science and Engineering" New Age International Publication, 4th Multicolour Edition, New Delhi, 2014.

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.


Dr. M. Raja
Course Coordinator / Sciences


Dr. C. Shanthi
HOD / Sciences


Dr. M. Renuga
Chairperson BOS,
Science and Humanities

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: <ol style="list-style-type: none"> Attitude building Dealing with criticism Innovation and creativity Problem solving and decision making Public speaking Group discussions 	
2. Quantitative Aptitude and Logical Reasoning	Solving problems with reference to the following topics: <ol style="list-style-type: none"> Vedic Maths: Fast arithmetic, multiplications technique, Criss cross, Base technique, Square root, Cube root, Surds, Indices, Simplification. Numbers: Types, Power cycle, Divisibility, Prime factors & multiples, HCF & LCM, Remainder theorem, Unit digit, Tens digit, highest power. Averages: Basics of averages and weighted average. Percentages: Basics of percentage and Successive percentages. Ratio and proportion: Basics of R & P, Alligations, Mixture and Partnership. Profit, Loss and Discount: Basic & Advanced PLD Data Interpretation: Tables, Bar diagram, Venn diagram, Line graphs, Pie charts, Case lets, Mixed varieties, Network diagram and other forms of data interpretation. 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: <ol style="list-style-type: none"> Verbal analogy Tenses Prepositions Reading comprehension Choosing correct / incorrect sentences Describing pictures 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.

EEE
IV

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

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
Theory							
1	U19MAT401B	Probability and Statistical Methods	3	1	0	4	60
2	U19EE401	Signals and Systems	2	1	0	3	45
3	U19EE402	Electrical Machines – II	3	0	0	3	45
4	U19EE403	Power Electronics and Drives	3	0	0	3	45
5	U19EE404	Digital Electronics and Microcontroller	3	0	0	3	45
6	U19CS408	Data Structures	3	0	2	4	75
7	U19GE403	Mandatory Course - Essence of Indian Traditional Knowledge	2	0	0	0	30
Practical							
8	U19EE405	Electrical Machines Laboratory – II	0	0	2	1	30
9	U19EE406	Power Electronics and Drives Laboratory	0	0	2	1	30
10	U19EE407	Digital Electronics and Microcontroller Laboratory	0	0	3	1.5	45
11	U19GE401	Soft Skills and Aptitude - II	0	0	2	1	30
Total Credits						24.5	

Approved By

S. Padma
Chairperson, Electrical and Electronics Engineering BoS
Dr.S.Padma

M. Shivakumar
Member Secretary, Academic Council
Dr.R.Shivakumar

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

Copy to:-

HOD/Electrical and Electronics Engineering, Sixth Semester BE EEE Students and Staff, COE

B. E / ELECTRICAL AND ELECTRONICS ENGINEERING

SEMESTER – IV	PROBABILITY AND STATISTICAL METHODS	L	T	P	C
U19MAT401B		3	1	0	4

COURSE OUTCOMES

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

1. apply the concepts of measures of central tendency, dispersion, correlation to the given data and analyze the results.
2. apply the concepts of random variables and their properties to generate the moments.
3. fit the suitable distribution and its properties to the real world problems and interpret the results.
4. apply the concepts of joint probability distribution and its properties to find the covariance.
5. test the hypothesis of the population using sample information.

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	2		3	2						2	2	3	3
CO2	3	2		3	2						2	2	3	3
CO3	3	2		3	2						2	2	3	3
CO4	3	2		3	2						2	2	3	3
CO5	3	2		3	2						2	2	3	3

UNIT – I BASIC STATISTICS 12

Measures of central tendency (simple arithmetic mean, median, mode) – quartile's – measures of dispersion (range, inter-quartile range, quartile deviation, mean deviation, standard deviation, coefficient of variation) – simple correlation – curve fitting (straight line and parabola).

UNIT – II RANDOM VARIABLES 12

Discrete and continuous random variables – probability mass function, probability density function, moments, moment generating function and their properties.

UNIT – III THEORETICAL DISTRIBUTIONS 12

Binomial, Poisson, geometric, uniform, exponential and normal distributions and their properties – applications.

UNIT – IV TWO DIMENSIONAL RANDOM VARIABLES 12

Joint distributions, marginal and conditional distributions – covariance – correlation – central limit theorem.

UNIT – V TESTING OF HYPOTHESIS**12**

Sampling distributions – testing of hypothesis for proportion, mean, standard deviation and differences using normal distribution– t -test for single mean and difference between means - χ^2 - tests for independence of attributes and goodness of fit and F -test for equality of two variances.

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

1. S. C. Gupta and V. K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons Publishers, 11th Edition, Reprint, 2019.
2. T. Veerarajan, "Probability, Statistics and Random Processes with Queuing Theory and Queuing Networks", McGraw Hill Publishers, 4th Edition, 7th Reprint, 2018.

REFERENCE BOOKS:

1. R. A. Johnson and C. B. Gupta, "Miller and Freund's, Probability and Statistics for Engineers", Pearson Publishers, 9th Edition, 2018.
2. S. Ross, "A First Course in Probability", Pearson Publishers, 9th Edition, 2019.
3. P. G. Hoel, S. C. Port and C. J. Stone, "Introduction to Probability Theory", Universal Book Stall Publishers, Reprint, 2003.
4. W. Feller, "An Introduction to Probability Theory and Its Applications – Volume – I", Wiley Publishers, 3rd Edition, 2008.



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 OUTCOMES:

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

1. Explain the basic properties of signal & systems and the various methods of classification.
2. Apply Laplace transform & Fourier transform for continuous signals and systems analysis.
3. Analyse discrete time signals and linear time invariant systems.
4. Analyse LTI systems in the time domain and various transform domains.
5. Analyse discrete transforms properties

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	2	3	3							3	3	3
CO2	3	3	2	3	3							3	3	3
CO3	3	3	2	3	3							3	3	3
CO4	3	3	2	3	3							3	3	3
CO5	3	3	2	3	3							3	3	3

UNIT I CLASSIFICATION OF SIGNALS AND SYSTEMS

9

Continuous Time signals (CT signals) – Discrete Time signals (DT signals) – step, ramp, pulse, impulse, sinusoidal, exponential, classification of CT and DT signals – periodic & aperiodic signals, deterministic & random signals, energy & power signals – CT systems and DT systems classification of systems – static & dynamic, linear & nonlinear, time-variant & time-invariant, causal & non-causal, stable & unstable systems.

UNIT II ANALYSIS OF CONTINUOUS TIME SIGNALS AND LINEAR TIME INVARIANT (LTIV) SYSTEMS

9

Fourier and Laplace transforms in CT Signal analysis – Fourier and Laplace transforms in analysis of CT systems – Dirichlet's Conditions - Properties of Fourier and Laplace Transform s - Initial Value, Final Value and Parseval's Theorems.

UNIT III ANALYSIS OF DISCRETE TIME SIGNALS

9

Baseband sampling – Sampling Theorem for Low pass Signals - under sampling - Nyquist Rate and Nyquist Interval - Discrete Time Fourier Transform (DTFT) – properties of DTFT – Z transform – properties of Z transform.

UNIT IV LINEAR TIME INVARIANT DISCRETE TIME SYSTEMS

9

Difference equations – Block diagram representation - Direct form I and Direct Form II structures – impulse response – convolution sum – discrete Fourier and Z transform analysis – Magnitude / Phase Transfer Function using Fourier Transform – Pole-Zero Plots.

UNIT V DISCRETE TRANSFORMS

9

Discrete Fourier Transform(DFT) – definition – properties, computation of Discrete Fourier Transform(DFT) using Fast Fourier Transform(FFT) algorithm – Decimation in Time (DIT) domain and Decimation in Frequency(DIF) domain – Fast Fourier Transform(FFT) using radix-2 – Butterfly structure – computation of Inverse Discrete Fourier Transform(IDFT) using DFT-Architecture of TMS320C54X Processor.

Lecture: 30; Tutorial:15; Total: 45 Hours

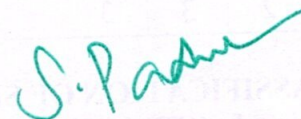
S.P. Padma
Dr.S.PADMA, M.E., Ph.D.,
 Professor and Head,
 Department of EEE,
 Sona College of Technology
 Salem-636 005. Tamil Nadu.

TEXT BOOKS:

1. Allan V.Oppenheim, S.Wilsky and S.H.Nawab, "Signals and Systems", Pearson Education, 2007.
2. Edward W Kamen & Bonnie's Heck, "Fundamentals of Signals and Systems", Pearson Education, 2007.

REFERENCES:

1. H.P.Hsu, RakeshRanjan, "Signals and Systems", Schaum's Outlines, Tata McGraw Hill, Indian Reprint, 2007
2. S.Salivahanan, A.Vallavaraj, C.Gnanapriya, "Digital Signal Processing", McGraw Hill International, 2007.
3. Simon Haykins and Barry Van Veen, "Signals and Systems", John Wiley & sons Inc., 2004.
4. Rodger E.Ziemer, William H.Tranter, D.RonaldFannin, "Signals & Systems", Pearson Education, Fourth Edition, 2002.



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COURSE OUTCOMES

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

1. Illustrate the construction and working of alternators and apply various methods to calculate voltage regulation.
2. Explain the operation and derive the power equations of synchronous motor.
3. Explain the construction and operation of three phase induction motor.
4. Calculate the performance characteristics of induction motor using circle diagram and explain various starting methods and speed control methods of three phase induction motor.
5. Construct the equivalent circuit of single phase induction motor and explain the fundamentals of special machines.

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	3	2					2	2	3	3	3
CO2	3	3	3	3	2					2	2	3	3	3
CO3	3	3	3	3	2					2	2	3	3	3
CO4	3	3	3	3	2					2	2	3	3	3
CO5	3	3	3	3	2					2	2	3	3	3

UNIT I ALTERNATOR

9

Constructional details – types of rotors – armature windings – terminologies – EMF equation – alternator on load, synchronous reactance – voltage regulation – EMF, MMF and ZPF methods – synchronizing of alternators – synchronizing current and power – change of excitation and mechanical input – Blondel's theory – determination of X_d and X_q using slip test.

UNIT II SYNCHRONOUS MOTOR

9

Principle of operation – starting methods – power flow – effect of change of excitation and load – expression for back EMF – power equations – power/power angle relations – construction of V-curves – hunting – synchronous condenser – Applications.

UNIT III THREEPHASE INDUCTION MOTOR

9

Constructional details – principle of operation – slip and its importance – torque equations – slip-torque characteristics – power and efficiency – equivalent circuit – crawling and cogging – induction generator.

UNIT IV CIRCLE DIAGRAM, STARTERS AND SPEED CONTROL OF THREE PHASE INDUCTION MOTOR

9

Load test – no load and blocked rotor test – circle diagram – need for starters – types of starters : stator resistance and reactance, rotor resistance, auto-transformer and star-delta starters – speed control – voltage, voltage/frequency, poles and rotor resistance – cascaded connection.

UNIT V SINGLE-PHASE INDUCTION MOTOR AND SPECIAL MACHINES

9

Principle of operation – double revolving field theory – types of single phase induction motor – equivalent circuit – performance calculation – no load and blocked rotor test – Basics of BLDC Motor, stepper motor and Universal motor – applications.

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

S. Padma
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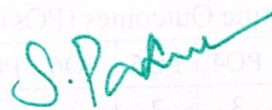
Professor and Head,
Department of EEE,
Sona College of Technology
Salem-636 005, Tamil Nadu.

TEXT BOOKS:

1. B.L.Theraja and A.K.Theraja, "A Text Book of Electrical Technology", S.Chand Publisher, Fifth Edition, 2008.
2. D.P.Kothari and I.J.Nagrath, "Electric Machines", Tata McGraw Hill Publishing Company Ltd, Fourth Edition, 2011.

REFERENCES:

1. A.E.Fitzgerald, Charles Kingsley, Stephen.D.Umans, "Electric Machinery", Tata McGraw Hill Publishing Company Ltd, 2013.
2. K.Murugesh Kumar, "Induction & Synchronous Machines", Vikas Publishing House Pvt. Ltd, 2000.
3. M.V.Deshpande, "Electrical Machines", Wheeler Publishing, 2011
4. M. G. Say, "Performance and Design of AC Machines", CBS Publishers, 3rd Edition, 2002.



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COURSE OUTCOMES

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

1. Illustrate the operation of single phase and three phase controlled converters and analyze the operation of choppers with relevant mode waveforms.
2. List various types of inverter and explain the operation of single phase and three phase inverters with and outline voltage control and harmonic reduction methods.
3. Explain operation of single phase and three phase AC voltage regulators with its sequence control techniques and summarize the operation of cyclo converters.
4. Describe the steady state operation and transient dynamics of a motor load system.
5. Analyze the operation of the converter fed, inverter fed and chopper fed DC & AC drives.

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
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CO2	3	3	3	2	2	2	2				2	2	3	3
CO3	3	3	3	2	2	2	2				2	2	3	3
CO4	3	3	3	2	2	2	2				2	2	3	3
CO5	3	3	3	2	2	2	2				2	2	3	3

UNIT I PHASE-CONTROLLED CONVERTERS AND CHOPPERS 9

Single phase converter - half controlled bridge converter and full controlled bridge converter with R Load – analysis of average & RMS values of load voltage, load current and input power factor- Three phase full bridge converter – Half controlled and fully controlled converter with R Load.

DC Choppers: Principle of step up, step down chopper and Chopper operation – Control strategies – Classification & operation of choppers class (A, B, C, D, E)

UNIT II INVERTERS 9

Types of inverters – operation of Single phase and three phase (120° , 180°) voltage source inverter modes analysis with star connected R load – operation of single phase current source inverter – series inverters – Voltage control of Single phase inverters – harmonic reduction techniques and filters.

UNIT III AC TO AC CONVERTERS 9

AC Voltage Controllers : Single phase voltage regulators – half wave and full wave with R, RL loads – sequence control of AC regulators – two stage sequence regulator with R, RL load – Multistage sequential control of AC regulators – Introduction to Three phase regulators (no analysis).

Cycloconverters: Single phase to single phase cycloconverter – three phase to single phase and three phase to three phase cycloconverters.

UNIT IV INTRODUCTION TO ELECTRIC DRIVES 9

Electric drives – advantage of electric drives – selection of motor power rating – thermal model of motor for heating and cooling – classes of duty cycle – determination of motor rating four quadrant operations – starting, braking and reversing operation.

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UNIT V SOLID STATE CONTROL OF DC & AC DRIVES

9

DC DRIVES: Single-phase and three-phase converter fed drives – continuous and discontinuous conduction modes – chopper fed drives.

AC DRIVES: Induction motor drives – stator control – stator voltage and frequency control – Cyclo-converter fed drives.


Lecture: 45, Tutorial: 0, TOTAL: 45Hours

TEXT BOOKS

1. Singh.M.D. & Khanchandani.K.B. Power Electronics McGraw Education (India) Private limited, New Delhi 2016.
2. Gopal K Dubey, “Fundamentals of Electric Drive”, Narosa Publications, II Edition, 2002.

REFERENCES

1. M.H. Rashid, ‘Power Electronics: Circuits, Devices and Applications’, Pearson Education, PHI Third edition, New Delhi 2004.
2. Ned Mohan Tore. M.Undeland, William.P.Robbins, ‘Power Electronics: Converters, applications and Design’, John Wiley and sons, third edition, 2003.
3. P.S.Bimbra “Power Electronics” Khanna Publishers, third Edition 2003.
4. Bimal K.Bose, “Modern Power Electronics and AC Drives”, Prentice Hall of India, 2005.


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COURSE OUTCOMES

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

1. simplify switching functions and understand logic families.
2. design combinational logic circuits using gates and MSI devices.
3. analyse and design sequential logic circuits and counters using Flip-flops.
4. explain the architecture and features of microcontroller and arm processor.
5. write assembly language programs and apply in electrical appliances.

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

UNIT I BOOLEAN ALGEBRA AND LOGIC FAMILIES 9

Introduction to digital logic and number systems – Binary codes: Gray and BCD – Logic gates – Boolean algebra: Laws, theorems and minimization of switching functions – Simplification using Karnaugh map (upto five variables).

Logic families: terminologies, types, TTL and CMOS gates – comparison.

UNIT II COMBINATIONAL AND SEQUENTIAL LOGIC CIRCUITS 9

Design of adder, subtractor (half and full), 4-bit binary adder / subtractor and comparator (single bit) – Encoder, Decoder, Demultiplexer and Multiplexer – Realization of combinational circuits using decoders and multiplexers.

Sequential logic: SR latch – Level and edge triggering – Flip-Flops (FF): SR, JK, D and T - conversion between flip flops – Shift registers.

UNIT III SYNCHRONOUS SEQUENTIAL LOGIC CIRCUITS 9

Analysis and design of synchronous sequential circuits – Moore and Mealy models – State diagram, state table, state reduction and state assignment.

Design of synchronous and asynchronous counters: Up, down and modulo counters – Sequence detectors.

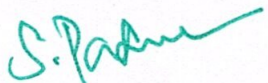
UNIT IV MICROPROCESSOR AND MICROCONTROLLER 9

Over view of microprocessor: Terminologies, functional block diagram, applications–Introduction to Microcontroller – Microprocessor vs Microcontroller – 8051 Microcontroller: Architecture, memory organization, port operation, counters and timers, serial communication, interrupts – Introduction to ARM Processor: features, simple architecture of ARM 7 processor.

UNIT V 8051 PROGRAMMING AND APPLICATIONS 9

8051 instruction set and addressing modes = simple programming =Temperature sensor interfacing with 8051.

Applications: waveform generation, speed control of stepper motor, DC motor and traffic light control.


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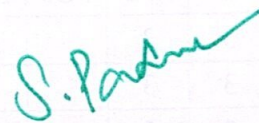
Lecture: 45, Tutorial: 0, TOTAL: 45 Hours

TEXT BOOKS:

1. Morris Mano M and Michael D. Ciletti, "Digital Design", Pearson Education, 6th edition, 2018.
2. Krishna Kant, "Microprocessors and Microcontrollers", PHI Publisher, 2013.

REFERENCE BOOKS:

1. Anand Kumar A, "Fundamentals of Digital Circuits", PHI Publishers, 4th edition, 2016.
2. Padmanabhan T.R., "Introduction to Microcontrollers and their Applications", Narosa Publishing House, 2012
3. Nagoor Kani A, "Microprocessors and Microcontrollers", McGraw Hill Education, 2020.
4. Senthil Kumar N., Saravanan M. & Jeevananthan S., "Microprocessors and Microcontrollers", Oxford Publication, 2nd edition 2016.



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COURSE OUTCOMES:

At the end of the course, the students 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)													
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CO3	3	3	3	3	3			3	3			3	2	2
CO4	3	3	3	3	3			3	3			3	2	2
CO5	3	3	3	3	3			3	3			3	2	2

UNIT I LINEAR DATA STRUCTURES – LIST**15**

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

List of Experiments:

- *Implementation of Lists*

UNIT II LINEAR DATA STRUCTURES – STACKS, QUEUES**15**

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.

List of Experiments:

- *Implementation of Stacks*
- *Implementation of Queues*

UNIT III NON-LINEAR DATA STRUCTURES – TREES**15**

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

List of Experiments:


- *Implementation of Binary Search Trees*
- *Implementation of AVL Trees*
- *Implementation of Heap*

UNIT IV NON-LINEAR DATA STRUCTURES – GRAPHS**15**

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.

List of Experiments:

- *Implementation of graphs using BFS and DFS.*
- *Implementation of Prim's algorithm.*
- *Implementation of Kruskal's algorithm*
- *Implementation of Dijkstra's algorithm*


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UNIT V SEARCHING, SORTING AND HASHING TECHNIQUES

15

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

List of Experiments:

- Implementation of Hashing and Collision Resolution Technique
- Implementation of Searching Techniques
- Implementation of Sorting Techniques

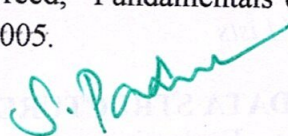
Lecture: 45, Practical: 30, TOTAL: 75 Hours

TEXT BOOKS

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, Sartaj Sahni, Susan Anderson-Freed, "Fundamentals of Data Structures in C", Silicon Press, New Jersey, Second Edition, 2005.


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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 Dalai The Vedas: An Introduction to Hinduism's Sacred Texts, Penguin Books 2014. ISBN 13: 9780143066385
5. Raja Ram Mohan Roy, Vedic Physics, Mount Meru Publication ISBN : 9781988207049



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COURSE OUTCOMES:

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

1. Determine the regulation of three-phase alternator using EMF, MMF, ZPF, slip test, inductive and capacitive load methods.
2. Analyse the V and inverted V curves of three-phase synchronous motor.
3. Draw the performance characteristics and equivalent circuit of single-phase and three-phase induction motor.

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	3	2				3	2	3	2	3	3
CO2	3	3	3	3	2				3	2	3	2	3	3
CO3	3	3	3	3	2				3	2	3	2	3	3

LIST OF EXPERIMENTS:

1. Regulation of three-phase alternator by EMF and MMF methods.
2. Regulation of three-phase alternator by ZPF method.
3. Regulation of three-phase salient pole alternator by slip test.
4. Synchronization and load sharing by two alternators.
5. Plotting V and inverted V curve of three-phase synchronous motor.
6. Comparison of performance quantities of three-phase squirrel cage and slip ring induction motors.
7. Equivalent circuit of a three-phase induction motor.
8. Pre-determination of performance from circle diagram of a three-phase induction motor.
9. Determination of starting current of a three-phase induction motor with different types of starters.
10. Determination of equivalent circuit of single-phase induction motor.
11. Performance analysis of three-phase alternator.
12. Regulation of three-phase alternator using inductive load and capacitive load.
13. Performance calculation of BLDC motor.

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Total: 30 Hours

COURSE OUTCOME


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

1. Design various configurations of converters to fed R and RL & RLE loads.
2. Verify the operation of step down and step up choppers, commutated choppers, single phase and three phase PWM inverters, cycloconverter and AC voltage regulators.
3. Simulate AC and DC drives using power electronics modules and the performance characteristics of AC, DC and special drives

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)													
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CO2	3	3	3	3	3				3		3		3	3
CO3	3	3	3	3	3				3		3		3	3

LIST OF EXPERIMENTS

1. Design of single phase half controlled & fully controlled converter using R, RL & RLE Loads.
2. Design of three phase half controlled & fully controlled converter using R, RL & RLE Loads
3. Design of step down and step up MOSFET based choppers.
4. Construct and verify the four quadrant operation of chopper.
5. Design IGBT based single-phase PWM inverter.
6. Design IGBT based three-phase PWM inverter(120 and 180 degree)
7. Design of single phase cycloconverter.
8. Construct single phase and three phase AC voltage regulators and verify its operation.
9. Design and Simulation of closed loop control of converter fed DC motor.
10. Design and Simulation of closed loop control of chopper fed DC motor.
11. Design and Simulation of VSI fed 3 phase induction motor.
12. Speed control of 3 phase induction motor using PWM inverter


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Total: 30 Hours.

COURSE OUTCOME


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

1. Implement the Boolean functions using logic gates and digital ICs.
2. Design and implement counters and shift registers.
3. Write and implement simple programs using microcontroller.

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	2	3	3	3	3
CO2	3	3	3	3	3				3	2	3	3	3	3
CO3	3	3	3	3	3				3		3		3	3

LIST OF EXPERIMENTS

1. Implementation of Boolean functions using logic gates.
2. Implementation of adder and subtractor circuits using logic gates.
3. Implementation of combinational circuits using Decoder and Multiplexer.
4. Design and implementation of synchronous counters using flip-flop.
5. Design and implementation of asynchronous counters using flip-flop.
6. Design and implementation of shift registers.
7. Simple arithmetic operations using 8051 microcontroller.
8. Simple array operations using 8051 microcontroller.
9. Interfacing and Programming of DC Motor Speed Control
10. Interfacing and Programming of Temperature Indicator
11. Interfacing and Programming of Water tank level control
12. Measurement and data acquisition of temperature using NI CIRO


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Total: 45 Hours

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 laureates 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)														
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CO3	3	2	2	-	-	2	-	-	-	-	-	-	-	-	2
CO4	3	2	2	-	-	2	-	-	-	-	-	-	-	-	2
CO5	2	2	2	-	-	2	-	-	-	-	-	-	-	-	2

Unit I

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

6

Unit II

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

6

UNIT – III- Modern Science

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

6

UNIT – IV Technology

- 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

6

UNIT – V- Yoga and Holistic Health Care

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

6

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

Shanthi
22/12/2023

Dr. C. SHANTHI, M.Sc., M.E., Ph.D.,
Professor of Physics
Head, Department of Sciences
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M. Renuga
22/12/23

Dr. M. RENUGA,
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Department of Humanities & Languages,
Sona College of Technology,
SALEM - 636 005.

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: <ol style="list-style-type: none"> SWOT Goal setting Time management Stress management Interpersonal skills and Intrapersonal skills Presentation skills Group discussions 					
2. Quantitative Aptitude and Logical Reasoning	Solving problems with reference to the following topics: <ol style="list-style-type: none"> Equations: Basics of equations , Linear, Quadratic Equations of Higher Degree and Problem on ages. Logarithms, Inequalities and Modulus Sequence and Series: Arithmetic Progression, Geometric Progression, Harmonic Progression, and Special Series. Time and Work: Pipes & Cistern and Work Equivalence. Time, Speed and Distance: Average Speed, Relative Speed, Boats & Streams, Races and Circular tracks and Escalators. Arithmetic and Critical Reasoning: Arrangement, Sequencing, Scheduling, Network Diagram, Binary Logic, and Logical Connection. Binary Number System.- Binary to decimal, Octal, Hexadecimal 					
3. Verbal Aptitude	Demonstrating English language skills with reference to the following topics: <ol style="list-style-type: none"> Critical reasoning Theme detection Verbal analogy Prepositions Articles Cloze test Company specific aptitude questions 					

Total: 30 Hours

S. Anita
18/12/2023

Dr.S.Anita
Professor and Head
Department of Training

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