Swaminarayan University

Teaching & Examination Scheme
Course – Faculty of Engineering (Degree)
Branch – Electrical Engineering
Semester – 3rd

Subject Code	Subject Name	Category	L	T	P	Total Credit	E	M	I	V	Total Marks
BE100301	Technical Writing & Communication Skills	Humanities and Social Science	2	0	2	3	60	40	20	30	150
BE100302	Indian Constitution	Mandatory	2	0	0	0	50	0	0	0	50
BE105301	Analog & Digital Electronics	Professional Core	4	0	2	5	60	40	20	30	150
BE105302	Electrical Circuit Analysis and Synthesis	Professional Core	4	0	2	5	60	40	20	30	150
BE105303	Modern Control Engineering	Engineering Science	3	0	2	4	60	40	20	30	150
BE105304	Advanced Engineering Mathematics	Basic Science	3	2	0	5	60	40	0	0	100
	Total		**18**	**2**	**8**	**22**					

L=Lecture,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=PracticalInternal, V=Practical External

SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: Degree

Course/ Subject Code: BE105304

Course/Subject Name: Advanced Engineering Mathematics

w.e.f.Academic Year:	2023-24
Semester:	3rd Semester/ 2ndYear
Category of the Course:	Basic Science

Prerequisite:	The students are required to have a reasonable understanding of Calculus, Differential equations and Linear algebra and introductory knowledge of probability and statistics
Rationale:	There is different kind of systems which requires through mathematical analysis tools. The type of systems which requires such tools are linear systems, nonlinear systems and dynamical systems. Apart from them, it requires systematic study of uncertainty (randomness) by probability - statistics and curve fitting. The different methods like numerical methods are required to be studied.

Teaching and Examination Scheme -

Hours per Week			Course Credits	Examination Marks				
				Theory Marks		Practical Marks		
L	T	P		E	M	I	V	100
3	2	0	5	60	40	00	00	

Course Content:

Unit No.	Content	Hours	Approx. Weightage (%)
1	Numerical Solutions: Roots of Algebraic and Transcendental Equations: Bisection, false position, Secant and Newton-Raphson methods, Fixed Point Iteration, Rate of convergence, Applications to electrical engineering problems	06	14%
2	Interpolation: Finite Differences, Forward, Backward and Central operators, Interpolation by polynomials: Newton's forward, Backward interpolation formulae, Newton's divided formulae and Lagrange's interpolation formulae for unequal intervals, Applications to electrical engineering problems	06	14%
3	Numerical Integration: Newton-Cotes formula, Trapezoidal and Simpson's formulae, error formulae, Gaussian quadrature formulae, Applications to electrical engineering problems	04	10%
4	Numerical solution of Ordinary Differential Equations: Picard, Taylor, Euler methods and Runge-Kutta methods, Applications to electrical engineering problems	04	10%
5	Curve fitting by the numerical method: Curve fitting by method of least squares, fitting of straight lines, second degree parabola and more general curves	04	10%

6	Basic Probability: Experiment, definition of probability, conditional probability, independent events, Bayes' rule, Bernoulli trials, Random variables, discrete and continuous random variables, probability functions, cumulative distribution function, properties, Applications to electrical engineering problems	10	24%
7	Basic Statistics: Measures of central tendency, Moments, Expectation, dispersion, skewness, kurtosis, Bounds on probability, Chebyshev's Inequality, Applications to electrical engineering problems	08	19%
Total		**42**	**100%**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**30**	**20**	**0**	**0**	**0**

Course Outcome: After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
1	Solve algebraic equations related to electrical engineering problems using various numerical methods.	Apply
2	Estimate unknown data values using interpolation methods and curve fitting techniques.	Apply
3	Evaluate definite integrals and solve ordinary differential equations using numerical approaches.	Apply
4	Understand basic probability concepts and apply probability functions in solving electrical engineering-related problems.	Understand, Apply
5	Analyze and apply basic statistical tools including measures of central tendency and dispersion to interpret engineering data.	Analyze, Apply

CO -PO MAPPING

PO (with Description) / CO	CO1	CO2	CO3	CO4	CO5
PO1 – Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to solve complex engineering problems.	3	3	3	3	3
PO2 – Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions.	3	2	3	2	2
PO3 – Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs.	–	1	1	–	–

PO4 – Conduct investigations of complex problems: Use research-based knowledge and methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide conclusions.	2	2	2	1	1
PO5 – Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities.	2	2	3	2	1

CO-PSO Mapping

PSO (with Description)	CO1	CO2	CO3	CO4	CO5
PSO1 – Apply mathematical concepts to solve real-world engineering problems.	3	3	3	2	2
PSO2 – Develop and analyze models of engineering systems using statistical, numerical, and analytical tools.	3	3	3	3	3

References/Suggested Learning Resources:

(a) Books:

- J. L. Devore, Probability and Statistics for Engineering and the Sciences, Cengage Learning
- Chapra S.C, Canale, R P, Numerical Methods for Engineers, Tata McGraw Hill, 2003.
- S. Ross, A First Course in Probability, 6th Ed., Pearson Education India.
- W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, Wiley.
- D. C. Montgomery and G.C.Runger, Applied Statistics and Probability for Engineers, Wiley.

(b) Open Source software and website:

- https://nptel.ac.in/courses/112104121/

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SWAMINARAYAN UNIVERSITY
Program Name: Engineering
Level: Degree
Branch:Electrical Engineering
Subject Code: BE105301
Subject Name : Analog & Digital Electronics

w.e.f.Academic Year:	2023-24
Semester:	3rd
Category of the Course:	PCC

Prerequisite:	**Professional Core Course**
Rationale:	Analog Circuits and Digital Circuits is a classic way of differentiating between two types of electronic circuits based on the signals they process. To put it in simple words, Analog Circuits deals with continuous analog signals whereas Digital Circuits deals with discrete digital signals.

Teaching and Examination Scheme –

Hours per Week			Course Credits	Examination Marks				
				Theory Marks		Practical Marks		
L	T	P		E	M	I	V	150
4	0	2	5	60	40	20	30	

Detailed Syllabus –

Unit	Content	Hours	% Of Weight
1	**Differential, multi-stage and operational amplifiers:**Differential amplifier; power amplifier; direct coupled multi-stage amplifier; internal structure of an operational amplifier, ideal op-amp, non-idealities in an op-amp (Output offset voltage, input bias current, input offset current, slew rate, gain bandwidth product)	10	15
2	**Linear applications of op-amp:**Idealized analysis of op-amp circuits. Inverting and non-inverting amplifier, differential amplifier, instrumentation amplifier, integrator, active filter, P, PI and PID controllers and lead/lag compensator using an op-amp, voltage regulator, oscillators (Wein bridge and phase shift). Analog to Digital Conversion.	10	15
3	**Nonlinear applications of op-amp:**Hysteretic Comparator, Zero Crossing Detector, Square-wave and triangular-wave generators. Precision rectifier, peak detector.	08	15
4	**Combinational Digital Circuits:**Standard representation for logic functions, K-map representation, simplification of logic functions using K-map, minimization of logical functions. Don't care	10	15

	conditions, Multiplexer, De-Multiplexer/Decoders, Adders, Subtractors, BCD arithmetic, carry look ahead adder, serial adder, ALU, elementary ALU design, popular MSI chips, digital comparator, parity checker/generator, code converters, priority encoders, decoders/drivers for display devices, Q-M method of function realization		
5	**Sequential circuits and systems:**A 1-bit memory, the circuit properties of Bi-stable latch, the clocked SR flip flop, J- K-T and D types flip-flops, applications of flip-flops, shift registers, applications of shift registers, serial to parallel converter, parallel to serial converter, ring counter, sequence generator, ripple(Asynchronous) counters, synchronous counters, counters design using flip flops, special counter IC's, asynchronous sequential counters, applications of counters	**10**	**25**
6	**A/D and D/A Converters:**Digital to analog converters: weighted resistor/converter, R-2R Ladder D/A converter, specifications for D/A converters, examples of D/A converter lCs, sample and hold circuit, analog to digital converters: quantization and encoding, parallel comparator A/D converter, successive approximation A/D converter, counting A/D converter, dual slope A/D converter, A/D converter using voltage to frequency and voltage to time conversion, specifications of A/D converters, example of A/D converter ICs	**08**	**15**
	Teaching hours	**56**	**100**

Course Outcomes-

CO No	Course Outcome Description	RBT Level
CO1	**Describe the functioning and selection of OP-AMP as per application.**	Understanding
CO2	**Design and test OP-AMP-based circuits.**	Applying
CO3	**Design and implement combinational and sequential logic circuits.**	Applying
CO4	**Describe the process of analog-to-digital and digital-to-analog conversion.**	Understanding

CO\PO MATRIX

CO \ PO	CO1	CO2	CO3	CO4
PO1 Basic knowledge	**3**	**3**	**3**	**3**
PO2 Discipline knowledge	**2**	**3**	**3**	**2**
PO3 Experiments and practice	**-**	**3**	**3**	**2**
PO4 Engineering tools	**-**	**2**	**3**	**-**
PO5 The engineer and society	**-**	**-**	**-**	**-**

PO6 Environment and sustainability	-	-	-	-
PO7 Ethics	-	-	-	-
PO8 Individual and team work	-	-	-	-
PO9 Communication	**2**	**2**	**2**	**2**
PO10 Life-long learning	**2**	**2**	**2**	**2**

CO\PSO MATRIX

CO \PSO	**PSO1(Circuit Analysis and Implementation.)**	**PSO2(Use of Tools and Instruments)**
CO1	**3**	**2**
CO2	**3**	**3**
CO3	**3**	**3**
CO4	**2**	**2**

Reference Books -

- Ramakant A Gayakwad, Op- Amps and Linear Integrated Circuits, Prentice Hall of India
- R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.
- M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.
- A.Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016.

List of Practical-

- Study the different parameter of op-amp.
- Frequency response of inverting amplifier and non-inverting amplifier.
- Study of op-amp as inverting amplifier and non-inverting amplifier.
- OPAMP circuits –integrator, differentiator, and comparator.
- Phase shift and Wein's Bridge oscillator with amplitude stabilization using OPAMPs.
- Waveform generation – Square, triangular and saw tooth wave form generation using OPAMPs.
- Application of op-amp as low pass filter, high pass filter and band-pass filter.
- Verification of function of Half/Full adder circuits.
- Verification of function of Binary to Grey code conversion.
- Verification of function of Latch and flip-flop.

List of Major Equipment –

- Trainer kits related to Analog and Digital electronics.

SWAMINARAYAN UNIVERSITY
Program Name: Engineering
Level: Degree
Branch:Electrical Engineering
Subject Code: BE105302
Subject Name : Electrical Circuit Analysis and Synthesis

w.e.f.Academic Year:	2023-24
Semester:	3rd
Category of the Course:	PCC

Prerequisite:	**Professional Core Course**
Rationale:	Electrical circuits are the integral elements of the power system. Analysis of response of electrical circuits for various inputs is the basic requirement to understand the behavior of the system. The responses for various inputs are in turn helpful to design, implement, operate and control a network effectively. This subject is intended to provide the basic insight into the theory and problems related to electrical circuit analysis.

Teaching and Examination Scheme –

Hours per Week			Course Credits	Examination Marks				
				Theory Marks		Practical Marks		
L	T	P		E	M	I	V	150
4	0	2	5	60	40	20	30	

Detailed Syllabus –

Unit	Content	Hours	% Of Weight
1	**Network Theorems:** Superposition theorem, Thevenin theorem, Norton theorem, Maximumpower transfer theorem, Reciprocity theorem, Compensation theorem.Analysis with dependent current and voltage sources. Node and MeshAnalysis. Concept of duality and dual networks.	10	20
2	**Solution of First and Second order networks:** Solution of first and second order differential equations for Series and parallel R-L, R-C, RLC circuits, initial and final conditions in network elements, forced and free response, time constants, steady state and transient state response.	08	20
3	**Sinusoidal steady state analysis:** Representation of sine function as rotating phasor, phasor diagrams, impedances and admittances, AC circuit analysis, effective or RMS values, average power and complex power. Three-phase circuits. Mutual coupled circuits, Dot Convention in coupled circuits, Ideal Transformer.	08	20

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4	**Electrical Circuit Analysis Using Laplace Transforms:** Review of Laplace Transform, Analysis of electrical circuits using Laplace Transform for standard inputs, convolution integral, inverse Laplace transform, transformed network with initial conditions. Transfer function representation. Poles and Zeros. Frequency response (magnitude and phase plots), series and parallel resonances.	**08**	**20**
5	**Two Port Network and Network Functions:** Two Port Networks, terminal pairs, relationship of two port variables, impedance parameters, admittance parameters, transmission parameters and hybrid parameters, interconnections of two port networks.	**08**	**20**
	Teaching hours	**42**	**100**

Course Outcomes-

CO No	Course Outcome Description	RBT Level
CO1	**Apply basic circuit laws and network reduction techniques.**	Apply
CO2	**Analyze circuits using Kirchhoff's laws and network theorems.**	Analyze
CO3	**Evaluate transient and steady-state responses in electrical circuits.**	Evaluate
CO4	**Analyze resonance and apply maximum power transfer theorem.**	Analyze
CO5	**Evaluate two-port network parameters.**	Evaluate

CO\PO MATRIX

CO \ PO	CO1	CO2	CO3	CO4	CO5
PO1 Basic knowledge	**3**	**3**	**3**	**3**	**3**
PO2 Discipline knowledge	**2**	**3**	**3**	**3**	**3**
PO3 Experiments and practice	**2**	**2**	**3**	**3**	**3**
PO4 Engineering tools	**-**	**-**	**2**	**2**	**3**
PO5 The engineer and society	**-**	**-**	**-**	**-**	**-**
PO6 Environment and sustainability	**-**	**-**	**-**	**-**	**-**
PO7 Ethics	**-**	**-**	**-**	**-**	**-**
PO8 Individual and team work	**-**	**-**	**-**	**-**	**-**
PO9 Communication	**2**	**2**	**2**	**2**	**2**
PO10 Life-long learning	**2**	**2**	**2**	**2**	**3**

CO\PSO MATRIX

CO \PSO	PSO1(Apply circuit laws and analysis techniques .)	PSO2(Use modern tools to simulate/analyze networks)
CO1	**3**	**2**
CO2	**3**	**2**

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

Reference Books -

- A. Nimje and D. P. Kothari, "Electrical Circuit Analysis and synthesis", New Age International Publications, 2017
- K.S.Suresh Kumar, "Electric Circuit Analysis", Pearson Publications, 2013.
- W. H. Hayt and J. E.Kemmerly, "Engineering Circuit Analysis", McGraw Hill Education, 2013.
- K. Alexander and M. N. O. Sadiku, "Electric Circuits", McGraw Hill Education, 2004.
- K. V. V. Murthy and M. S. Kamath, "Basic Circuit Analysis", Jaico Publishers, 1999

List of Practical-

- To verify the Superposition theorem.
- To verify the Thevenin and Norton's theorems.
- To verify the maximum power transfer theorem.
- To verify the reciprocity theorem.
- To measure and verify the steady-state and transient time-response of R-L circuit.
- To measure and verify the steady-state and transient time-response of R-C circuit.
- To verify the impedance parameters for a two port network.
- To verify the admittance parameters for a two portnetwork.
- To verify the hybrid parameters for a two port network.
- To verify the transmission parameters for a two port network.

List of Major Equipment -

- Multimeter
- Oscilloscope
- Power supplies
- Function generator

Open Sources -

E-materials available at the website of NPTEL- http://nptel.ac.in/

SWAMINARAYAN UNIVERSITY
Program Name: Engineering
Level: Degree
Branch:Electrical Engineering
Subject Code: BE100302
Subject Name : Indian Constitution

w.e.f.Academic Year:	2023-24
Semester:	3rd
Category of the Course:	**Mandatory course**

Prerequisite:	Zeal to learn the subject
Rationale:	The subject *Indian Constitution* aims to create awareness among students about the fundamental principles, values, and structure of the Indian democratic system. It helps learners understand their **rights, duties, and responsibilities** as citizens and professionals. By studying the Constitution, students develop a sense of **legal literacy, national integrity, ethical values**, and **participation in democratic governance**, which are essential for responsible and informed citizenship..

Faculty of Engineering (Degree)

Teaching and Examination Scheme –

Hours per Week			Course Credits	Examination Marks				
				Theory Marks		Practical Marks		
L	T	P		E	M	I	V	50
2	0	0	0	50	0	0	0	

Detailed Syllabus –

Unit	Content	Hours	% Of Weight
1	**Constitutional Framework:** Meaning of the Constitution, Historical Background of the Constituent Assembly, Government of India Act of 1935 and Indian Independence Act of 1947, Salient Future of Constitution Preamble of Constitution, Schedules, National Symbols.	6	20
2	**Fundamental Rights and Duties**: Right to equality, Right to freedom, Right against exploitation, Right to freedom of religion,	6	20

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Level: Degree
Branch:Electrical Engineering
Subject Code: BE100302
Subject Name : Indian Constitution

	Cultural and Educational rights, Right to Property, Right to constitutional remedies, Writs types The Scheme of the Fundamental Duties and its legal status		
3	**Amendments of the Constitution and Emergency Provisions:** Procedure for Amendment, Types of Amendment, The historical perspectives of the constitutional amendments in India National Emergency, President's Rule, Financial Emergency, Parliamentary Approval, and Duration	**6**	**20**
4	**Central Government:** Lok Sabha, Rajya Sabha, Duration of Two Houses, System of Elections of Lok Sabha and Rajya Sabha, Budget in Parliament, Constitution Powers and Status of the President of India, Supreme Court	**6**	**20**
5	**Constitutional Bodies:** Introduction, Power & Function of Election Commission, Union Public Service Commission, State Public Commission, Finance Commission, National Commission for SCs, National Commissions for STs, Comptroller and Auditor General of India, Attorney General of India, Advocate General of State	**6**	**20**
	Teaching hours	**30**	**100**

Course Outcomes –

CO No	Course Outcome Description	RBT Level
CO1	**Enhance human values, understand law enactment, and appreciate the importance of the Constitution**	**Understand**
CO2	**Understand Fundamental Rights and Duties to develop morality, social values, dignity, and responsibilities**	**Understand**
CO3	**Create awareness of social issues and suggest suitable solutions by considering citizen rights and duties.**	**Applying**
CO4	**Understand the distribution of powers and functions of Local Self Government.**	**Understand**
CO5	**Understand the concept of National and Financial Emergency and their impact on the Indian economy**	**Understand**

CO\PO MATRIX

SWAMINARAYAN UNIVERSITY

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Level: Degree
Branch:Electrical Engineering
Subject Code: BE100302
Subject Name : Indian Constitution

CO \ PO	CO1	CO2	CO3	CO4	CO5
PO1 Engineering Knowledge	-	-	-	-	-
PO2 Problem Analysis	-	-	-	-	-
PO3 Design/Development of Solutions	-	-	-	-	-
PO4 Conduct Investigations of Complex Problems	-	-	-	-	-
PO5 Modern Tool Usage	-	-	-	-	-
PO6 The Engineer and Society	3	2	3	2	2
PO7 Environment and Sustainability	2	2	3	2	2
PO8 Ethics	2	3	2	2	2
PO9 Individual and Team Work	-	-	2	-	-
PO10 Communication	2	-	2	2	-
PO11 Project Management and Finance	-	-	-	-	-
PO12 Life-long learning	2	2	3	2	2

CO\PSO MATRIX

CO \PSO	PSO1(Ethical and Civic Understanding)	PSO2(Professional and Social Responsibility)
CO1	3	2
CO2	3	3
CO3	3	3
CO4	2	3
CO5	2	2

Reference Books –

- Constitutional Law of India, Dr. J.N. Pandey, Central Law Agency
- Introduction to the Consitution of India, Durga Das Basu, LexisNexis.
- Indian Constitutional Law, M.P. Jain, LexisNexis
- V.N.Shukla's Constitution of India, Mahndra Pal Singh, Eastern Book Company
- Constitutional Law – I Structure, Udai Raj Rai, Eastern Book Company

SWAMINARAYAN UNIVERSITY
Program Name: Engineering
Level: Degree
Branch:Electrical Engineering
Subject Code: BE105303
Subject Name : Modern Control Engineering

w.e.f.Academic Year:	2023-24
Semester:	3rd
Category of the Course:	**Engineering Science**

Prerequisite:	**Engineering Science**
Rationale:	Automatic control of industrial processes is essential for increasing the output and in turn the profit of an industry. As a result, most of the companies are using automatic control of the machineries and processes. As an engineer, a student must know the basics of automatic control system. This subject is intended to supplement the basic skill of an engineer.

Teaching and Examination Scheme –

Hours per Week			Course Credits	Examination Marks				
				Theory Marks		Practical Marks		
L	T	P		E	M	I	V	150
3	0	2	4	60	40	20	30	

Detailed Syllabus –

Unit	Content	Hours	% Of Weight
1	**Introduction to control problem:** Industrial Control examples. Mathematical models of physical systems.Control hardware and their models. Transfer function models of lineartime-invariant systems.Feedback Control: Open-Loop and Closed-loop systems. Benefits of feedback. Block diagram algebra.	05	15
2	**Time response analysis:** Standard test signals. Time response of first and second order systems and their designspecifications. Concept of stability, Routh and Hurwitz criterion for stability assessment,Root-locus.	12	25
3	**Frequency-response analysis:** Relationship between time and frequency response, Polar plots, Bode plots. Nyquist stability criterion. Relative stability using Nyquist criterion – gain and phase margin. Closed-loop frequency response.	08	15

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4	**Design of controller:** Design of controller using root-locus, design of controller using frequency domain techniques, design of robust control system.	**12**	**30**
5	**State variable techniques:** State variable techniques 07 Concept of state and state variables, state space modelling, solution of state equations, conversion between state space and transfer function model, Concept of controllability and observability, Pole placement by state feedback.	**06**	**15**
	Teaching hours	**43**	**100**

Course Outcomes-

CO No	Course Outcome Description	RBT Level
CO1	**Develop mathematical models of linear time-invariant (LTI) systems**	Apply
CO2	**Analyze time and frequency domain responses of LTI systems**	Analyze
CO3	**Design controllers using root-locus and frequency domain techniques.**	Evaluate
CO4	**Understand state-space representation, controllability, and observability of LTI systems.**	Analyze

CO\PO MATRIX

CO \ PO	CO1	CO2	CO3	CO4
PO1 Basic knowledge	**3**	**3**	**2**	**2**
PO2 Discipline knowledge	**3**	**3**	**3**	**3**
PO3 Experiments and practice	**2**	**3**	**3**	**2**
PO4 Engineering tools	**2**	**2**	**3**	**3**
PO5 The engineer and society	-	-	-	-
PO6 Environment and sustainability	-	-	-	-
PO7 Ethics	-	-	-	-
PO8 Individual and team work	-	-	-	-
PO9 Communication	**2**	**2**	**2**	**2**
PO10 Life-long learning	**2**	**2**	**3**	**3**

CO\PSO MATRIX

CO \PSO	PSO1(Model and analyze control systems)	PSO2(Use tools like MATLAB/Simulink for simulation and design)
CO1	**3**	**2**
CO2	**3**	**3**
CO3	**3**	**3**
CO4	**3**	**3**

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Level: Degree
Branch:Electrical Engineering
Subject Code: BE105303
Subject Name : Modern Control Engineering

Reference Books -

- M. Gopal, "Control Systems: Principles and Design", McGraw Hill Education, 1997.
- U. A. Patel, Textbook of Control Systems Engineering, Mahajan Publishing House, Ahmedabad
- B. C. Kuo, "Automatic Control System", Prentice Hall, 1995.
- K. Ogata, "Modern Control Engineering", Prentice Hall, 1991.
- J. Nagrath and M. Gopal, "Control Systems Engineering", New Age International, 2009

List of Practical–

- Characteristics of D.C. and A.C. Servo motors.
- Characteristics of Synchro Pair.
- Frequency response of compensating networks.
- Step response of second order system.
- D.C.Positon Control System.
- A.C.position Control System.
- Closed loop P, PI and PID Controller.
- Step response and Frequency response of a given plant.
- Design of lag and lead compensation for the given plant.
- ON/OFF Temperature Control systems.

List of Major Equipment –

- Process Control Training Equipment.
- Magnetic Levitation PID Control System.
- Motors and Controllers.
- Ladder Logic Trainer.
- Fluid Trainer System.

Open Sources –

- E-materials available at the website of NPTEL- http://nptel.ac.in/

SWAMINARAYAN UNIVERSITY
Program Name: Engineering
Level: Degree
Branch:Electrical Engineering
Subject Code: BE100301
Subject Name : Technical Writing & Communication Skills

w.e.f.Academic Year:	2023-24
Semester:	3rd
Category of the Course:	Social science

Prerequisite:	**Humanities and Social Science**
Rationale:	The rationale of the curriculum is to help students learn technical communication along with necessary moral and ethical dimensions of engineering.

Teaching and Examination Scheme –

Hours per Week			Course Credits	Examination Marks				
				Theory Marks		Practical Marks		
L	T	P		E	M	I	V	150
2	0	2	3	60	40	20	30	

Detailed Syllabus –

Unit	Content	Hours	% Of Weight
1	**Dynamics of Communication:** Definition and process, Kinesics, Proxemics, Paralinguistic features, Importance of Interpersonal and Intercultural Communication in today's organizations	6	15
2	**Technical Writing:** Report writing, Technical proposal, Technical description, Business letters (sales, order, complaint, adjustment, inquiry, recommendation, appreciation, apology, acknowledgement, cover letter), Agenda of meeting, Minutes of meeting, Resume writing	8	20
3	**Technical Communication:** Public speaking Group discussion Presentation strategies Interview skills Negotiation skills Critical and Creative thinking in communication	6	15

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Subject Name : Technical Writing & Communication Skills

4	**Ethics in Engineering:** Scope of engineering ethics Accepting and sharing responsibility Responsible professionals and ethical corporations Resolving ethical dilemmas Making moral choices	**4**	**15**
5	**Etiquettes:** Telephone etiquettes Etiquettes for foreign business trips Visits of foreign counterparts Etiquettes for small talks, Respecting privacy Learning to say NO Time management	**5**	**20**
6	**Self-development and Assessment:** Change, Grow, Persist, Prioritize, Read, Learn, Listen, Record, Remember, Asses, Think, Communicate, Relate, Dream	**3**	**15**
	Teaching hours	**32**	**100**

Course Outcomes-

CO No	Course Outcome Description	RBT Level
CO1	Define and discuss dynamics of verbal and non-verbal aspects of communication.	Understand
CO2	Write various formal documents used in technical and professional communication.	Applying
CO3	Communicate effectively in diverse formal situations taking place in organizations.	Applying
CO4	Illustrate and examine the knowledge of ethical aspects related to engineering practice.	Analyze
CO5	Demonstrate and explain professional and social etiquettes.	Understand
CO6	Plan self-development activities and practice self-assessment for continuous personal and professional growth.	Create

CO\PO MATRIX

CO \ PO	CO1	CO2	CO3	CO4	CO5	CO6
PO1 Engineering Knowledge	-	-	-	2	-	-
PO2 Problem Analysis	-	-	-	-	-	-
PO3 Design/Development of Solutions	-	-	-	-	-	-
PO4 Conduct Investigations of Complex Problems	-	-	-	-	-	-
PO5 Modern Tool Usage	-	2	2	2	-	2
PO6 The Engineer and Society	2	-	-	1	-	-
PO7 Environment and Sustainability	-	-	-	-	-	-
PO8 Ethics	-	-	-	3	3	2

SWAMINARAYAN UNIVERSITY
Program Name: Engineering
Level: Degree
Branch:Electrical Engineering
Subject Code: BE100301
Subject Name : Technical Writing & Communication Skills

PO9 Individual and Team Work	**1**	**1**	**2**	**1**	**1**	**1**
PO10 Communication	**3**	**3**	**3**	**2**	**2**	**2**
PO11 Project Management and Finance	**-**	**1**	**2**	**-**	**-**	**2**
PO12 Life-long learning	**2**	**2**	**2**	**2**	**2**	**3**

CO\PSO MATRIX

CO \PSO	PSO1(Engineering Communication)	PSO2(Professional Ethics & Soft Skills)
CO1	**2**	**3**
CO2	**3**	**2**
CO3	**3**	**3**
CO4	**2**	**3**
CO5	**1**	**3**
CO6	**2**	**3**

Reference Books –

- Raman and Sharma, Technical Communications, OUP, New Delhi, 2017
- Lata and Kumar, Communication Skills, OUP, New Delhi, 2018
- Mike Martin and Roland Schinzinger, Ethics in Engineering, McGraw Hill, New York, 2014
- Mohapatra and Sreejesh S., Case Studies in Business Ethics and Corporate Governance, Pearson, UP, 2013
- Ramesh and Ramesh, The Ace of Soft Skills, Pearson, UP, 2019
- Sherfield, Montgomery and Moody, Cornerstone: Developing Soft Skills, UP, 2009

List of Exercise –

- Role Play
- Letter writing: Formal
- Group Discussion
- Presentations
- Book Review(Preferably related to self-development)
- Mock Interview
- Report writing
- Case studies related to unit 4, 5 and 6
- Conducting meetings and minutes of meeting

- Practical assessment

Open Sources –

- https://www.scu.edu/ethics/focus-areas/more/engineering-ethics/engineering-ethics-cases/