SANDIP UNIVERSITY

Courses of Study

2019-20

B. Tech Electronics Engineering

IILP

SANDIP UNIVERSITY

School of Engineering and Technology

B. Tech. (Part Time) Electronics Engineering 2018-19

Semester	Course I				Course II				Course III				Course IV				Course V				Course VI				Course VII				Course VIII				L	T	P	C	Contact Hours
I	TYBS101				TYEC101				TYEC102				TYEC103				TYHS111				Code				Code				Code								
	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C									
	3	1	0	**4**	4	0	0	**4**	3	0	2	**4**	3	0	2	**4**	1	0	2	**2**	0	0	0	**0**	0	0	0	**0**									
	BS				PC				PC				PC				HSS																14	1	6	18	21
	Algebra and differential calculus, statistic, probability				Electromagnetic Theory				Analog Communications				Digital Electronics System and Design				Communication Skills																				
II	TYBS201				TYEC201				TYEC202				TYEC203				TYES201								Code				Code								
	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C									
	3	0	2	**4**	3	0	2	**4**	3	0	2	**4**	3	1	0	**4**	3	0	2	**4**	**0**	0	0	**0**	0	0	0	**0**									
	BS				PC				PC				PC				ES																15	1	8	20	24
	Applied Physics and Chemistry				Analog and digital Electronics				Digital Computational Technique				Network Analysis and Synthesis				Fundamentals of Computing																				

School of Engineering and Technology

B.Tech. (Part Time) Electronics Engineering 2018-19																																							
Semester	Course I				Course II				Course III				Course IV				Course V				Course VI				Course VII				Course VIII				L	T	P	C	Contact Hours			
III	TYEX301				TYEX302				TYEX303				TYEX304				TYEX305				Code				Code				Code												
	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C									
	3	0	2	**4**	3	0	2	**4**	3	0	0	**3**	3	0	2	**4**	0	0	0	**3**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**									
	PC				PC				PC				PC				PWSI																12	0	6	18	18			
	Linear Integrated Circuits				Power Electronics				Electronic Measurement & Instrumentation				Microcontroller Applications				Internship I																									
IV	TYEX401				TYEX402				TYEX403				TYEX404				TYEX405				TYEX406				Code				Code												
	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C									
	3	0	0	**3**	3	0	2	**4**	3	0	0	**3**	3	0	2	**4**	2	0	2	**3**	0	0	4	**2**	0	0	0		0	0	0	**0**									
	PC				PC				PC				PC				HSS																14	0	10	19	24			
	Control System 1				Signal and Systems				Communication Theory				Digital Control System				Technical Communication				Seminar																				

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B.Tech. (Part Time) Electronics Engineering 2018-19

Semester	Course I				Course II				Course III				Course IV				Course V				Course VI				Course VII				Course VIII				L	T	P	C	Contact Hours
V	TYEX501				TYEX502				TYEX503				TYEX504				TYEX505				TYEX506				Code				Code				12	0	10	21	22
	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C					
	3	0	2	**4**	3	0	0	**3**	3	0	0	**3**	3	0	2	**4**	0	0	0	**4**	0	0	6	**3**	0	0	0	**0**	0	0	0	**0**					
	PC				PC				PC				PC				PWSI				PWSI																
	Digital Signal Processing				Computer Organization &Architecture				Control System 2				Python Programming				Internship II				Mini Project																
VI	TYEX601				TYEX602				TYEX603				TYEX604				TYEX605				TYEX606				Code				Code								
	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	15	0	10	20	25
	3	0	2	**4**	3	0	2	**4**	3	0	0	**3**	3	0	0	**3**	3	0	0	**3**	0	0	6	**3**	0	0	0	**0**	0	0	0	**0**					
	PC				PC				PCE				PCE				OE				PWSI																
	Image Processing				Microwave and Optical				DEI				DEII				OEI				Project Stage I																

SANDIP UNIVERSITY

School of Engineering and Technology

B.Tech. (Part Time) Electrical Engineering 2018-19

Semester	Course I				Course II				Course III				Course IV				Course V				Course VI				Course VII				Course VIII				L	T	P	C	Contact Hours
VII	TYEE701				TYEE702				TYEE703				TYEE704				TYEE705				Code				Code				Code								
	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C					
	3	0	2	**4**	3	0	0	**3**	3	0	0	**3**	0	0	16	**8**	0	0	0	**6**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	9	0	18	24	27
	PC				PCE				OE				PCE				PWSI																				
	VLSI design				DEIII				OEII				Project Stage II & Viva Voce				Internship III																				
																																	9		6	14	
																																	1	2	8	0	161

TOTAL

Department Elective I					
Energy Studies					
Course Code	Course	L	T	P	C
TYEE603	Energy Management	3	0	0	3
TYEE603	Energy Analysis	3	0	0	3
TYEE603	Energy Markets	3	0	0	3
TYEE603	Energy Storage	3	0	0	3
TYEE603	Renewable Energy Services	3	0	0	3

Department Elective II					
Electrical Applications					
Course Code	Course	L	T	P	C
TYEE604	Electric Vehicles	3	0	0	3
TYEE604	Utilization of Electric Energy	3	0	0	3
TYEE604	Smart Energy	3	0	0	3
TYEE604	Battery Management System	3	0	0	3
TYEE604	Robotics and Automation	3	0	0	3

Department Elective III					
Advanced Electrical Engineering					
Course Code	Course	L	T	P	C
TYEE702	Sustainable Energy Technology	3	0	0	3
TYEE702	Extra High Voltage	3	0	0	3
TYEE702	FACTs Controller	3	0	0	3
TYEE702	Power Quality	3	0	0	3
TYEE702	Smart Grid	3	0	0	3

Year: First Year **Semester: I**

Course: Algebra & Differential Calculus Statistics, probability **Course Code: TYBS101**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	1	-	4	10	20	10	10	---	50	---	100
Max. Time, End Semester Exam (Theory) -3Hrs.									End Semester Exam (Lab) - ---		

Prerequisite 1. Basic knowledge of fundamental mathematics.

Course Objectives	
1	To be familiar with linear differential equations of higher order applicable to control systems.
2	To study complex functions, conformal mappings, contour integration applicable to electrostatics, digital filters, signal and image processing.
3	To study differentiation and integration vectors.
4	To be familiarize with Z- transform and their applications.
5	To be thorough with applications to control systems and signal processing.

Course Content			
Unit No.	Module No.	Content	Hours
1	I	**Linear Differential Equations** :- Solution of linear differential equations of first order, solution of nth order linear differential equations with constant coefficients.	7
	II	**Applications of Linear Differential Equations:** Method of variation of parameters, applications in simple electrical circuit.	5
2	I	**Laplace Transform:** Laplace transforms, properties and Theorems on them, Laplace transform of standard functions, inverse Laplace transform.	6
	II	**Laplace transform of standard functions**: Laplace transform of some special functions like - periodic, unit step, unit impulse; applications of Laplace transform for solving differential equations.	6
3	I	**Z - Transform:** Introduction and definition of Z - Transform, standard properties of Z - Transform, Z - Transform of standard sequences and their region of convergence.	8
	II	**Inverse Z - Transform:** Inverse Z-transform, solution of difference equations by using Z-Transform.	4
4	I	**Vector Differentiation**: Basics of vector differentiation, vector	7

		differential operator, gradient, divergence and curl, directional derivative, solenoidal, irrotational fields, scalar potential.	
	II	**Vector Integration:** Standard vector identities, line integral, Green's Lemma and its applications	5
5	I	**Complex Variables:** Functions of complex variables, analytic functions, Cauchy-Riemann equations, Cauchy's integral Theorem	8
	II	**Complex Variables (continued):** Cauchy's integral Theorem, Cauchy's integral formula, residue Theorem, bilinear transformation.	4
		Total No. of Hrs	60

Beyond the Syllabus
Introduction of Fourier series and fourier transforms. Solutions of simultaneous linear equations. Gauss divergence theorem and stokes theorem

Course Outcome	
Students should able to	
CO1	Solve linear differential equations and apply them on simple electric circuit.
CO2	Gain the basic knowledge of Laplace transform and their applicability in solving initial value problems.
CO3	Understands the new notion of Z- transform and their usability in solving difference equations.
CO4	Solve the problems on vector derivatives and integrations.
CO5	Gain the knowledge of complex analysis and its application electrical engineering problem.

RecommendedResources	
Text Books	1. Ervin Kreyszig, Advanced Engineering Mathematics, 10th edition, John Wiley and Sons. 2. S.R.Sakhare, B.S.Waghe, S. M. Bhati, Naveen Mani, Engineering Mathematics- III (Electrical & Instrumentation Branch), Gigatech Publishing House, Pune [ISBN: 978-81-938081-0-8]
Reference Books	3. B. S. Grewal, Higher Engineering Mathematics, 43rd edition, Khanna Publishers.
E-Resources	http://nptel.ac.in/syllabus/108106070/

Year: First Year **Semester: I**
Course: Electromagnetic Theory **Course Code: TYEC101**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
4	0	--	4	10	20	10	10	----	50	----	100
Max. Time, End Semester Exam (Theory) -3Hrs.									End Semester Exam (Lab) - ---		

Prerequisite 1. Basic knowledge of fundamental physics.

Course Objectives	
1	To introduce the basic mathematical concepts related to electromagnetic vector fields potential and its applications.
2	To impart knowledge on the concepts of electrostatics, electrical potential, energy density and their applications.
3	To impart knowledge on the concepts of magneto statics, magnetic flux density, scalar and vector potential and its applications.
4	To impart knowledge on the concepts of Faraday's law, induced EMF and Maxwell's equations.
5	To impart knowledge on the concepts of Concepts of electromagnetic waves and Pointing vector.

Course Content			
Unit No.	Module No.	Content	Hours
1	I	**ELECTROSTATICS – I:** Sources and effects of electromagnetic fields – Coordinate Systems – Vector fields –Gradient, Divergence, Curl – theorems and applications - Coulomb's Law – Electric field intensity – Field due to discrete and continuous charges – Gauss's law and applications.	10
2	I	**ELECTROSTATICS – II:** Electric potential – Electric field and equipotential plots, Uniform and Non-Uniform field, Utilization factor – Electric field in free space, conductors, dielectrics - Dielectric polarization – Dielectric strength - Electric field in multiple dielectrics – Boundary conditions, Poisson's and Laplace's equations, Capacitance, Energy density, Applications.	10
3	I	**MAGNETOSTATICS :** Lorentz force, magnetic field intensity (H) – Biot–Savart's Law - Ampere's Circuit Law – H due to straight conductors, circular loop, infinite sheet of current, Magnetic flux density (B) – B in free space, conductor, magnetic materials – Magnetization, Magnetic field in	11

		multiple media – Boundary conditions, scalar and vector potential, Poisson's Equation, Magnetic force, Torque, Inductance, Energy density, Applications.	
4	I	**ELECTRODYNAMIC FIELDS** Magnetic Circuits - Faraday's law – Transformer and motional EMF – Displacement current -Maxwell's equations (differential and integral form) – Relation between field theory and circuit theory –Applications.	10
5	I	**ELECTROMAGNETIC WAVES** Electromagnetic wave generation and equations – Wave parameters; velocity, intrinsic impedance, propagation constant – Waves in free space, lossy and lossless dielectrics, conductors- skin depth -Poynting vector – Plane wave reflection and refraction – Standing Wave Applications.	11
		Total No. of Hrs	**52**

Beyond the Syllabus
1. Introduction of basic and advanced Physics. All theorem such as Maxwell Poynting,Theory related to electromagnetic and Electrostatics .

Course Outcome	
Students should able to	
CO1	Ability to understand and apply basic science.
CO2	Ability to understand and apply circuit theory.
CO3	Capable to apply Electro-magnetic field theory.
CO4	Capable to apply them to electronics engineering problems.
CO5	Capable to apply various techniques by IS standards.

Recommended Resources	
Text Books	1. Mathew N. O. Sadiku, 'Principles of Electromagnetics', 4 th Edition ,Oxford University Press Inc.First India edition, 2009. 2. Ashutosh Pramanik, 'Electromagnetism – Theory and Applications', PHI Learning Private Limited, New Delhi, Second Edition-2009. 3. K.A. Gangadhar, P.M. Ramanthan ' Electromagnetic Field Theory (including Antennas and wave propagation', 16th Edition, Khanna Publications, 2007**.**
Reference Books	1. Joseph. A. Edminister, 'Schaum's Outline of Electromagnetics, Third Edition (Schaum's OutlineSeries), Tata McGraw Hill, 2010 2. William H. Hayt and John A. Buck, 'Engineering Electromagnetics', Tata McGraw Hill 8th Revised edition, 2011. 3. Kraus and Fleish, 'Electromagnetics with Applications', McGraw Hill International Editions, Fifth Edition, 2010.
E-Resources	http://nptel.ac.in/courses/

Year: First Year **Semester: I**

Course: ANALOG COMMUNICATIONS **Course Code: TYEC102**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	0	2	4	10	20	10	10	25	50	25	150
Max. Time, End Semester Exam (Theory) -3Hrs.									End Semester Exam (Lab) – 2 Hrs.		

Prerequisite	1. Basic knowledge of Communication system 2. Compare and analyze different modulation techniques.

Course Objectives	
1	To analyze the Analog communication system requirements.
2	To understand the generation & detection of various analog modulation techniques.
3	To analyze the noise performance of analog modulation techniques.
4	To understand AM and FM receivers.
5	To understand the pulse modulation techniques.

Course Content			
Unit No.	Module No.	Content	Hours
1	I	**Linear Modulation schemes**: Need for modulation, conventional Amplitude Modulation (AM).Double side band suppressed carrier (DSB –SC)modulation ,Hilbert transform, properties of Pre-envelop. Complex envelope representation of band pass signals, In-phase and Quadrature component representation of band pass signals. Low pass representation of bandpass systems. Single side band (SSB) modulation and Vestigial-sideband (VSB) modulation. Modulation and demodulation of all the modulation schemes, COSTAS loop	10
2	I	**Angle modulation schemes**: Frequency Modulation (FM) and Phase modulation (PM), Concept of instantaneous phase and frequency. Types of FM modulation: Narrow band FM and wide band FM. FM spectrum in terms of Bessel functions. Direct and indirect (Armstrong's) methods Of FM generation. Balanced discriminator, Foster–Seeley discriminator ,Zero crossing detector and Ratio detector for FM demodulation. Amplitude Limiter in FM.	10

3	I	**Analog pulse modulation schemes**: Sampling of continuous time signals. Sampling of low pass and band pass signals. Types of sampling. Pulse Amplitude Modulation (PAM) generation and demodulation. Pulse time modulation schemes: PWM and PPM generation and detection. Time Division Multiplexing.	11
4	I	**Transmitters and Receivers**: Classification of transmitters. High level and low level AM transmitters. FM transmitters. Principle of operation of Tuned radio frequency (TRF) and super heterodyne receivers. Selection of RF amplifier. Choice of Intermediate frequency. Image frequency and its rejection ratio Receiver characteristics: Sensitivity, Selectivity, Fidelity, Double spotting, Automatic Gain Control.	12
5	I	**Noise Sources and types**. Atmospheric noise, Shot noise and thermal noise. Noise temperature. Noise in two-port network: noise figure, equivalent noise temperature and noise bandwidth. Noise figure and equivalent noise temperature of cascade stages. Narrow band noise representation. S/N ratio and Figure of merit calculations in AM, DSB-SC, SSB and FM systems, Pre-Emphasis and De-Emphasis.	10
		Total No. of Hrs	53

Beyond the Syllabus
Introduction of various communication techniques. Introduction of linear modulation techniques. Capable to understand about transmitter and receiver.

Course Outcome	
Students should able to	
CO1	Understand analog communication system.
CO2	Compare and analyze analog modulation techniques.
CO3	Calculate noise performance of analog modulation techniques.
CO4	Design AM and FM receivers.
CO5	Differentiate between pulse modulation techniques & continuous modulation.

List of Experiments	
Sr. No.	**Description**
1	AM modulator and Demodulator.
2	DSB-SC modulator and Demodulator.
3	SSB Modulation and Demodulation in MATLAB.
4	FM modulator and Demodulator.
5	PAM modulator and Demodulator.
6	Simulation experiments using P-SPICE and MATLAB. (AM modulator with AWGN noise in MATLAB)
7	Pulse Width Modulation
8	Pulse Position Modulation & Demodulation
9	Spectral Characteristics of AM &FM
10	Modulation Characteristics of AM

RecommendedResources	
Text Books	1. Simon Haykin, "*Communication Systems*," 2/e, Wiley India, 2011. 2. B.P. Lathi, Zhi Ding, "Modern Digital and Analog Communication Systems".
Reference Books	1. P. Ramakrishna Rao, "*Analog Communication*," 1/e, TMH, 2011.
E-Resources	http://nptel.ac.in/

Year: First Year **Semester: I**

Course: Digital Electronics System and Design **Course Code: TYEC103**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	**T**	**P**	**C**	**CIA-1**	**CIA-2**	**CIA-3**	**CIA-4**	**Lab**	**Theory**	**Lab**	
3	0	2	**4**	10	20	10	10	25	50	25	150
Max. Time,End Semester Exam (Theory) -3Hrs.									**End Semester Exam (Lab) - 2Hrs.**		

Prerequisite	**1**. Basic Knowledge of digital system. **2.** Ability to understand different digital logic circuits with their applications. 3.Ability to understand combinational and sequential logic circuits

Course Objectives	
1	Identify the components that effect digital logic and Boolean expression.
2	Recognize the type of logic circuits and how they apply for advanced processor.
3	Minimazation of Boolean expression with standard method.
4	Identify the importance digital system and design concept.

Course Content			
Unit No.	Module No.	Content	Hours
1	I	**NUMBER SYSTEMS AND DIGITAL LOGIC FAMILIES:** Review of number systems, binary codes, error detection and correction codes (Parity and Hammingcode0- Digital Logic Families ,comparison of RTL, DTL, TTL, ECL and MOS families -operation, characteristics of digital logic family.	9
2	I	**COMBINATIONAL CIRCUITS :** Combinational logic - representation of logic functions-SOP and POS forms, K-map representations minimization using K maps - simplification and implementation of combinational logic multiplexers and demultiplexers - code converters, adders, subtractors.	9
3	I	**SYNCHRONOUS SEQUENTIAL CIRCUITS:** Sequential logic- SR, JK, D and T flip flops - level triggering and edge triggering - counters -asynchronous and synchronous type - Modulo counters - Shift registers - design of synchronous sequential circuits –- Counters, state diagram; state reduction	9
4	I	**ASYNCHRONOUS SEQUENTIAL CIRCUITS AND PROGRAMMABLE LOGIC DEVICES:** Asynchronous sequential logic circuits-Transition table, flow table-race conditions, hazards &errors in digital circuits; analysis of	9

		asynchronous sequential logic circuits-introduction to Programmable Logic Devices: PROM – PLA –PAL.	
5	I	**VHDL** RTL Design – combinational logic – Sequential circuit – Operators – Introduction to Packages –Subprograms – Test bench. (Simulation /Tutorial Examples: adders, counters, flip flops,	9
	Total No. of Hrs		45

Beyond the Syllabus
Student should know about basic circuits and to understand and analyse, linear and digital electronic circuits.

Course Outcome	
Students should able to	
CO1	Ability to understand and analyse digital electronic circuits.
CO2	Ability to understand and analyse, linear digital circuits.
CO3	Ability to understand about digital logic to design various circuits.

List of Experiments	
Sr. No.	**Description**
1	Implementation of Boolean Functions, Adder/ Subtractor circuits.
2	Code converters: Excess-3 to BCD and Binary to Gray code converter and vice-versa
3	Counters: Design and implementation of 4-bit modulo counters as synchronous and Asynchronous
4	Study of multiplexer and demultiplexer
5	Encoders and Decoders
6	Design Full Adder and Subtractor using Gates
7	Implementation of Flip Flop
8	Shift Registers: Design and implementation of 4-bit shift registers in SISO, SIPO,

RecommendedResources	
Text Books	**1.** Floyd and Jain, 'Digital Fundamentals', 8th edition, Pearson Education, 2003.
Reference Books	1.Raj Kamal, ' Digital systems-Principles and Design', Pearson Education 2nd edition, 2007. 2. M. Morris Mano, 'Digital Design with an introduction to the VHDL', Pearson Education,2013
E-Resources	http://nptel.ac.in/courses/

SANDIP UNIVERSITY

School of Engineering and Technology

Common to All

Year: First Year **Semester: I**

Course: English Communication Skill (HSS) **Course Code:TYHS111**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	**T**	**P**	**C**	**CIA-1**	**CIA-2**	**CIA-3**	**CIA-4**	**Lab**	**Orals**	**Lab**	
1	-	2	**2**	10	20	10	10	-	50	-	100
Max. Time, End Semester Exam									**End Semester Orals –1 Hr.**		

Prerequisite	1. Functional grammar-Parts of speech, Tenses, Sentence pattern
	2. Formal letter
	3. Fluency in reading and speaking

Course Objectives	
1	To acquire basic language skills (LSRW) to communicate with speakers of English language.
2	To develop their intellectual, personal and professional abilities.
3	To develop skill to communicate fluently.
4	To enhance team building and time management skills.
5	To inculcate employability skills among students.

Course Content			
Unit No.	Module No.	Content	Hours
1	I	**English Vocabulary building:** Affixes, Prefixes & Suffixes	3
	II	Word building- Compound words, Standard Abbreviations	2
	III	Antonyms and Synonyms- functional usage	2
	IV	Active & Passive voice	2
2	I	**Writing skills:** Parts of speech	3
	II	Paragraph writing	2
	III	Use of Idioms, Phrases and Proverbs in sentences	2
	IV	Basic sentence pattern	1
	V	Importance of punctuation	1
3	I	**CALL- Computer Assisted Language Laboratory** Listening exercises- Extempore	4
	II	Vocabulary building -Task based Lab Activities	5
	III	Language fluency Linguistic accuracy & Communicative fluency	5
	IV	Listening to varied registers-Role play - Situational Dialogues	2
	V	Pronunciation, Intonation, Stress and Rhythm- Public speaking	4

4	I	**Oral & Written Presentation** Tenses	2
	II	Ice breaking, reporting, Question & answer skill	2
	III	Formal & Informal speech	3
		Total No. of Hrs	46

Beyond the Syllabus
Self Introduction, SWOT/SWOC, Group Discussion

Course Outcome	
Students should able to	
CO1	Students will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.
CO2	Students will be able to write formal letters effectively.
CO3	Students will be able to prepare, organize and deliver oral presentation.
CO4	Students will develop reading speed and build academic vocabulary.
CO5	Students will demonstrate behavior and attitudes appropriate to university environment.

List of Experiments	
Sr. No.	**Description**
1	**Module 1** **CALL- Computer Assisted Language Laboratory** Listening exercises- Extempore
2	**Module 2** Vocabulary building -Task based Lab Activities
3	**Module 3** Language fluency Linguistic accuracy & Communicative fluency
4	**Module 4** Listening to varied registers-Role play - Situational Dialogues
5	**Module 5** Pronunciation, Intonation, Stress and Rhythm- Public speaking

RecommendedResources	
Text Books	1. Communication Skills by Sanjay Kumar and PushpaLata, Oxford University Press. 2. Developing Communication Skill by Krishna Mohan, MeeraBanerji, McMillan India Ltd. 3. English for Business Communication by Simon Sweeney, Cambridge University Press. 4. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press
Reference Books	1. Ethics in Engineering Practice and Research by Caroline &Whitbeck, Cambridge University Press. 2. Basic Managerial Skills by E. H. McGrath, Eastern Economy Edition, Prentice hall India. 3. Change Your Thoughts; Change Your Life by Wayne Dyer, Hay House India, ISBN-139788189988050. 4. The Power of Your Subconscious Mind by Dr Joseph Murphy MaanuGraphics , ISBN-13 9789381529560. 5. Baltra, A. (1986). "Computer assisted language learning: What is it all about?" Paper presented at a conference at the University of California, Irvine. 6. Jones, C. (1986). It's not so much the program, more what you do with it: The importance of methodology in CALL. "System, 14"(2), p.171-78. 7. Rivers, W. (Ed.). (1987) "Interactive language teaching." NY: Cambridge University Press.
E-Resources	https://www.britishcouncil.in/sites/default/files/esfe_report.pdf https://www.britishcouncil.org/sites/default/files/english-soft-skills-maghreb-research-report.pdf http://nptel.ac.in/courses/109104030/references/references.pdf http://promeng.eu/downloads/training-materials/ebooks/soft-skills/effective-communication-skills.pdf

SANDIP UNIVERSITY

School of Engineering and Technology
Common to All

Year: First Year **Semester: II**
Course: Applied Physics & Applied Chemistry **Course Code:TYBS201**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	**T**	**P**	**C**	**CIA-1**	**CIA-2**	**CIA-3**	**CIA-4**	**Lab**	**Theory**	**Lab**	
3	0	2	**4**	10	20	10	10	50	50	-	150
Max. Time, End Semester Exam (Theory) -3Hrs.									**End Semester Exam (Lab) – ---**		

Prerequisite	1. Introduction and basic concepts of derivative and integration of functions. 2. Basic concepts and methods to solve simultaneous equations, quadratic equations.

Course Objectives	
1	To solve System of linear equations using matrix methods.
2	To understand partial differentiation with their applications stationary values arising in engineering optimization problems.
3	To solve ordinary differential equations
4	To understand the basic concepts of statistics and probability

Course Content			
Unit No.	Module No.	Content	Hours
1	I	**LASER** Laser - introduction, difference between ordinary source of light and laser. Properties of laser, Absorption, spontaneous and stimulated emission, population inversion, pumping and types of pumping. Active medium, Components of laser. Three level and four level system, Ruby laser, He-Ne laser, Applications of laser industrial, medical etc. Holography.	8
2	II	**Semiconductor physics** Introduction to formation of energy bands in solids. Classification of solids, electrical conductivity in conductor and semiconductors. Influence of external factors on conductivity (temperature, impurity), Hall effect.	6
3	III	**Superconductivity** : properties of superconductor, Meissner effect, isotope effect, persistent current, critical current density, critical	6

		magnetic field, BCS theory of superconductivity, type-I and type-II superconductors. DC and AC Josephson effect, SQUIDS, application of superconductivity like magnets, transmission line, levitation, etc.).	
4	IV	UNIT-I : WATER TECHNOLOGY Boiler problems- scale, sludge, priming, foaming, caustic embritlment, and corrosion, causes, preventions, and disadvantages. Water softening processes (external and internal treatment methods) – Zeolite process, Ion exchange method, Desalination, Reverse osmosis & Electrodialysis. Phosphate conditioning, colloidal conditioning, calgon conditioning for boiler feed water.	10
5	V	UNIT III: POLYMER Degree of polymerisation, classification of polymers based on sources, composition, structure etc., Types of polymerisation- addition and condensation polymerisation, free radical mechanism of addition polymerisation. compounding of plastics, glass transition temperature and factors affecting it. Important polymers- Preparation, properties and Engineering uses. Thermoplastics, Thermosetting plastics, polythene (LDPE and HDPE), Polycarbonate,Nylon-6,Nylon-66, , Rubber, processing of natural rubber, vulcanization of rubber, synthetic rubber, Natural and synthetic rubber.	10
		Total No. of Hrs	40

Beyond the Syllabus

Course Outcome	
Students should able to	
CO1	Student will able to understand basics involved in lasers.
CO2	Student will able to classify solids, will understands the concepts involved in conductivity.
CO3	Student will be able to understand basic concepts of superconductivity.
CO4	Student will be able to understand impurities in water and their treatment methods.
CO5	Student will be understood preparation, properties and applications of some polymers.

List of Experiments
1. To determine the wavelength of laser by using plane diffraction grating
2. To Determine the sound absorption coefficient
3. To study Hall effect
4. To determine band gap of semiconductor
5. Identify and determination of type and amount of alkalinity in given water sample
6. Performing titration of Strong acid Vs Weak base by using PH Meter
7. Determining Hardness of given water sample By EDTA method
8. Preparation of phenol formaldehyde resin .

RecommendedResources	
Text Books:	1. A text book of Engg. Physics by M. N. Avadhalula and P. G. Kshirsagar, S. Chand Pub. 2. Engg. Physics by Abhijit Nayak, S. K. Kataria and sons Pub. 3. R. K. Gaur and S.C. Gupta, 'Engineering Physics' Dhanpat Rai Publications, New Delhi(2003) 4. A Text book of Engineering Chemistry by Dr S S Dara, Dr S S Umare, S Chand & company Ltd. 5. Engineering Chemistry - Sunita Rattan 6. Engineering Chemistry, K. Shesha Maheshwari, Mridula Chug, Pearson,2018
Reference Books:	1. Engineering Physics, malik and singh, Tata Mc Graw Hill . 2. A textbook of engineering Physics, Pillai, sivakami, new age International, limited 3. Corrosion Engineering ,Fontenna & Greene 4. Chemistry, Raymond Chang. (Tata McGraw Hill).
E-Resources	http://nptel.ac.in/courses/

SANDIP UNIVERSITY

Year: First Year **Semester: II**

Course: Analog & Digital Electronics **Course Code: TYEC201**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	**T**	**P**	**C**	**CIA-1**	**CIA-2**	**CIA-3**	**CIA-4**	**Lab**	**Theory**	**Lab**	
3	0	2	**4**	10	20	10	10	25	50	25	150
Max. Time, End Semester Exam (Theory) -3Hrs.									**End Semester Exam (Lab) - 2Hrs.**		

Prerequisite	**1.** Basic knowledge of fundamental of Semiconductor Theory **2.** Ability to understand different amplifiers circuits with their applications. 3. Ability to understand clipping and clamping circuits and various multi-vibrators.

Course Objectives	
1	Identify the components that effect the frequency response and analyze the single
2	Recognize the type of feedback and analyze its effect on amplifier's
3	Calculate the frequency of oscillation for different types of oscillator circuits
4	Identify the importance of power amplifiers and calculate the efficiencies of class -A, B, AB and examine the effect on distortion.

Course Content			
Unit No.	Module No.	Content	Hours
1	I	**Multistage amplifiers**: Classification of amplifiers, Low, mid and high Frequency response of single stage RC coupled amplifiers, step response of amplifier. Cascading of amplifier. Interacting and non interacting amplifiers, effect of cascading on gain and Bandwidth.	8
2	I	**Feedback Amplifiers**: The feedback concept, General characteristics of negative feedback amplifier, Effect of negative feedback on input and output impedances, Voltage and current, series and shunt feedbacks. Stability considerations, Local Versus global feedback.	9
3	I	**Oscillators**: Barkhausen's Criterion, RC oscillator, Wein bridge, Phase shift, LC Hartley and Colpitts oscillator, Crystal controlled oscillator, (Analysis oscillators using BJTs only) frequency stability of oscillator.	8
4	I	**Large Signal Amplifiers**: BJT as large signal audio amplifiers. Classes of operation, Harmonic distortion, power dissipation, efficiency calculations. Design considerations of transformer coupled and transform less push-pull audio power amplifiers under Class-A. Class-B, Class D and Class-AB operations	9

5	I	**Wave-Shaping Circuits**: RC Low Pass and High Pass circuit, response to Step, Pulse, Ramp and square wave inputs, Differentiating and Integrating circuits using diode, Clipping Circuits for Single level and two levels, Clamping Circuits.	8
	Total No. of Hrs		42

Beyond the Syllabus
Student should know about basic circuits of rectification with and without filters using diodes Awareness about Calculate ripple factor, efficiency and % regulation of rectifier circuits.

Course Outcome	
Students should able to	
CO1	Ability to design feedback amplifiers circuit with its applications
CO2	Ability to analyze and design various oscillators
CO3	Ability to design power amplifier for various applications
CO4	Ability to design various filters required

List of Experiments

Sr. No.	**Description**
1	Static characteristics of BJT in CE configuration
2	Frequency response of Single and two stage BJT amplifier in CE configuration
3	Voltage series amplifier without and with feedback
4	Voltage shunt amplifier without and with feedback.
5	Current shunt amplifier without and with feedback.
6	LC Oscillators: Hartley Oscillator and Colpitts Oscillator.
7	RC Phase Oscillator and Wein Bridge Oscillator.
8	Study of Power Amplifier circuit
9	Design and develop Clipping circuits.
10	Design and develop Clamping Circuits

RecommendedResources	
Text Books:	**1.** Basic Electronics, A text- Lab Manual, 7th Edition. Mc- Graw- Hill Higher Education 2001
Reference Books:	1. David Bell A., Operational Amplifiers and Linear ICS, Prentice Hall of India, 2. David Bell A., Laboratory for Electronic Devices and Circuits, Prentice Hall of India, 2007.
E-Resources:	http://nptel.ac.in/courses/

Year: First Year

Course: Digital Computational Techniques **Course Code: TYEC202**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	**T**	**P**	**C**	**CIA-1**	**CIA-2**	**CIA-3**	**CIA-4**	**Lab**	**Theory**	**Lab**	
3	0	2	**4**	10	20	10	10	25	50	25	150
Max. Time,End Semester Exam (Theory) -3Hrs.									**End Semester Exam (Lab) – 2Hrs**		

Objectives	
1	To provide sound knowledge of various numerical methods.
2	To impart skills to develop programs using C language for equation fitting
3	To impart analyzing skill of student for solving complex electrical numerical problems
4	To impart evaluation using various computational technique.
5	To motivate student for global problem solving and analyzing of complex engineering problems.

Unit Number	Details	Hours
I	**Solution of Transcendental and Polynomial Equation**: Concept of roots of an equation. Descartes' rule of signs, Intermediate value theorem, Synthetic division, Roots of Polynomial Equations using Bisection method, Secant method, Regula - Falsi method and Newton - Raphson method. Newton - Raphson method for two variables.	10
II	**Solution of Equations by Iteration:** Solution of equation by fixed point iteration method, Solution of linear system by Gaussian elimination and Gauss-Jordon method. Gauss-Seidel method, Inverse of a matrix by Gauss Jordon method. Curve Fitting using least square approximation–First and second order.	12
III	**Eigen value Problems, Interpolation and Approximation:** Eigen value of a matrix by power method and by Jacobi method for symmetric matrix. Lagrangian polynomials and interpolation, Newton's forward and backward difference.	11
IV	**Numerical Differentiation And Integration:** Differentiation using interpolation formulae –Numerical integration by trapezoidal and Simpson's 1/3 and 3/8 rules.	12
V	**Initial Value Problems for Ordinary Differential Equations**: Single step methods: Taylor series method – Euler method for first order equation –Fourth order Runge – Kutta method for solving first and second order equations, Finite difference solution of 2^{nd} order ordinary differential equation.	12
	Total	**57**

Course Outcome	
Students should able to	
CO1	Simulates an algebraic and transcendental equation using appropriate numerical method.
CO2	Aware about the numerical solutions techniques of linear and non-linear system of equations
CO3	Find approximate curve fitting using interpolating techniques
CO4	Recognize the numerical integration and differentiation techniques
CO5	Identify and interpret of errors in numerical methods.

List of Experiments	
Sr. No.	List of Experiments
1	Solution of a transcendental equation using Bisection method
2	Solution of a polynomial equation using Regula-Falsi method
3	Solution of two variable non-linear equation using N-R method.
4	Solution of second order ODE using 4th order RK method.
5	Solution of Numerical Integration using Simpson's (1/3)rd
6	Solution of simultaneous equation using Gauss Seidel method
7	Program for interpolation using Newton's forward interpolation
8	Program for interpolation using Lagrange's interpolation
9	Solution of first order ODE using Euler Method.
10	Solution of first order ODE using 4th order RK method.
11	Solution of simultaneous equation using Gauss elimination or Jordon method
12	Finite difference solution of 2nd order ordinary differential equation.

Recommended Books	1. Numerical Methods, second edition, by S. Arumugan, A. Thangapandi Isaac, A. Somasundaram, SCITECH Publications (India) Pvt. Ltd 2. Sankara Rao K, 'Numerical Methods for Scientisits and Engineers' – 3rd editiion Printice Hall of India Private Ltd, New Delhi, (2007). 3. Numerical Methods with Programs in C and C++ by T. Veerarajan and T. Ramchandran, Tata McGraw Hill Publication
Reference Books	1 Chapra, S. C and Canale, R. P. "Numerical Methods for Engineers", 5th Edition, Tata McGraw-Hill, New Delhi, 2007. 2 Gerald, C. F. and Wheatley, P.O., "Applied Numerical Analysis", 6th Edition, Pearson Education Asia, New Delhi, 2006. 3 Numerical Methods by E. Balgurusamy, Tata McGraw Hill Publication. **4** Veerarajan, T and Ramachandran, T. 'Numerical methods with programming in 'C' Second Editiion, Tata McGraw-Hill Publishing.Co.Ltd. (2007).
E-Resources	http://nptel.ac.in/

Year: First Year **Semester: II**

Course: Network Analysis and Synthesis **Course Code: TYEC203**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	**T**	**P**	**C**	**CIA-1**	**CIA-2**	**CIA-3**	**CIA-4**	**Lab**	**Theory**	**Lab**	
3	1	--	**4**	10	20	10	10	---	50	----	100
Max. Time,End Semester Exam (Theory) -3Hrs.											

Prerequisite	**1.** Basic knowledge of Network and different theorem. 2. Ability to understand and response of RL,RC,RLC circuit.

Course Objectives

1. To analyze concepts of symmetrical and assymetrical networks
2. To realize the basic T and Pi Networks and Design the various filters
3. To study the response of the RLC circuits and construct the network.

Course Content

Unit No.	Module No.	Content	Hours
1	I	**Asymmetrical networks**, Image and Iterative impedances. Image transfer constant and iterative transfer constant. Symmetrical networks, characteristic impedance and propagation constant. Properties of L, T and Pi section types, Bridged T-Network.	9
2	I	**Filter Characteristics**, Constant K-filters – low pass, high pass, band pass, band eliminations filter design, m-derived - low pass, high pass, band pass, band elimination filter design and composite filter design. Notch filter.	9
3	I	**Attenuators**- Attenuation, Types of Attenuators, Symmetrical T-Type, Pi-Type Attenuator, Symmetrical Bridged T-Type, Lattice-Type Attenuator, Asymmetrical L Type Attenuator, Symmetrical T-Type Attenuator, Symmetrical Pi-Type Attenuator. Equalizers- Inverse Impedance, Two-Terminal Equalizers, Four-Terminal Equalizers: Full Series Equalizer, Full Shunt Equalizer, Bridged T Equalizer.	9
4	I	**Network Functions**: Driving Point Impedance and Admittance, Transfer Impedance and Admittance, Concept of poles and zeroes in a network function, Necessary conditions for driving point functions and transfer functions. Application of Laplace Transforms: Resistance Element, Inductance Element, Capacitance Element, Step Response of RL, RC and RLC circuits, Impulse Response of Series RL, RC circuits.	9

5	I	**Network synthesis**: Hurwitz polynomials, positive real functions, Basic Philosophy of Synthesis, L-C admittance functions, RC impedance functions and RL admittance functions. RL impedance functions and RC admittance functions.	9
	Total No. of Hrs		**45**

Beyond the Syllabus
Student should know about basic circuits and to understand characteristics and operation of Semiconductor devices.

Course Outcome	
Students should able to	
CO1	Design asymmetric, symmetric, filter, attenuator and equalizer networks.
CO2	Estimate step and impulse responses of RL and RC networks.
CO3	Synthesize RL and RC networks.

Recommended Resources	
Text Books	1. S.P. Ghosh and A.K. Chakraborty**, Network Analysis and Synthesis**, McGraw Hill.
Reference Books	1. M.E. Van Valkenburg, **Network Analysis**, PHI. 2. Smarjit Ghosh, **Network Theory : Analysis and Synthesis**, PHI.
E-Resources	http://nptel.ac.in/courses/