



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



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

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



SWAMINARAYAN UNIVERSITY
Program Name: Engineering
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



SWAMINARAYANUNIVERSITY

Program Name: Engineering Level: Degree

Course/ Subject Code: BE100107

Course/Subject Name: Physics (Group - 1)

w.e.f. Academic Year:	2024-25
Semester:	2 nd Semester/ 1 st Year
Category of the Course:	Basic Science

Prerequisite:	Basic understanding of Calculus, Physics and Mathematics course on Differentiate equations
Rationale:	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	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weight age
1.	Properties of Matter: <ul style="list-style-type: none"> • Concept of Load, Stress and Strain • Hook's Law, • Stress-Strain Diagram • Ductility • Brittleness and Plasticity • Elastic behavior of solids • Working stress and factor of safety • Factors affecting elasticity • Types of Elasticity • Twisting couple on a cylinder or wire-shaft • Torsional Pendulum • Cantilever-Depression of Cantilever • Young's modulus by Cantilever, I-shape Griders • Viscosity and comparison of viscosities 	7	20
2.	Waves, Motion and Acoustics: <ul style="list-style-type: none"> • Simple Harmonic motion • Free, forced, resonance, damped and undamped vibration • Damped harmonic motion 	7	20



SWAMINARAYANUNIVERSITY

Program Name: Engineering Level: Degree

Course/ Subject Code: BE100107

Course/Subject Name: Physics (Group - 1)

	<ul style="list-style-type: none"> • Force vibration and amplitude resonance • Velocity resonance and energy intake • Wave motion, transverse and longitudinal vibration • Sound absorption and reverberation • Sabine's formula and usage (excluding derivation) • Acoustic of building 		
3.	Ultrasonic and Non destructive testing (NDT): <ul style="list-style-type: none"> • Ultrasonic waves • Properties of ultrasound • Production of ultrasonic waves: Piezoelectric and magnetostriction method • Detection of ultrasound • Application of ultrasound • Introduction of NDT • Advantages of NDT • NDT through ultrasound 	9	25
4.	Superconductivity: <ul style="list-style-type: none"> • Introduction of Superconductivity • Properties of superconductor • Effect of magnetic field • Meissner effect • Pressure effect • Impurity effect • Isotopic mass effect • Mechanism of Superconductivity: BCS Theory • Penetration depth : Magnetic field • Josephson's junction and its application • Application of superconductors 	6	15
5.	Lasers: <ul style="list-style-type: none"> • Properties of Laser • Einstein's theory of matter radiation: A and B coefficients • Amplification of light by population inversion • Different types of lasers • gas lasers (He-Ne) solid-state lasers(ruby) • Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles • Applications of lasers in science, engineering and medicine. 	7	20
Total		36	100



SWAMINARAYANUNIVERSITY

Program Name: Engineering Level: Degree

Course/ Subject Code: BE100107

Course/Subject Name: Physics (Group - 1)

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10%	20%	30%	15%	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	Understand properties of materials and elasticity.	
2	Analyze wave motion, resonance, and acoustics principles.	
3	Apply ultrasonic techniques and NDT in engineering.	
4	Explain superconductivity and related applications.	
5	Use lasers in science, engineering and medicine applications.	

Course Outcome to Program 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	3	3	3	3	
PO-2 Problem Analysis	2	2	3	2	2	
PO-3 Design/Development	2	-	2	-	3	
PO-4 Investigations	1	1	2	2	2	
PO-5 Modern Tool Usage	-	-	2	1	2	
PO-6 Engineer & Society	-	-	-	-	-	
PO-7 Environment & Sustainability	-	-	-	-	-	
PO-8 Ethics	-	-	-	-	-	
PO-9 Individual & Team Work	-	-	-	-	-	
PO-10 Communication	-	2	-	-	1	
CO-PSO Mapping						



SWAMINARAYANUNIVERSITY

Program Name: Engineering Level: Degree

Course/ Subject Code: BE100107

Course/Subject Name: Physics (Group - 1)

PSO \ CO	CO-1	CO-2	CO-3	CO-4	CO-5
PSO1 (Automobile Manufacturing Skills)	3	3	3	3	3
PSO2 (Design and Analysis)	-	2	3	2	3

References/Suggested Learning Resources:

(a) Books:

1. D. Kleppner and R. Kolenkow, An Introduction to Mechanics, McGraw Hill Education, 2017.
2. D. Halliday, R. Resnick and J. Walker, Principles of Physics, John Wiley & Sons, 2015.
3. M. N. Avadhanulu & P. G. Kshirsagar, A Textbook of Engineering Physics, S. Chand & Company Ltd., New Delhi.
4. Neeraj Mehta, Applied Physics for Engineers, PHI Learning Private Ltd., New Delhi.
5. G. Vijayakumari, Engineering Physics, Vikas Publication House Pvt. Ltd., New Delhi.
6. Dattu R. Joshi, Engineering Physics, McGraw Hill Publications.
7. Shatendra Sharma & Jyotsna Sharma, Engineering Physics, Pearson Publication.

(b) Open source software and website:

- NPTEL
- Syllabus contents videos

(C) Suggested Course Practical List:

1. Stress and strain diagram for different materials.
2. Use of Multimeter for electrical measurements.
3. Calculate the periodic time for a simple pendulum.
4. Determine Young's Modulus of materials using a suitable method.
5. Study of Damped Simple Harmonic Motion (SHM).



SWAMINARAYANUNIVERSITY

Program Name: Engineering Level: Degree

Course/ Subject Code: BE100107

Course/Subject Name: Physics (Group - 1)

6. Study of Forced Harmonic Vibration.
7. Testing of material using Ultrasonic Waves.
8. Check superconductivity of different materials.

(D) List of Laboratory/Learning Resources Required:

1. Universal Testing Machine (UTM) or Stress-Strain Apparatus – for drawing stress-strain diagrams of different materials.
2. Digital and Analog Multimeters – for measuring voltage, current, and resistance.
3. Pendulum Setup with Stopwatch / Timer – for calculating the periodic time of a pendulum.
4. Young's Modulus Experimental Setup – Cantilever apparatus, Searle's apparatus, or similar.
5. Damped SHM Apparatus – with sensors or mechanical damping components.
6. Forced Vibration Setup – with variable frequency driver and amplitude measuring tools.
7. Ultrasonic Flaw Detector / NDT Kit – for testing material using ultrasonic waves.
8. Superconductivity Kit or Cryostat with Materials (like YBCO) – for demonstrating superconductivity under liquid nitrogen.
9. Stopwatches, Weights, Meter Scales, Vernier Calipers, Micrometers – general lab equipment.
10. Safety Equipment – gloves, aprons, and eye protection especially for cryogenic or ultrasonic experiments

Suggested Project List:

1. Stress-Strain Behavior Analysis in Different Materials
2. Pendulum-Based Time Measurement Device
3. Acoustic Analysis of Classroom or Auditorium
4. Torsional Pendulum for Modulus of Rigidity Measurement
5. Ultrasonic Non-Destructive Testing (NDT) System



SWAMINARAYANUNIVERSITY

Program Name: Engineering Level: Degree

Course/ Subject Code: BE100107

Course/Subject Name: Physics (Group - 1)

6. Demonstration of Superconductivity and Meissner Effect
7. Laser-Based Security System
8. Laser Speckle Pattern Analysis for Surface Roughness
9. Young's Modulus Measurement Using Cantilever Method
10. Simulation of Damped and Forced Oscillations



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: 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

Teaching & Examination Scheme

Course – Faculty of Engineering (Degree)

Branch – Civil Engineering

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
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
BE100107	Physics (Group - 1)	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
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	12	19					

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