



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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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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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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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: 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



SWAMINARAYAN UNIVERSITY

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



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: Degree

Branch:Electrical Engineering

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



SWAMINARAYAN UNIVERSITY

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



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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



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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

Teaching & Examination Scheme

Course – Faculty of Engineering (Degree)

Branch – Electrical 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
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