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
				Theory		Tutorial / Practical		
L	T	PR	C	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 Polor 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 derivates, 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 changeand 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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Program Name: Engineering
Level: Degree
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Subject Name: Mathematics - 1

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

SWAMINARAYAN UNIVERSITY
Program Name: Engineering
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 courceware.

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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:	1st 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
				Theory		Tutorial / Practical		
L	T	PR	C	(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

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)

SWAMINARAYAN UNIVERSITY

Program Name: Engineering

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.

SWAMINARAYAN UNIVERSITY

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 stoke 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.

SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: BE

Course/ Subject Code: BE100103

Course/Subject Name: Basic Civil Engineering

w.e.f.Academic Year:	2022-24
Semester:	1st Semester/ 1stYear
Category of the Course:	**Engineering Science**

Prerequisite:	Basic understanding of science and mathematics at 12th standard level.
Rationale:	Rationale- This course introduces students to the fundamental aspects of civil engineering, materials used in construction, basic surveying, town planning, building services, and recent advancements. It lays a foundation for all subsequent civil engineering courses by familiarizing students with key concepts, materials, tools, and practices. It aims to develop awareness of the civil engineer's role in sustainable and smart infrastructure development.

Teaching and Examination Scheme:

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

Course Content:

Unit	Content	Hours	
1	**INTRODUCTION TO CIVIL ENGINEERING AND CIVIL ENGINEERING MATERIALS:** Introduction, Branches, Scope, Impact, Role of Civil Engineer, Units of measurement, Unit conversion (Length, Area, Volume). List of materials, Details (types, properties, uses) of materials: Cement, Aggregate, Brick, Steel, Concrete, Stone, Soil, Mortar, Timber, Plastic, Epoxy, Flyash, Steel slag, Copper slag, Bitumen, Optical fiber, Pipe, Wire, Cable, Smart material, Basic hand fill tests, FRP Water and waste water quality characteristics, drinking water standards, Road traffic, traffic control, traffic signals & Intersections.	**10**	**10**
2	**INTRODUCTION TO BUILDING AND TOWN PLANNING:** Definition and concept of plan of a simple residential building, Principles of planning, Elementary principles and basic requirements for building planning, elevation and section of a residential building. Principles of	**8**	**20**

	town planning, Necessity of town planning, Origin of town, Growth of town, Land use, Principles and objects of zoning, Advantages of zoning, Low cost housing, Prevention of slum, FSI.		
3	**BUILDING CONSTRUCTION AND BUILDING SERVICES** **Building Construction:** Types of building, Components of building & its functions, types of loads acting on building, Types of brick bonds, Typical building layout, Symbols used in electrical layout, Symbols used for water supply, plumbing and sanitation. Nominal dimensions for door, window and furniture. **Building Services:** Types of building services like plumbing & sanitation, water supply& drainage system, electricity, building finishes, HVAC.	**8**	**30**
4	**INTRODUCTION TO SURVEYING AND LEVELLING:** Introduction, Fundamental principles, Classification. **Linear measurement**: Instruments used, Chaining on plane ground, Offset, Ranging. **Angular measurement:** Compass-Instrument used Meridian, Bearing, and Local attraction. **Leveling:** Instrument used, Terminology, Types of leveling, and Methods of leveling, Introduction to contour **Modern tools:** Introduction to Theodolite, Total Station, Introduction to GPS, GIS & RS	**11**	**20**
5	**ADVANCEMENTS IN CIVIL ENGINEERING:** Smart city and it's features, Solid waste management systems, Mass Transportation systems-BRTS, Metro, Rain water harvesting systems, Watershed Management, Green building, Energy efficient building, Development of River fronts, Heritage structures & its conservations, Features of Earthquake resistant structures	**8**	**10**
6	Torsion of Prismatic Bars: Saint Venant's Method, Prandtl's Membrane Analogy, Torsion of Rectangular Bar, Torsion of Thin Walled Tubes.	**6**	**10**
		14	**100**

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**	**20**	**10**	**10**

SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: BE

Course/ Subject Code: BE100103

Course/Subject Name: Basic Civil Engineering

WhereR:Remember;U:Understanding;A:Application,N:AnalyzeandE:EvaluateC: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 the various branches and scope of civil engineering and identify the role of civil engineers.	Apply
2	Classify and describe various civil engineering materials and their properties.	Apply
3	Interpret and apply basic principles of building planning and town planning.	Apply
4	Identify types of building construction, services and understand their basic layout elements.	Apply
5	Explain basic concepts of surveying, levelling and use of modern surveying tools.	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	3	3	2	1
PO-2 Problem Analysis	2	2	1	1	3
PO-3 Design/Development	2	2	3	3	3
PO-4 Investigations	1	-	2	2	1
PO-5 Modern Tool Usage	1	-	1	1	-
PO-6 Engineer & Society	1	-	1	-	1
PO-7 Environment & Sustainability	1	-	1	-	-
PO-8 Ethics	-	-	-	-	-
PO-9 Individual & Team Work	-	1	1	-	1
PO-10 Communication	-	1	-	1	-

PO-11 Project Management	1	-	1	-	1
PO-12 Lifelong Learning	-	1	-	-	-
CO-PSO Mapping					
PSO \ CO	**CO-1**	**CO-2**	**CO-3**	**CO-4**	**CO-5**
PSO-1 Design Skills))	2	3	2	3	3
PSO-2 Analytical Ability)	1	2	2	1	2
PSO-3 Software/Tool Uss)	-	-	1	2	1

Reference Books –

- Surveying Vol. I Author: Dr. B. C. Punmia, Ashokkumar Jain, Arunkumar Jain17th Edition Publisher: Laxmi Publication Delhi .
- Surveying Vol. I Author: S. K. Duggal Publisher: Tata McGraw Hill Publication New Delhi.
- Elements of Civil Engineering Author: Dr. R.K. Jain and Dr. P.P. Lodha Publisher: McGraw Hill Education, India Pvt. Ltd.
- Building drawing Author: M.G.Shah, C.M.Kale and S.Y.Patki Publisher: Tata McGraw Hill
- Building Construction Author: Dr. B. C. Punmia, Ashokkumar Jain, Arunkumar Jain Publisher: Laxmi Pub. Delhi
- Engineering Material Author: S.C. Rangwala Publisher: Charotar Pub. House, Anand.
- Irrigation Engineering and Hydraulic Structures Author: Santoshkumar Garg Publisher: Khanna Publishers
- Highway Engineering Author: Khanna S. K. and Justo C. E.G. Publisher: Nemchand and Brothers.
- Basic Civil Engineering S. Ramamrutham Dhanpatrai Publication
- Basic Civil Engineering Satheesh Gopi Pearson Publisher

List of Practical–

- Unit conversation Exercise
- Chart preparation of various materials & Collection of rate and sample. (field visit)
- Components of building (field visit)
- Planning of a residential building(plan, elevation& section of simple 1 room)
- Assignment based upon town planning module
- Linear and angular measurements (Chain and Compass) (in field with instrument)
- Introduction to Theodolite & total station.
- Determine R.L of given point by Dumpy level. (in field with instrument)
- Assignment based upon estimation.(simple, 1 room only)

- Videos showing working of construction Equipment's
- Presentation on BRTS / mass transportation system (city bus)
- Seminar on green building & smart city Introduction to Environment

SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: Diploma

Course/ Subject Code: DE104101

Course/Subject Name: PYTHON PROGRAMMING

w.e.f.Academic Year:	2022-23
Semester:	1st Semester/ 1stYear
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
				Theory		Tutorial/Practical		
L	T	PR	C	(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

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**	-	-	-

WhereR:Remember;U:Understanding;A:Application,N:AnalyzeandE:EvaluateC: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. 1 Technical English, Dr. M. Hemamalini, Wiley. 2014
2. 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. Lougheed 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: UG

Course / Subject Code: BE100109

Course / Subject Name: Programming for Problem Solving

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

Prerequisite:	• 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
				Theory		Tutorial / Practical		
L	T	PR	C	(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 9.	**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. **Structures and Unions:** Defining structure, declaring and initializing structure variables, typedef, accessing structure members, copying and comparing structure variables, nested structures, arrays and structures, structures and functions, unions	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 YashvantKanetkar, 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 andgives their addition, subtraction, multiplication, division and modulo.
3. Write a program to select & print the largest of the threenos. 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+……+1/Nseries.
6. Write a program to find sum of all integers greater than100 & 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
BBBB
CCC
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 integerand 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

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Swaminarayan University

Teaching & Examination Scheme

Course – Faculty of Engineering (Degree)

Branch – Mechanical Engineering

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
BE100102	Basic Mechanical Engineering	Engineering Science	3	0	2	4	60	40	20	30	150
BE100103	Basic Civil 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
BE100109	Programming for Problem Solving	Engineering Science	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**	**8**	**20**					

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