



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: Degree

Subject Code: BE100101

Subject Name: Mathematics - 1

w. e. f. Academic Year:	2025-26
Semester:	Ist Year (Sem – 1)
Category of the Course:	Basic Science Course

Prerequisite:	Geometry, Trigonometry, Algebra
Rationale:	To compute rate of change, Compute area, Express the volume and area in term of series and function, Matrix algebra.

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
3	2	0	5	60	40	NA	NA	100

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Introduction of L'Hospital rule and working, Improper integrals, Convergence and Divergence, Gamma function, Application of integral, Length of plane curve, Area of surface revolution in parametric and Polar form	8	10 %
2.	Fourier series, Dirichlet's condition for representation by Fourier series, Fourier series of a function of period 2π , fourier series of even and odd function, Half range expansion	5	15%
3.	Matrix, Inverse matrix by adjoint method and Gauss-jordan method, Rank of matrix by echelon form, Solution of linear equation by Gauss Elimination and Gauss Jordan, Eigen value and Eigen vector, Diagonalization, Cayley-Hamilton theorem.	8	20%



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4.	Convergence and Divergence of sequences, The continuous function theorem for sequences, Sandwich theorem, Bounded monotonic sequences, Geometric series, Telescoping series, First term test for divergent series, Harmonic series, The P series, Test and limit comparison, Ratio test, Root test power series, Taylor series, Maclaurin series.	9	20%
5.	Function of several variables, Limits and continuity, Test for non existence of limit, Partial differentiation and mixed derivative theorem, Chain rule, Implicit differentiation, Gradient and directional derivatives, Tangent plane and normal line, Method of lagrange multipliers, multiple, Double and triple integrals, Change the order of integration, Doubles integration for area and volumes, Triple integrals in rectangular, Cylindrical and spherical coordinates, Jacobian multiple integral by substitution	12	35%
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
25	30	35	0	0	0

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

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

No	Course Outcomes	RBT level
1	To apply differential and integral calculus to improper integrals and to determine applications of definite integral. Apart from some other applications they will have a basic understanding of indeterminate forms, Beta and Gamma functions.	Apply, Understand
2	To apply the various tests of convergence to sequence, series and the tool of power series and fourier series for learning advanced Engineering Mathematics.	Apply, Analyze
3	To compute directional derivative, maximum or minimum rate of change and optimum value of functions of several variables.	Analyze, Evaluate
4	To compute the areas and volumes using multiple integral techniques.	Apply
5	To perform matrix computation in a comprehensive manner.	Apply, understand



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CO-PO MAPPING

PO / CO	CO1	CO2	CO3	CO4	CO5
PO1 – Engineering knowledge: Apply knowledge of mathematics, science and engineering fundamentals	3	3	3	3	3
PO2 – Problem analysis: Identify, formulate and analyze engineering problems	2	3	3	3	3
PO3 – Design/development of solutions: Design solutions for complex engineering problems	1	2	2	2	2
PO4 – Investigation of complex problems: Use research-based knowledge for analysis and interpretation	2	2	3	3	3
PO5 – Modern tool usage: Use appropriate techniques and IT tools for engineering practice	1	1	2	1	2
PO6 – Engineer and society: Apply contextual knowledge to assess societal, health, safety, legal issues	-	-	-	-	-
PO7 – Environment and sustainability: Understand societal and environmental impact of engineering	-	-	-	-	-
PO8 – Ethics: Apply ethical principles in engineering practices	-	-	-	-	-
PO9 – Individual and team work: Function effectively as an individual and in teams	-	-	-	-	-
PO10 – Communication: Communicate effectively on engineering activities	-	-	-	-	-
PO11 – Project management and finance: Apply management principles to projects	-	-	-	-	-
PO12 – Life-long learning: Recognize the need for and engage in lifelong learning	-	-	-	-	-

CO- PSO MAPPING

CO / PSO	PSO1 – Apply mathematical knowledge to solve engineering problems	PSO2 – Use analytical techniques for designing and modeling engineering systems effectively
CO1	3	2
CO2	3	3
CO3	3	3
CO4	3	2
CO5	3	3



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Level: Degree

Subject Code: BE100101

Subject Name: Mathematics - 1

References/Suggested Learning Resources:

(a) Books:

- Maurice D. Weir, Joel Hass, Thomas' Calculus, Early Transcendentals, 13e, Pearson, 2014.
- Howard Anton, Irl Bivens, Stephens Davis, Calculus, 10e, Wiley, 2016.
- James Stewart, Calculus: Early Transcendentals with Course Mate, 7e, Cengage, 2012.
- Anton and Rorres, Elementary Linear Algebra, Applications version, Wiley India Edition.
- T. M. Apostol, Calculus, Volumes 1 & 2, Wiley Eastern.
- Erwin Kreyszig, Advanced Engineering Mathematics, Wiley India Edition.
- Peter O'Neill, Advanced Engineering Mathematics, 7th Edition, Cengage.

(b) Open-source software and website:

- Scilab
- MIT open courseware.



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Course / Subject Code : BE100102

Course / Subject Name : Basic Mechanical Engineering

w. e. f. Academic Year:	2024-25
Semester:	1 st Year
Category of the Course:	ESC

Prerequisite:	Nil
Rationale:	Knowledge of basic principles of Mechanical Engineering is required in various fields of engineering.

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				(E)	(M)	(I)	(V)	
3	0	2	4	60	40	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Basic Terminology and Energy: Prime movers and its types, Concept of Force, Pressure, Energy, Work, Power, System, Heat, Temperature, Specific heat capacity, Process, Cycle, Internal energy, Enthalpy, Statements of Zeroth law and First law Applications of Energy sources like Fossil fuels, Nuclear fuels, Hydrogen fuel, Hydro, Solar, Wind, and Bio-fuels, Environmental issues like Global warming and Ozone depletion	8	14
2.	Properties of gases: Boyle's law, Charles's law, Gay-Lussac's law, Avogadro's law, Combined gas law, Gas constant, Relation between cp and cv, Various non-flow processes like constant volume process, constant pressure process, Isothermal process, Adiabatic process, Polytropic process Properties of Steam: Steam formation, Types of steam, Enthalpy, Specific volume, Internal energy and dryness fraction of steam, use of steam tables, steam calorimeters	12	22



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Level: UG

Course / Subject Code : BE100102

Course / Subject Name : Basic Mechanical Engineering

3.	Heat Engines: Heat engine cycle and Heat engine, working substances, Classification of heat engines, Description and thermal efficiency of Carnot; Rankine; Otto cycle and Diesel cycles Internal Combustion Engines: Introduction, Classification, Engine details, four-stroke/ two-stroke cycle Petrol/Diesel engines, Indicated power, Brake Power, Efficiencies	10	20
4.	Steam Boilers: Introduction, Classification, Cochran, Lancashire and Babcock and Wilcox boiler, Functioning of different mountings and accessories	-	10
5.	Air compressors and pumps: Types and operation of Reciprocating and Rotary air compressors, significance of Multistage, Types and operation of Reciprocating, Rotary and Centrifugal pumps, Priming	6	10
6.	Refrigeration & Air Conditioning: Refrigerant, Vapor compression refrigeration system, Vapor absorption refrigeration system, Domestic Refrigerator, Window and split air conditioners	4	8
7.	Couplings, Clutches and Brakes: Construction and applications of Couplings (Box; Flange; Pin type flexible; Universal and Oldham), Clutches (Disc and Centrifugal), and Brakes (Block; Shoe; Band and Disc) Transmission of Motion and Power: Shaft and axle, Different arrangement and applications of Belt drive; Chain drive; Friction drive and Gear drive	-	10
8.	Engineering Materials: Types, properties and applications of Ferrous & Nonferrous metals, Timber, Abrasive material, silica, ceramics, glass, graphite, diamond, plastic and polymer	5	6
	Total	45	100

Note: Topic No. 4 and 7 of the above syllabus must be covered in Practical Hours.

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	40	40	-	-	-

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)



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Level: UG

Course / Subject Code : BE100102

Course / Subject Name : Basic Mechanical Engineering

Course Outcomes (COs):

CO No.	Course Outcome	RBT Level
CO1	Explain the various sources of energy and basic terminology of Mechanical engineering	Understand
CO2	Make calculations for commonly used working fluids i.e. ideal gases and steam	Apply
CO3	Make use of various heat engine cycles and explain construction and working of IC engines	Apply
CO4	Explain working and applications of steam boilers and various energy conversion systems	Understand
CO5	Explain power transmission elements, clutches, couplings, brakes, and properties of engineering materials	Understand

CO-PO Mapping:

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	1	2	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-
CO3	3	2	3	-	2	-	-	-	-	-	-	-
CO4	3	2	-	-	-	2	2	-	-	-	-	-
CO5	3	-	-	-	2	2	-	-	-	-	-	-

CO-PSO Mapping: (Assuming PSOs as follows for a Mechanical Engineering program)

- **PSO1:** Apply fundamental concepts of mechanical engineering to solve engineering problems.
- **PSO2:** Use thermal, fluid, and energy systems knowledge in practical applications.
- **PSO3:** Demonstrate knowledge of mechanical components and systems in design and analysis.



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Program Name: Engineering

Level: UG

Course / Subject Code : BE100102

Course / Subject Name : Basic Mechanical Engineering

CO \ PSO	PSO1	PSO2	PSO3
CO1	3	2	-
CO2	3	3	-
CO3	3	3	2
CO4	3	3	-
CO5	3	2	3

References/Suggested Learning Resources:

(a) Books:

1. Elements of Mechanical Engineering by N M Bhatt and J R Mehta, Mahajan Publishing House
2. Basic Mechanical Engineering by Pravin Kumar, Pearson Education
3. Fundamental of Mechanical Engineering by G.S. Sawhney, PHI Publication New Delhi
4. Elements of Mechanical Engineering by Sadhu Singh, S. Chand Publication
5. Introduction to Engineering Materials by B.K. Agrawal, McGraw Hill Publication, New Delhi

(b) Open source software and website:

1. <https://nptel.ac.in>
2. www.vlab.co.in

Suggested Course Practical List:

1. To understand construction and working of various types of boilers.
2. To understand construction and working of different boiler mountings and accessories.
3. To understand construction features of two/four stroke petrol/diesel engines
4. To determine brake thermal efficiency of an I. C. Engine.
5. To understand construction and working of different types of air compressors.
6. To demonstrate vapor compression refrigeration cycle of domestic refrigerator OR window air conditioner OR split air conditioner.
7. To understand construction, working and application of clutches, couplings and brakes
8. To understand different arrangement and application of various power transmission drives

List of Laboratory/Learning Resources Required:

Models of Cochran, Lancashire and Babcock and Wilcox boilers, models of various mountings and accessories, Models of various types of IC engines, Single cylinder two stroke /four stroke petrol/ diesel engine, models of pumps, compressors, Domestic refrigerator/window air conditioner/split air conditioner, models of various types of brakes, coupling, clutches, drives.



सर्व विद्या अधिपतये

SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: Degree

Branch: Electrical Engineering

Subject Code: BE100104

Subject Name : Basic Electrical Engineering

w.e.f.Academic Year:	2025-26
Semester:	1 st
Category of the Course:	Science

Prerequisite:	Engineering Science
Rationale:	Electricity has been the main source of energy for the developing and developed countries. Per capita consumption of electricity of a country can be considered as an indicator of the development of the country. In view of this, it is essential for all engineering graduates to know the basic aspects of electrical engineering. This subject deals with basic circuit solution methods, introduction to electrical machines and basics of domestic electrical installations.

Teaching and Examination Scheme –

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

Detailed Syllabus –

Unit	Content	Hours	% Of Weight
1	DC Circuits: Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff's current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.	8	20
2	AC Circuits: Representation of sinusoidal waveforms, peak and RMS values, Phasor representation of AC quantities, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), Series and parallel resonance. Three phase balanced circuits, voltage and current relations in star and delta connections, Power measurement in three phase circuits.	10	20



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Level: Degree

Branch: Electrical Engineering

Subject Code: BE100104

Subject Name : Basic Electrical Engineering

3	Transformers: Magnetic materials, BH characteristics. Construction and working principle of single phase and three phase transformers. Ideal and practical transformer. Auto-transformer and its applications.	8	20
4	Electrical Machines: Generation of rotating magnetic fields. Construction and working of following machines: <ul style="list-style-type: none"> • Three-phase induction motor • Single-phase induction motor. • Separately excited DC motor. • Synchronous generators. 	8	20
5	Electrical Installations: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB. Types of Wires and Cables. Earthing – Types of earthing and its importance. Safety precautions for electrical appliances. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption. Basics of power factor improvement.	8	20
	Total	42	100

Course Outcomes-

CO No	Course Outcome Description	RBT Level
CO1	Analyze and solve basic **DC electrical circuits** using network theorems and laws.	Analyze
CO2	Analyze **single-phase and three-phase AC circuits** for power and resonance conditions.	Analyze
CO3	Explain the **construction and working** of single-phase and three-phase **transformers**	Understanding
CO4	Describe the construction and working of various **electrical machines** like induction motors and DC motors.	Understanding
CO5	Identify components of **electrical installations** , apply safety practices, and perform basic energy calculations.	Apply

CO\PO MATRIX

CO \ PO	CO1	CO2	CO3	CO4	CO5
PO1 Engineering Knowledge	3	3	3	3	2
PO2 Problem Analysis	3	3	-	-	-
PO3 Design/Development of Solutions	2	2	-	-	1
PO4 Conduct Investigations of Complex Problems	2	2	-	-	-
PO5 Modern Tool Usage	-	-	-	-	2



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Level: Degree
Branch: Electrical Engineering
Subject Code: BE100104
Subject Name : Basic Electrical Engineering

PO6 The Engineer and Society	-	-	-	-	3
PO7 Environment and Sustainability	-	-	-	-	2
PO8 Ethics	-	-	-	-	2
PO9 Individual and Team Work	-	-	-	-	-
PO10 Communication	-	-	-	-	2
PO11 Project Management and Finance	-	-	-	-	-
PO12 Life-long Learning	2	2	1	1	3

CO\PSO MATRIX

CO \ PSO	PSO1(Fundamentals of Electrical Engineering)	PSO2(Application & Safety Practices)
CO1	3	2
CO2	3	2
CO3	3	1
CO4	3	1
CO5	2	3

Reference Books –

- U.A. Patel, “Elements of Electrical & Electronics Engineering”, Atul Prakashan.
- B.L. Theraja, “Electrical Technology–Part I and II”, S. Chand and Co. 2012
- J. Nagrath, Basic Electrical Engineering, TMH Publishing Co. Ltd.
- D.P. Kothari and I.J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 2010.

List of Practical–

- To study the standard symbols used in Electrical Engineering.
- Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Resistors, Capacitors and Inductors.
- To study the effect of temperature on Resistance of winding.
- To study of Kirchhoff's laws.
- Verification of Superposition Theorem.
- Verification of Thevenin's Theorem.
- Verification of Norton's Theorem.
- To verify the resonance in R-L-C circuits.
- To study about measurement of Power factor in R-L- C series circuit



सर्व विद्या अधिपतये

SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: Degree

Branch: Electrical Engineering

Subject Code: BE100105

Subject Name : Basic Electronics

w.e.f.Academic Year:	2025-26
Semester:	1 st
Category of the Course:	Engineering Science

Prerequisite:	High School Education & Physics
Rationale:	Electronics is playing a key role in all engineering applications. All engineers should have basic knowledge of electronics. Purpose of this subject is make students familiar with basic electronics concepts. Students will be able to operate electronic test and measurement equipment like multi-meter, CRO, DC power supply and function generator.

Teaching and Examination Scheme –

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

Detailed Syllabus –

Unit	Contents	Hours	% Of Weight
1	Diode theory and applications: Basic idea about forward bias, reverse bias and VI characteristics, ideal diode, second and third approximation, surface mount diodes, Zener diode, Testing of diode with multi-meter, half wave rectifier, full wave rectifier, bridge rectifier, RC and LC filters, Design of un-regulated DC power supply, circuit, Clamping circuit, voltage multiplier circuit, Reading datasheet of semiconductor diode.	10	20
2	Bipolar junction transistors and its biasing: BJT operation, BJT voltages and currents, CE, CB and CC characteristics, DC load line and bias point, base bias, emitter feedback bias, collector feedback bias, voltage divider bias, Thermal stability, biasing BJT switching circuits, transistor power dissipation and switching time, Testing of bipolar junction transistor with multi-meter, Reading datasheet of BJT.	10	20
3	Special purpose diodes and transistors: Light emitting diode (LED). Zener diode, Zener diode circuit for voltage regulation, Photo diode, Solar cell, PIN	4	10



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Program Name: Engineering

Level: Degree

Branch: Electrical Engineering

Subject Code: BE100105

Subject Name : Basic Electronics

	diode, Varactor, Schottky diode, Varistors, Tunnel diode, Seven Segment display, sixteen segment display, identify segments on pin using multi-meter, Dot-matrix LED display, Photo transistor, Opto-coupler, Reading datasheet of opto-electronics devices		
4	AC Analysis of BJT circuits and small signal amplifier: Coupling and bypass capacitors, AC load lines, Transistor models and parameters, Common emitter circuit analysis, common base circuit analysis, common collector circuit analysis, Comparison of CE, CB and CC circuits, Transistor as a switch	10	20
5	Field effect transistors (FET) and its biasing: Junction field effect transistors (JFET), Comparison of BJT and FET, JFET characteristics, FET, Biasing in ohmic region and active region, Trans-conductance, amplification and switching, MOSFETs (D-type and E-type MOSFET), CMOS introduction, E-MOSFET amplifier. MOSFET testing, Reading datasheet for FET and MOSFET.	10	20
6	Digital Circuits: Basic gates AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR, Building AND, OR Gate with diodes, Digital logic families RTL, DTL, TTL, CMOS, Comparison of logic families	4	10
	Total	48	100

Course Outcomes-

CO No	Course Outcome Description	RBT Level
CO1	Explain diode theory and its applications including rectifiers and voltage multipliers.	Understanding
CO2	Analyze characteristics and biasing of BJT for amplifier and switching applications.	Analyze
CO3	Identify and describe the characteristics of special purpose diodes and optoelectronic devices	Remember
CO4	Analyze BJT small signal amplifier configurations (CE, CB, CC) for AC applications.	Analyze
CO5	Explain and compare the characteristics and biasing of JFET, MOSFET, and CMOS devices.	Apply



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Subject Code: BE100105

Subject Name : Basic Electronics

CO\PO MATRIX

CO \ PO	CO1	CO2	CO3	CO4	CO5
PO1 Engineering Knowledge	3	3	2	3	3
PO2 Problem Analysis	-	2	-	3	2
PO3 Design/Development of Solutions	1	3	1	3	2
PO4 Conduct Investigations of Complex Problems	-	2	-	3	2
PO5 Modern Tool Usage	-	-	-	-	-
PO6 The Engineer and Society	-	-	-	-	-
PO7 Environment and Sustainability	-	-	-	-	-
PO8 Ethics	-	-	-	-	-
PO9 Individual and Team Work	-	-	-	-	-
PO10 Communication	-	-	-	-	-
PO11 Project Management and Finance	-	-	-	-	-
PO12 Life-long Learning	1	2	1	2	2

CO\PSO MATRIX

CO \ PSO	PSO1(Analog Circuit Design)	PSO2(Digital Logic & Devices)
CO1	3	2
CO2	3	1
CO3	2	3
CO4	3	1
CO5	3	2

Reference Books –

- M D Singh & K B Khanchandani, “Power Electronics”, Tata McGraw-Hill
- P S Bimbhra, “Power Electronics”, Khanna Publications
- Anandkumar, “Fundamentals of Digital Circuits”, PHI
- Albert Malvino & David, “Electronic Principles”, Tata McGraw-Hill, Seventh edition

List of Practical –

- Identification and testing of electronic components
- To study the diode V-I characteristics
- To study half wave and full wave diode rectifier with and without LC filter circuits



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Program Name: Engineering

Level: Degree

Branch: Electrical Engineering

Subject Code: BE100105

Subject Name : Basic Electronics

- To Study Transistor Input/Output Characteristics in CE, CB, CC Configuration
- To study V-I characteristics of Zener Diode with Graph
- To Study Positive and Negative Clipper (Diode application in Clipper circuit)
- To plot the V-I Characteristics of the solar cell and hence determine the fill factor
- To perform the functions of the logic gates



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: Diploma

Course/ Subject Code: DE104101

Course/Subject Name: PYTHON PROGRAMMING

w.e.f.Academic Year:	2022-23
Semester:	1 st Semester/ 1 st Year
Category of the Course:	Engineering Science

Prerequisite:	Basic knowledge of school-level English grammar and vocabulary., Ability to read and write in English., Willingness to improve communication skills.
Rationale:	The objective of this course is to strengthen students' proficiency in English communication skills — verbal and written — for effective professional and academic interactions. It aims to: Develop strong vocabulary, grammar, and phonetic understanding. Enhance listening, speaking, reading, and writing (LSRW) skills. Prepare students for interpersonal communication, interviews, and workplace interactions using effective verbal and non-verbal cues. Introduce students to computer-assisted tools for professional correspondence and presentations.

Teaching and Examination Scheme:

Teaching Scheme(in Hours)			Total Credits L+T+(PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial/Practical		
				(E)	(M)	(I)	(V)	
2	0	2	3	60	40	30	20	150

Course Content:

Unit No.	Content	No. of Hours	% of Weight age
1.	Vocabulary building: Introduction to Word Formation, Types of word formation processes: compounding, clipping, blending, derivation, creative respelling, coining and borrowing Acquaintance with prefixes and suffixes Synonyms, antonyms, and standard abbreviations.	6	18
2.	Identifying Common Errors in Writing: Tenses, Subject-verb agreement, Noun pronoun agreement, Misplaced modifiers, Articles, Prepositions, Modal Auxiliaries, Redundancie	6	18



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: Diploma

Course/ Subject Code: DE104101

Course/Subject Name: PYTHON PROGRAMMING

3.	Listening Skills: Hearing Vs listening, process of listening, types, Barriers to Listening, Qualities of a Good Listener and Active Vs Passive Listening.	2	6
4.	Telephone Skills : Telephonic Communication: Do's and Don'ts	1	3
5.	Phonetics: IPA Transcription Introduction to different accents	4	13
6	Basic Writing Skills: Sentence Structures, Use of phrases and clauses in sentences, Importance of proper punctuation, Creating coherence, Organizing principles of paragraphs in documents	4	13
7	Speaking Skills: Introducing yourself, Describing a person, place, situation and event, Giving instruction, Making inquiries – at a bank, post- office, air-port, hospital, reservation counter and role play	4	13
8	Non-verbal Communication and Body Language: Forms of Non-verbal communication; Kinesics; Proxemics; Chromatics and Effective use of body language.	3	10
9	Computer Assisted Language Learning: Effective e-mail messages and power-point presentation.	2	6
Total		32	100

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
49	28	23	-	-	-

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: Diploma

Course/ Subject Code: DE104101

Course/Subject Name: PYTHON PROGRAMMING

Course Outcome:

After Completion of the Course, Student will able to:

CO No.	Course Outcomes	RBT Level
CO1	Apply word formation rules and use correct vocabulary in context.	Apply
CO2	Identify and correct common grammatical errors in writing.	Understand
CO3	Demonstrate listening and telephonic communication skills effectively.	Apply
CO4	Understand and use phonetics and non-verbal communication effectively.	Understand
CO5	Develop writing and speaking skills for workplace and academic communication.	Apply

Course Outcome to Programme Outcome (CO-PO) Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	2	-	-	-	2	3	-	-
CO2	3	-	-	-	2	-	-	-	-	3	-	-
CO3	2	-	-	-	3	-	-	-	2	3	-	-
CO4	2	-	-	-	2	-	-	-	2	3	-	-
CO5	3	-	-	-	3	-	-	-	3	3	-	-

CO-PSO Mapping

(Assuming general PSOs related to communication and soft skills in an engineering context)

CO \ PSO	PSO1: Professional Communication Skills	PSO2: Use of English in Engineering Context
CO1	3	2
CO2	3	2
CO3	3	2
CO4	3	2



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: Diploma

Course/ Subject Code: DE104101

Course/Subject Name: PYTHON PROGRAMMING

CO \ PSO	PSO1: Professional Communication Skills	PSO2: Use of English in Engineering Context
CO5	3	3

Reference Books -

1. Technical English, Dr. M. Hemamalini, Wiley. 2014
2. Remedial English Grammar, F.T. Wood, Macmillan. 2007
3. Oxford Language Reference, (Indian Edition) OUP
4. Communication Skills, Sanjay Kumar and Pushp Lata, Oxford University Press. 2011
5. The Study of Language, George Yule, CUP, 4th Edition. 2010
6. Spoken English, R K Bansal and J B Harrison, Orient Longman. 2013
7. Muralikrishna C., Sunita Mishra "Communication Skills for Engineers" 2nd edition, Pearson, New Delhi 2010
8. Loughheed Lin, "Business Correspondence: A Guide to Everyday Writing", Longman, Pearson Education, Inc, 2003

List of Practical –

Activity type

1. Word Formation
2. Communication at Workplace
3. Functional Grammar Practice and Test
4. Listening Comprehension
5. Technical Report writing
6. Reading Comprehension
7. E-mail Writing
8. Presentation Practice



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: Degree

Subject Code: BE100108

Subject Name: Mathematics - 2

w. e. f. Academic Year:	2024-25
Semester:	Ist Year (Sem – 2)
Category of the Course:	Basic Science Course

Prerequisite:	Calculus, fourier series.
Rationale:	To compute line integrals, solution techniques of higher order ordinary differential equations, fourier integral representation.

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
3	2	0	5	60	40	NA	NA	100

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Vector Calculus: Parametric equation of curve, Arc length of curve, Vector fields and applications, Line integrals, Potential functions, Fundamental theorem of line integral, Conservative fields, Exact differential forms, Divergence, curl, Green's theorem, Stoke's theorem	8	20
2.	Laplace transform, Inverse laplace transform, 1st Shifting theorem, 2nd shifting theorem, transforms of derivatives and integrals, Laplace transform of periodic functions, Convolution, Integral equation, ODEs with variable coefficient, Fourier integral, Fourier sine integral, Fourier cosine integral	10	20
3.	First ODEs, Exact, Linear equation, Bernoulli's equation, Linear equation, Equation not for first degree: soluable for P, X and Y	6	14



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: Degree

Subject Code: BE100108

Subject Name: Mathematics - 2

4.	Higher Order ODEs, Homogeneous linear ODEs, Homogeneous linear ODEs with constant coefficient, Existence and uniqueness of solution, Linear dependence and Independence of solution, Wronskian method, Non homogeneous ODEs, Solution by variation of parameter, Method of undetermined coefficient.	12	26
5.	Series solutions of ODEs, Special function, Power series method, Frobenius method, Legendre's equation, Bessel's equation, Bessel function of first kind, Legendre polynomials.	6	20
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
25	30	30	15	-	-

(Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy))

Course Outcome:

After Completion of the Course, Student will able to:

Sr. No.	Course Outcomes	RBT Level
1	To apply mathematical tools needed in evaluating vector calculus and their usage like Work, Circulation and Flux.	Apply
2	To apply the Laplace transform as tools which are used to solve differential equations and Fourier integral representation.	Apply
3	To apply effective mathematical tools for the solutions of first order ordinary differential equations.	Apply
4	To apply effective mathematical methods for the solutions of higher order ordinary differential equations.	Analyze
5	To use series solution methods and special functions like Bessel's functions.	Understand

CO-PO MAPPING

PO (with Description) /CO	CO1	CO2	CO3	CO4	CO5
PO1 – Engineering knowledge	3	3	3	3	3
PO2 – Problem analysis	2	3	3	2	2



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: Degree

Subject Code: BE100108

Subject Name: Mathematics - 2

PO3 – Design/development of solutions	1	2	2	2	1
PO4 – Conduct investigations	1	2	1	2	2
PO5 – Modern tool usage	1	2	1	1	2

CO-PSO MAPPING

PSO (with Description)	CO1	CO2	CO3	CO4	CO5
PSO1 – Apply basic mathematical and scientific knowledge to model and solve problems.	3	3	3	3	3
PSO2 – Analyze and apply mathematical techniques in engineering systems.	2	3	3	2	3

References Books:

- Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley and Sons.
- Peter O'Neill, Advanced Engineering Mathematics, 7th Edition, Cengage.
- Dennis G. Zill, 4th edition, Advanced Engineering Mathematics, 4th Edition, Jones and Bartlett Publishers.
- Maurice D. Weir, Joel Hass, Thomas' Calculus, Early Transcendentals, 13e, Pearson, 2014.
- Howard Anton, Irl Bivens, Stephens Davis, Calculus, 10e, Wiley, 2016.

Open Source:

- Scilab, MIT Open Course ware.



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Course / Subject Code: BE100109

Course / Subject Name: Programming for Problem Solving

w. e. f. Academic Year:	2022-23
Semester:	1 st
Category of the Course:	Engineering Science (ESC)

Prerequisite:	<ul style="list-style-type: none"> • Basic Computer Skills • Logical Thinking and Problem-Solving Abilities • Understanding of mathematical logic and problem-solving strategies
Rationale:	The "Programming for Problem Solving" course is a foundational skill that significantly enhances an engineer's problem-solving abilities, career prospects, and capacity for innovation. Integrating programming into the curriculum ensures that engineering programs prepare students to meet the challenges of the modern technological landscape and contribute effectively to their respective fields.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT level
1	Identify fundamental programming constructs such as variables, data types, operators, expressions, control structures, functions and basic data structures	Remember
2	Explain the principles of programming and software development, including the structure and operation of algorithms, flowcharts, and pseudocode.	Understand
3	Develop simple programs using appropriate data structures and standard libraries.	Apply
4	Apply programming constructs such as loops, conditional statements, and functions to solve basic engineering problems.	Apply
5	Debug and troubleshoot programming errors by systematically testing and refining code.	Analyze

CO PO MAPPING												
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	2	-	-	-	-	-	-	-	-	-
CO3	3	3	3	2	-	-	-	-	-	-	-	-
CO4	3	3	3	2	1	-	-	-	-	-	-	-
CO5	3	3	3	3	2	-	-	-	-	-	-	-

CO PSO MAPPING		
COs	PSO1 (Programming Skills)	PSO2 (Problem Solving)
CO1	3	2
CO2	3	2
CO3	3	3
CO4	3	3
CO5	3	3

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				(E)	(M)	(I)	(V)	
2	0	4	4	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Introduction to Computer and Programming: Introduction, Basic block diagram and functions of various components of computer, Concepts of Hardware and software, Types of software, Compiler and interpreter, Concepts of Machine level, Assembly level and high level programming, Flowcharts and Algorithms.	5	10
2.	Basics of 'C' Programming: Introduction to C, Constants, Variables & Data Types in C. Managing input and output Operators.	3	10
3.	C Operators: Arithmetic, Relational, Logical, Increment & Decrement, Assignment and Conditional Operators. Arithmetic Expressions and Precedence rules, Type Conversion in C, Mathematical function in C	4	10
4.	Control Structure in C: Decision making and Branching: if and if...else statement, nested and ladder if...else, conditional operator, switch statement, goto statement. Decision making and Looping: while, do...while, and for loops, nested loops, break and continue statements.	6	10
5.	Fundamentals of Arrays: Introduction to Arrays, Array Terminology and types of Arrays, Characteristics of Array, Array declaration, Array initialization, Accessing array elements, Sorting/Searching operations on array elements, Two dimensional & multi-dimensional array declaration and initialization,	5	10
6.	String: String manipulation operation using arrays, Built in String functions.	2	10

7	User-defined Functions: Function prototype and function declaration, function definition, function call, actual and formal parameters/arguments, return type and return statement, Nested function call, Recursion.	6	10
8	Control Structures: Defining structure, declaring and initializing structure variables, nested and accessing if structure conditional operator, copying with compound goto statement, Decision making and Looping: while, do-while, and for loops and nested loops, break and continue statements.	5 4	10 10
10.	Fundamentals of Arrays: Introduction to Arrays, Array Terminology and types of Arrays, Characteristics of Array, Array declaration, Array initialization, Accessing array elements, Sorting/Searching operations on array elements, Two dimensional & multi-dimensional array declaration and initialization,	4	10
Total		44	100

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	40	40	-	-	-

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Programming with C by Byron Gottfried, 3rd Ed., McGraw Hill Education
2. The C Programming Language by Kernighan and Ritchie, 2nd Ed., PHI Learning
3. Expert C Programming: Deep C Secrets by Peter Van Der Linden, Pearson Education
4. Let Us C by Yashvant Kanetkar, 12th Ed., BPB Publication • Programming in C by Ashok N. Kamthane, 2nd Ed., Pearson Education.
5. Programming with C, Second edition, by Gottfried, Tata McGraw-Hill Publishing Company Limited.

(b) Open source software and website:

1. OnlineGDB : GDB online Debugger | Compiler - Code, Compile, Run, Debug online C, C++ (onlinegdb.com)
2. Compiler Explorer (Godbolt): Compiler Explorer (godbolt.org)
3. JDoodle: JDoodle - Free online cloud coding platform IDE to practice, teach and learn programming

Suggested Course Practical List:

1. Write a program to print HELLO FRIENDS!
2. Write a program that reads two nos. from key board and gives their addition, subtraction, multiplication, division and modulo.
3. Write a program to select & print the largest of the three nos. using Nested-If-Else statement.
4. Write a program to display multiplication table.
5. Write a program to print $1+1/2+1/3+1/4+\dots+1/N$ series.
6. Write a program to find sum of all integers greater than 100 & less than 200 and are divisible by 5.
7. Write a program to find sum of first N odd numbers.

8. Program to print Patterns.

```
*  
* *  
* * * *
```

9. Program to print Patterns

```
AAAAA  
BBBBB  
CCCC  
DD  
E
```

10. Write a program to print Fibonacci series.

a. 1,1,2,3,5,.....N

11. Write a program to reverse the digit.

12. Add, subtract and multiply two nos. using switch statement.

13. Write a program to add two matrixes.

14. Write a program to given no in ascending order.

15. Write a program to count total words in text.

16. Write a program to copy one string to another string.

17. Write a program convert character into Toggle character.

18. Find given string is palindrome or not using string library Function.

19. Write a function find out maximum out of three numbers.

20. Write a program that used user defined function Swap () and interchange the value of two variable.

21. Write a calculator program (add, subtract, multiply, divide). Prepare user defined function for each functionality.

22. Write a function to enter roll no, marks of the three subjects for 3 students and find total obtained by each student.

23. Write a program using pointer to read an array of integer and print element in reverse order.

24. Write a program to store a character string in block of memory space created by malloc and then modify the same to store a large string.

List of Laboratory/Learning Resources Required:

1. Computer System/Laptop with latest configurations.
2. Internet Connectivity

Suggested Project List:

1. Rock Paper Scissors Game
2. Simple Calculator
3. Bank Management System
4. Tic Tac Toe
5. Library Management System

* * * * *



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: BE

Course/ Subject Code: BE100111

Course/Subject Name: Environmental Science

w.e.f.Academic Year:	2022-23
Semester:	1 st Semester/ 1 st Year
Category of the Course:	Engineering Science

Prerequisite:	Interest in natural systems sustaining the life on the earth..
Rationale:	To inculcate the environmental values translating into pro-conservation actions. Honorable Supreme Court of India has made it 'mandatory' to introduce a basic course on environment at the undergraduate level.

Teaching and Examination Scheme:

Teaching Scheme(in Hours)			Total Credits L+T+(PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial/Practical		
				(E)	(M)	(I)	(V)	
2	2	0	4	60	40	NA	NA	150

Course Content:

Unit	Content	Hours	% Weightage
1	INTRODUCTION TO ENVIRONMENT Definition, principles and scope of Environmental Science. Impacts of technology on Environment, Environmental Degradation, Importance for different engineering disciplines	2	5
2	ENVIRONMENTAL POLLUTION Water Pollution: Introduction – Water Quality Standards, Sources of Water Pollution, Classification of water pollutants, Effects of water pollutants Air Pollution: Composition of air, Structure of atmosphere, Ambient Air Quality Standards, Classification of air pollutants, Sources of common air pollutants like PM, SO ₂ , NO _x , Auto exhaust, Effects of common air pollutants Noise Pollution: Introduction, Sound and Noise, Noise measurements, Causes and Effects Solid Waste: Generation and management Bio-medical Waste: Generation and management	14	30



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: BE

Course/ Subject Code: BE100111

Course/Subject Name: Environmental Science

	E-waste: Generation and management		
3	GLOBAL ENVIRONMENTAL ISSUES Sustainable Development, Climate Change, Global Warming and Green House Effect, Acid Rain, Depletion of Ozone layer, Carbon Footprint, Cleaner Development Mechanism (CDM), International Steps for Mitigating Global Change	6	20
4	BASIC CONCEPT OF GREEN BUILDING AND SMART CITIES Green Building: Introduction, Objectives, Fundamental Principles, Benefits of Green Building, Examples of Green Building Smart Cities: Concept	4	20
5	CONCEPT OF 4R's Principles, Application of 4R's	2	5
		14	100

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
15	25	15	20	15	10

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT level
1	Explain the principles, scope, and importance of environmental science..	Apply
2	Identify different types of pollution and their sources, impacts, and preventive measures.	Apply
3	Describe solid, biomedical, and electronic waste generation and their	Apply



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: BE

Course/ Subject Code: BE100111

Course/Subject Name: Environmental Science

	management techniques.	
4	Analyze global environmental issues like climate change, acid rain, ozone depletion, and sustainability..	Apply
5	Understand the principles and benefits of green buildings and smart cities.	Apply

Course Outcome to Programme Outcome (CO-PO) Mapping

CO-PO Mapping					
PO \ CO	CO-1	CO-2	CO-3	CO-4	CO-5
PO-1 Basic Engg Knowledge	3		2	2	1
PO-2 Problem Analysis	2	2	1	1	3
PO-3 Design/Development		1	2	1	-
PO-4 Investigations	-	-	-	2	1
PO-5 Modern Tool Usage	1	-	-	1	2
PO-6 Engineer & Society	2	3	3	3	2
PO-7 Environment & Sustainability	2	3	3	3	2
PO-8 Ethics	1	2	1	2	1
PO-9 Individual & Team Work	-	-	-	-	-
PO-10 Communication	-	1	-	1	-
PO-11 Project Management	1	-	1	-	1
PO-12 Lifelong Learning	1	1	2	2	2
CO-PSO Mapping					
PSO \ CO	CO-1	CO-2	CO-3	CO-4	CO-5
PSO-1 Design Skills))	1	1	1	1	2
PSO-2 Analytical Ability)	2	3	2	3	2
PSO-3 Software/Tool Uss)	-	-	1	2	1

Reference Books –



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: BE

Course/ Subject Code: BE100111

Course/Subject Name: Environmental Science

- Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha Second edition, 2013 Publisher: Universities Press (India) Private Ltd, Hyderabad.
- Basics of Environmental Studies by Prof Dr N S Varandani ,2013 Publisher: LAP -Lambert Academic Publishing , Germany
- Environmental Studies by Anindita Basak ,2009 Publisher: Drling Kindersley(India)Pvt. Ltd Pearson
- Textbook of Environmental Studies by Deeksha Dave & S S Kateva , Cengage Publishers.
- Environmental Sciences by Daniel B Botkin & Edward A Keller Publisher: John Wiley & Sons.
- Environmental Studies by R. Rajagopalan, Oxford University Press
- Environmental Studies by Benny Joseph, TMH publishers
- Environmental Studies by Dr. Suresh K Dhameja, 2007 Published by : S K Kataria & Sons New Delhi
- Basics of Environmental Studies by U K Khare, 2011 Published by Tata McGraw Hill

List of Tutorial –

- Introduction to Environment
- Water Pollution
- Air Pollution
- Noise Pollution
- Solid Waste
- Bio-medical Waste
- E-waste
- Global Environmental Issues
- Concept of Green Building
- Concept of Smart Cities
- Concept of 4R's



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Course/ Subject Code: BE100112

Course/Subject Name: Engineering Graphics & Design

w.e.f.Academic Year:	2022-23
Semester:	1 st Semester/ 1 st Year
Category of the Course:	Engineering Science

Prerequisite:	Zeal to learn the subject
Rationale:	Engineering Drawing is an effective language of engineers. It is the foundation block which strengthens the engineering & technological structure. Moreover, it is the transmitting link between ideas and realization

Teaching and Examination Scheme:

Teaching Scheme(in Hours)			Total Credits L+T+(PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial/Practical		
				(E)	(M)	(I)	(V)	
2	0	4	4	60	40	30	20	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Introduction to Engineering Graphics: Drawing instruments and accessories, BIS – SP 46. Use of plane scales, Diagonal Scales and Representative Fraction.	*	10
2.	Engineering Curves: Classification and application of Engineering Curves, Construction of Conics, Cycloidal Curves, Involute and Spirals	*	10
3.	Projections of Points and Lines: Introduction to principal planes of projections, Projections of the points located in same quadrant and different quadrants, Projections of line with its inclination to one reference plane and with two reference planes. True length and inclination with the reference planes.	4	20



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Course/ Subject Code: BE100112

Course/Subject Name: Engineering Graphics & Design

4.	Projections of Planes: Projections of planes (polygons, circle and ellipse) with its inclination to one reference plane and with two reference planes	2	20
5.	Projections of Solids, Section of Solids: Classification of solids. Projections of solids (Cylinder, Cone, Pyramid and Prism) along with frustum with its inclination to one reference plane and with two reference planes, Section of such solids and the true shape of the section.	6	20
6.	Orthographic Projections: Fundamental of projection along with classification, Projections from the pictorial view of the object on the principal planes for view from front, top and sides using first angle projection method and third angle projection method, full sectional view.	3	20
7.	Computer Aided Drawing: Introduction to AutoCAD, Basic commands for 2D drawing like : Line, Circle, Polyline, Rectangle, Hatch, Fillet, Chamfer, Trim, Extend, Offset, Dim style, etc.	*	

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
25	30	30	15	-	-

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

Course Outcomes:

No.	Course Outcomes	RBT Level
CO1	Apply the conventions and the methods of engineering drawing and interpret engineering drawings.	Application
CO2	Construct basic and intermediate geometry and comprehend the theory of projection.	Application
CO3	Dissect the objects in three dimensions with different orientation.	Analyze



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Course/ Subject Code: BE100112

Course/Subject Name: Engineering Graphics & Design

No.	Course Outcomes	RBT Level
CO4	Make use of computer software for engineering drawings.	Application



Course Outcome to Programme Outcome (CO-PO) Mapping

CO-PO Mapping:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	2	-	-	-	-	2	-	-
CO2	3	2	-	-	2	-	-	-	-	-	-	-
CO3	3	3	2	-	2	-	-	-	-	-	-	-
CO4	2	-	-	-	3	-	-	-	-	-	-	-

CO-PSO Mapping;

CO\PSO	PSO1 (Fundamentals & Principles)	PSO2 (Software Skills & Tools)	PSO3 (Design Interpretation & Communication)
CO1	3	-	2
CO2	3	-	2
CO3	3	-	3
CO4	2	3	2



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Course/ Subject Code: BE100112

Course/Subject Name: Engineering Graphics & Design

References/Suggested Learning Resources:

(a) Books:

1. A Text Book of Engineering Graphics by P.J.Shah S.Chand & Company Ltd., New Delhi.
2. Elementary Engineering Drawing by N.D.Bhatt Charotar Publishing House, Anand.
3. A text book of Engineering Drawing by R.K.Dhawan, S.Chand & Company Ltd., New Delhi.
4. A text book of Engineering Drawing by P.S.Gill, S.K.Kataria & sons, Delhi.
5. Engineering Drawing by B. Agrawal and C M Agrawal, Tata McGraw Hill, New Delhi.

(b) Open-source software and website:

1. AutoCAD

Suggested Course Practical List:

Students must prepare sketch book and drawing sheets on the following topics.

1. Practice sheet (which includes dimensioning methods, different types of line, construction of different polygon, divide the line and angle in parts, use of stencil) – 2 Hrs.
2. Plane scale and diagonal scale – 2 Hrs.
3. Engineering curves- 4 Hrs.
4. Projection of point and line – 4 Hrs.
5. Projection of plane – 4 Hrs.
6. Projection of solid, section of solid - 4 Hrs.
7. Orthographic projection – 6 Hrs.
8. At least one orthographic drawing (three views) using above mentioned AutoCAD commands. – 4 Hrs.

List of Laboratory/Learning Resources Required:

Suggested Project List:

1. Students must prepare at least one model using cardboard/paper to understand the fundamentals of topic no. 1 to 6. This project work will be considered for practical evaluation.



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: DEGREE

Course/ Subject Code: BE100112

Course/Subject Name: Engineering Graphics & Design



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Course/ Subject Code: BE100115

Course/Subject Name: PHYSICS (GROUP 2)

w.e.f.Academic Year:	2022-23
Semester:	1 st Semester/ 1 st Year
Category of the Course:	Basic Science

Prerequisite:	Basic understanding of math's, physics course on Differentiate equations
Rationale:	The basic science - physics program is to prepare students for careers in engineering where physics principles can be applied to the advancement of technology. To make the students in understanding the importance of mechanics, understanding the importance of quantum physics.

Teaching and Examination Scheme:

Teaching Scheme(in Hours)			Total Credits L+T+(PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial/Practical		
				(E)	(M)	(I)	(V)	
3	0	2	4	60	40	30	20	150

Course Content:

Unit No.	Content	No. of Hours	% of Weight age
1.	Electronic Materials: Free Electron Theory, Energy Diagram, Density Of States, Introduce Origin Of Band Gap In Solid, Direct Gap And Indirect Gap, Type Of Electronic Material, Occupation Probability, Fermi Level, Phonons.	9	20
2.	Semiconductors: Intrinsic And Extrinsic Semiconductors, Dependence Of Fermi Level On Carrier Concentration And Temperature, Diffusion And Drift, P-N Junction, metal semiconductor junction, optoelectronic devices.	9	20
3.	Measurements: Four Point Probe and VAN DER PAUW Measurements For Carrier Density, Resistivity, Hot-Point Probe Measurement, Measurement Of Voltage, Electric Current, Capacitances	8	18



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Course/ Subject Code: BE100115

Course/Subject Name: PHYSICS (GROUP 2)

4.	Superconductivity Introduction Of Superconductivity, Magnetic, Meissner, Pressure, Impurity, Isotopic Mass Effect, Bcs Theory, Penetration Depth, Josephson's Junction, Application of Superconductors	6	16
5.	Light-Semiconductor Interaction: Absorption, Spontaneous Emission, And Stimulated Emission, Joint Density Of States, Density States For Photons, Fermi's Golden Rule, Photovoltaic Effect, Drude Model.	10	24
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
23	28	49	-	-	-

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

Course Outcomes (COs)

After completion of this course, the student will be able to:

CO No.	Course Outcomes	RBT Level
CO1	Understand the principles of electronic materials and their energy band structure.	Understand
CO2	Explain the working of semiconductors and their application in devices.	Understand
CO3	Perform measurements related to electrical properties using various instruments.	Apply
CO4	Explain the concepts and applications of superconductivity.	Understand
CO5	Interpret the interaction of light with semiconductors and its relevance to modern devices.	Analyze



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Course/ Subject Code: BE100115

Course/Subject Name: PHYSICS (GROUP 2)

CO-PO Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	1	-	-
CO2	3	2	-	-	-	-	-	-	-	1	-	-
CO3	3	3	2	2	2	-	-	-	-	2	-	1
CO4	3	2	-	-	-	-	-	-	-	1	-	-
CO5	3	3	2	2	1	-	-	-	-	2	-	1

CO-PSO Mapping (Assuming general PSOs for Engineering Physics)

CO \ PSO	PSO1: Application of physics in engineering domains	PSO2: Ability to use physical principles for measurements and analysis
CO1	3	-
CO2	3	-
CO3	2	3
CO4	3	-
CO5	3	2

Reference Books –

- ☐ Engineering Physics; G. Vijayakumari, Vikas Publication House Pvt. Ltd., New Delhi.
- ☐ Engineering Physics by Dattu R Joshi, McGraw hill Publications
- ☐ Engineering Physics by Shatendra Sharma & Jyotsan Sharma, Pearson Publication
- ☐ R.Kolenkow D.Kleppner and. An Introduction to Mechanics. McGraw Hill Education, 2017.
- ☐ D.Halliday, R.Resnick and J.Walker. Principles of Physics. John Wiley & Sons, 2015.
- ☐ Modern Engineering Physics; A.S. Vasudeva, S. Chand & Company Ltd, New Delhi.



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Course/ Subject Code: BE100115

Course/Subject Name: PHYSICS (GROUP 2)

- ☐ A Textbook of Engineering Physics; S. Chand and Company Ltd, New Delhi.
- ☐ Applied Physics for Engineers, Neeraj Mehta, PHI Learning Private Ltd., New Delhi.

List of Practical –

- ☐ Check superconductivity of different material.
- ☐ Measure resistance and voltage.
- ☐ Measure capacitance in series and parallel connection.
- ☐ Stress and strain diagram of superconductor.
- ☐ Superconductivity of different material at different temperature.
- ☐ Use of Multimeter.
- ☐ Energy absorption diagram of different material.



Swaminarayan University

Teaching & Examination Scheme
Course – Faculty of Engineering (Degree)
Branch – Information Technology
Semester – 1st

Subject Code	Subject Name	Category	L	T	P	Total Credit	E	M	I	V	Total Marks
BE100101	Mathematics - 1	Basic Science	3	2	0	5	60	40	0	0	100
BE100112	Engineering Graphics & Design	Engineering Science	2	0	4	4	60	40	20	30	150
BE100104	Basic Electrical Engineering	Engineering Science	3	0	2	4	60	40	20	30	150
BE100109	Programming for Problem Solving	Engineering Science	3	0	2	4	60	40	20	30	150
BE100115	Physics (Group - 2)	Basic Science (Elective)	3	0	2	4	60	40	20	30	150
BE100114	Chemistry	Basic Science (Elective)	3	0	2	4	60	40	20	30	150
BE100113	Induction Program	Mandatory	0	0	0	0	0	0	0	0	0
	Total		14	2	10	21					

L=Lecture, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External



Swaminarayan University

Teaching & Examination Scheme

Course – Faculty of Engineering (Degree)

Branch – Information Technology

Semester – 2nd

Subject Code	Subject Name	Category	L	T	P	Total Credit	E	M	I	V	Total Marks
BE100108	Mathematics - 2	Basic Science	3	2	0	5	60	40	0	0	100
BE100102	Basic Mechanical Engineering	Engineering Science	3	0	2	4	60	40	20	30	150
BE100106	English	Humanities and Social Science	2	0	2	3	60	40	20	30	150
BE100105	Basic Electronics	Engineering Science	3	0	2	4	60	40	20	30	150
BE100110	Engineering Workshop	Engineering Science	0	0	4	2	0	0	20	80	100
BE100111	Environmental Science	Mandatory	2	2	0	0	60	40	0	0	100
	Total		13	4	10	18					

L=Lecture, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External