



Swaminarayan

University

Teaching & Examination Scheme
Course – Faculty of Engineering (Degree)
Branch – Electrical Engineering
Semester – 5th

Subject Code	Subject Name	Category	L	T	P	Total Credit	E	M	I	V	Total Marks
BE100501	Contributor Personality Development Program	Personality Development (Elective)	2	0	0	2	60	40	20	30	150
BE100502	Integrated Personality Development Course		2	0	0	2	60	40	20	30	150
BE103502	Professional Ethics	Humanities and Social Science	3	0	0	3	60	40	0	0	100
BE105501	Signals and Systems	Professional Core	3	0	2	4	60	40	20	30	150
BE105502	Electrical Power System - 2	Professional Core	4	0	2	5	60	40	20	30	150
BE105503	Electrical Machine	Professional Core	4	0	2	5	60	40	20	30	150
BE103501	Python Programming	Open Elective - 1	2	0	2	3	60	40	20	30	150
BE105504	Disaster Management		3	0	0	3	60	40	0	0	100
BE101506	Operation Research		3	0	0	3	60	40	0	0	100

	Total		19	0	6	22					
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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 – Electrical Engineering

Semester – 6th

Subject Code	Subject Name	Category	L	T	P	Total Credit	E	M	I	V	Total Marks
BE100601	Contributor Personality Development Program	Personality Development (Elective)	2	0	0	2	60	40	20	30	150
BE100602	Integrated Personality Development Course		2	0	0	2	60	40	20	30	150
BE105601	Microprocessors and Microcontrollers	Professional Core	4	0	2	5	60	40	20	30	150
BE105602	Electrical Measurement and Measuring Instruments	Professional Core	4	0	2	5	60	40	20	30	150
BE105603	Energy Conservation	Professional Elective - 1	3	0	0	3	60	40	0	0	100
BE105604	Wind and Solar Energy		3	0	0	3	60	40	0	0	100
BE105605	Element of Electrical Design		3	0	0	3	60	40	0	0	100
BE105606	Electric Drives	Professional Elective - 2	3	0	2	4	60	40	20	30	150
BE105607	Inter Connected Power System		3	0	2	4	60	40	20	30	150
BE105608	HVDC Transmission Systems		3	0	2	4	60	40	20	30	150
BE105609	Electrical Materials	Open elective - 2	3	0	0	3	60	40	0	0	100
BE103609	Cyber Laws and Ethics		3	0	0	3	60	40	0	0	100

	Total		19	0	6	22					
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Swaminarayan University

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

Semester – 7th

Subject Code	Subject Name	Category	L	T	P	Total Credit	E	M	I	V	Total Marks
BE100701	Summer Internship	Project	0	0	0	2	0	0	20	80	100
BE105701	Switchgear and protective devices	Professional Core	4	0	2	5	60	40	20	30	150
BE105702	Machine Design	Professional Elective - 3	3	0	2	4	60	40	20	30	150
BE105703	Microcontrollers		3	0	2	4	60	40	20	30	150
BE105704	Power System stability and Control		3	0	2	4	60	40	20	30	150
BE105705	Advanced High Voltage Engineering	Professional Elective - 4	3	0	2	4	60	40	20	30	150
BE105706	Electrical Drives		3	0	2	4	60	40	20	30	150
BE105707	Advance FACTS Devices		3	0	0	3	60	40	0	0	100
BE105708	Digital Signal Processors	Professional Elective - 5	3	0	0	3	60	40	0	0	100
BE105709	Operation and Control in Power System		3	0	0	3	60	40	0	0	100
BE105710	Residential and Commercial Electrical Systems		3	0	0	3	60	40	0	0	100

BE105711	Industrial Instrumentation and Control	Open Elective - 3	2	0	2	3	60	40	20	30	150
BE105712	Fundamentals of IoT		2	0	2	3	60	40	20	30	150
	Total		15	0	8	21					

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



SWAMINARAYAN UNIVERSITY
Program Name: Engineering
Level: UG
Branch: Electrical Engineering
Subject Code: BE103501
Subject Name : Python Programming

w. e. f. Academic Year:	2024-25
Semester:	5TH
Category of the Course:	Open Elective 1

Prerequisite:	Basic understanding of programming concepts, logic building, and familiarity with any high-level language or computational thinking.
Rationale:	Python is general purpose programming language becomes very popular in last decade. In this age, every Electronics, Electrical and Computer engineers must learn Python Programming to build applications in their core domain. Python is becoming popular in artificial intelligence and machine learning. Micro Python is sub-set of Python Programming useful to port in hardware for embedded and IoT applications.

Teaching and Examination Scheme –

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

Detailed Syllabus –

Unit	Content	Hours	% Of Weight
1	Introduction, Data Types and Operators: Installation and working with Python, Variables and data types in python, Perform computations and create logical statements using Python's operators: Arithmetic, Assignment, Comparison, Logical, Membership, Identity, Bitwise operators, list, tuple and string operations.	06	20
2	Python Decision making and Loops: Write conditional statements using If statement, if ...else statement, elif statement and Boolean expressions, while loop, for loop, Nested Loop, Infinite loop, Break statement, Continue statement, Pass statement, Use for and while loops along with useful built-in functions to iterate over and manipulate lists, sets, and dictionaries. Plotting data, Programs using decision making and loops.	08	25



SWAMINARAYAN UNIVERSITY
Program Name: Engineering
Level: UG
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Subject Code: BE103501
Subject Name : Python Programming

3	Python Functions and Modules: Defining custom functions, Organizing Python codes using functions, Create and reference variables using the appropriate scope, Basic skills for working with lists, tuples, work with dates and times, get started with dictionaries, Importing own module as well as external modules, Programming using functions, modules and external packages	06	20
4	Python File Operations: An introduction to file I/O, use text files, use CSV files, use binary files, Handle a single exception, handle multiple exceptions, Illustrative programs, Exercises.	04	10
5	MicroPython: Introduction, main difference between MicroPython and Python, Installation of MicroPython on Hardware, MicroPython libraries, GPIO programming on MicroPython Hardware, Sensor Programming using MicroPython.	08	25
	Teaching Hours	32	100

Course Outcomes:

CO No	Course Outcome Description	RBT Level
CO1	To test and debug code written in python	Analyze
CO2	To create applications using Python Programming	Create
CO3	To perform file operations to read and write data in files	Apply
CO4	To write programs for general purpose I/O devices using MicroPython	Evaluate

CO\PO MATRIX

CO \ PO	CO1	CO2	CO3	CO4
PO1 Basic knowledge	3	3	3	3
PO2 Discipline knowledge	2	3	2	3
PO3 Experiments and practice	3	3	2	3
PO4 Engineering tools	2	2	1	2
PO5 The engineer and society	1	2	1	3
PO6 Environment and sustainability	-	-	-	-
PO7 Ethics	-	-	-	-
PO8 Individual and team work	-	-	-	-
PO9 Communication	1	2	1	2
PO10 Life-long learning	2	2	1	2



SWAMINARAYAN UNIVERSITY
Program Name: Engineering
Level: UG
Branch: Electrical Engineering
Subject Code: BE103501
Subject Name : Python Programming

CO\PSO MATRIX

CO \ PSO	PSO1(Apply knowledge of electrical engineering concepts, tools, and modern programming techniques like Python/MicroPython to design and analyze electrical/electronic systems.)	PSO2(Develop, test, and debug applications involving hardware-software integration using microcontrollers, sensors, and I/O interfacing for real-time embedded systems.
CO1	3	2
CO2	3	3
CO3	2	2
CO4	3	3

Reference Books –

- John V Guttag. “Introduction to Computation and Programming Using Python”, Prentice Hall of India
- Python Programming Fundamentals- A Beginner's Handbook by Nischay kumar Hegde
- Kenneth A. Lambert, “Fundamentals of Python – First Programs”, CENGAGE Publication
- Introduction to Python for Engineers and Scientists, By. Sandeep Nagar, Apress
- MicroPython for the Internet of Things (A Beginner’s guide to programming with Python on microcontrollers) By. Charles Bell, Apress

List of Practical –

- Write Python programs to understand control structures
- Write Python programs to understand list and tuples
- Use conditional statements and loops in Python programs
- Write python programs to create functions and use functions in the program
- Import module and use it in Python programs
- Write python program to plot data using PyPlot
- To become familiar with MicroPython and NodeMCU. Configure NodeMCU for MicroPython.
- Write program in MicroPython to send digital data on GPIO pins of NodeMCU and glow LED connected with NodeMCU or any other MicroPython supported board.
- Connect Digital/Analog I/O module with NodeMCU and write program to display temperature in MicroPython.



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Subject Name : Python Programming

- Connect NodeMCU with with WiFi Access Point and transmit data from NodeMCU to Cloud. Connect Digital/Analog I/O module with NodeMCU and send temperature and light data on cloud (Thingspeak, Firebase or any other cloud service)

Major equipment-

- NodeMCU boards or any other microcontroller board supporting MicroPython firmware
- Digital analog Input Output boards consisting LEDs, Switches, LDR, Temperature sensor, POT

List of Software/learning website-

- NPTEL Video lecture on Python Programming
- <https://www.coursera.org/learn/python-programming>
- Python Software
- Turtle - <https://docs.python.org/2/library/turtle.html>
- PyLab - <https://scipy.github.io/old-wiki/pages/PyLab>
- Anaconda software



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: Diploma

Branch: Electrical Engineering

Subject Code: BE100501

Subject Name : Contributor

Personality Development Program

w. e. f. Academic Year:	2024-25
Semester:	6TH
Category of the Course:	ELECTIVE

Prerequisite:	Basic understanding of self-awareness, motivation, and interest in developing personal and professional values.
Rationale:	This course is designed to transform the mindset of students from being just “workers” to becoming “contributors.” In today’s dynamic work environment, organizations seek individuals who go beyond task execution — those who take initiative, create value, and demonstrate ownership.

Teaching and Examination Scheme –

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

Detailed Syllabus –

Unit	Content	Hours	% Of Weight
1	The Contributor Work Ideal: In this topic, students explore what is their “ideal” of work – is the ideal to be a “worker” or to be a “contributor”? For example, an employee who has the ideal of a “worker” goes to work to pass time, earn a living, get benefits; in contrast to an employee with the ideal of a	7	16.7%



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: Diploma

Branch: Electrical Engineering

Subject Code: BE100501

Subject Name : Contributor

Personality Development Program

	“contributor” who wants to make a difference, get things done well, create value for the company. This enables students to transform their expectation of themselves in work		
2	Identity & Self-esteem: In this topic, students engage with the question “who am I?” or on what basis do they define themselves. Is their identity defined by what others think of them (extrinsic self-esteem) or by what they think of themselves (intrinsic self-esteem)? Further, they discover positive identities that lead to intrinsic self-esteem, such as an I-can identity based on one’s capacity and inner strength. This enables them to build confidence and self-esteem.	7	16.7%
3	Become a Creator of one’s destiny: In a “victim stance”, we see the career environment as full of difficulties and hurdles. We feel powerless or blame our circumstances for not having many opportunities. This makes us fearful of uncertainty and makes us settle for jobs where we remain mediocre. In this topic, students discover the “creator of destiny stance” to challenges and situations. This stance frees them to try out new things, open up new possibilities, take on responsibility, see the opportunity hidden in their environment.	7	16.7%
4	Achieving Sustainable Success: In this topic, students discover how to achieve sustainable or lasting success, by building one’s “engine of success”, making them success worthy. Where their focus shifts to building one’s “engine of success” Rather than being on chasing the “fruit of success”. This is important, because over a lifetime of work, all people go through ups and downs – where the fruits are not in their control. People who are focused on the fruit of success, fall	7	16.7%



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Subject Name : Contributor

Personality Development Program

	prey to disappointment, losing motivation, quitting too early, trying to find shortcuts – when fruits don't come. Whereas people focused on building their engine of success continue to contribute steadily, irrespective of whether fruits come or not. And with a strong engine of success, fruits come to them in time.		
5	Career Development Models: In this topic, students explore arrange of diverse “career development models” and the possibilities for contribution each opens up to them (e.g. start-up career model, change-maker career model, etc.). This opens their mind to different and even unconventional career models possible, beyond the usual (such as “stable large company career model” where one gets an engineering degree, then MBA, then get a job in a large company). This frees them from a herd mentality when making career choices.	7	16.7%
6	Expanding contribution in every role: In this topic, students explore the many roles they can play in their life & discover the power they have to expand the contribution possible in any role. (E.g. role of student, role of manager, role of a project site engineer). So, the potential of a role is in the individual's hands. This opens their mind to an alternative way of career growth.	7	16.7%
Teaching hours		42	100



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Subject Name : Contributor

Personality Development Program

Course Outcomes –

CO No.	Course Outcome	RBT Level
CO1	Recognize and appreciate two alternative ideals of work – “worker” vs “contributor”	Understand
CO2	Recognize and appreciate positive identities for building intrinsic self-esteem	Understand, Apply
CO3	Distinguish between “victim” stance and “creator of destiny” stance in facing challenges	Analyze, Evaluate
CO4	Differentiate between ‘building engine of success’ vs ‘chasing fruits of success’ for sustainable growth	Analyze
CO5	Explore and appreciate diverse career development models	Understand, Apply
CO6	Expand the contribution possible in any role and interpret experiences in terms of contribution	Apply, Evaluate

CO\PO MATRIX

CO \ PO	CO1	CO2	CO3	CO4	CO5	CO6
PO1 Basic knowledge	2	1	2	2	2	2
PO2 Discipline knowledge	-	-	2	2	-	2
PO3 Experiments and practice	-	-	-	1	-	1
PO4 Engineering tools	-	-	-	-	-	-
PO5 The engineer and society	-	-	-	-	-	-
PO6 Environment and sustainability	3	2	3	2	1	2
PO7 Ethics	-	-	-	-	-	-
PO8 Individual and team work	3	3	2	2	2	2
PO9 Communication	2	2	2	2	2	3
PO10 Life-long learning	2	2	2	2	2	3



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Subject Code: BE100501

Subject Name : Contributor

Personality Development Program

CO\PSO	PSO1(Ability to develop self-awareness and professional conduct)	PSO2(Ability to demonstrate leadership and team contribution in real-world roles)
CO1	3	2
CO2	3	2
CO3	3	3
CO4	3	3
CO5	2	3
CO6	3	3

Reference book-

Basic reference for both students and teachers

- Contributor Personality Program text book cum work book developed by Illumine
- Web-based Activ Guide™ for self-exploration of rich media resources to vividly understand many of the ideas, watch role models, learn from industry people, get reference readings – that help them enrich the understanding they gained in the class published by Illumine Foundation

Advanced reference for teachers

- On Contributors, Srinivas V.;Illumine Ideas, 2011
- Enlightened Citizenship and Democracy; Swami Rangan at hananda, Bharatiya Vidya Bhavan, 1989
- Eternal Values for a Changing Society – Vol I-IV, Swami Rangan at hananda; Bharatiya Vidya Bhavan
- Karma Yoga,Swami Vivekananda;Advaita Ashrama
- Vivekananda:His Call to the Nation ,Swami Vivekananda; Advaita Ashrama
- Six Pillars of Self Esteem, Nathaniel Branden ;Bantam, 1995
- Mindset:TheNewPsychologyofSuccess,CarolS.Dweck;RandomHousePublishingGroup, 2007
- Lasting Contribution:How to Think ,Plan ,and Actto Accomplish Meaningful Work, Tad



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Branch: Electrical Engineering

Subject Code: BE100501

Subject Name : Contributor

Personality Development Program

Waddington; Agate Publishing, 2007

- Why not?: how to use everyday ingenuity to solve problems big and small, Barry Nalebuff, Ian Ayres; Harvard Business School Press, 2003
- Thevaluemindset:returningtothefirstprinciplesofcapitalistenterprise(Ch8&9);Erik Stern, Mike Hutchinson; John Wiley and Sons, 2004
- The Power of Full Engagement: Managing Energy, Not Time, is the Key to High Performance and Personal Renewal, Jim Loehr, Tony Schwartz; Simon and Schuster, 2003
- CreatingSharedValue,MichaelE.PorterandMarkR.Kramer;HarvardBusinessReview; Jan/Feb2011, Vol. 89 Issue ½
- TheSpeedofTrust:TheOneThingThatChangesEverything,StephenM.R.Covey,Rebecca R.Merrill,StephenR.Covey;FreePress,2008
- TheCouragetomeetthedemandsofReality,HenryCloud;HarperCollins,2009
- Responsibilityatwork:howleadingprofessionalsact(ordon'tact)responsibly,HowardGardner ; John Wiley & Sons, 2007



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Branch: Electrical Engineering

Subject Code: BE100502

**Subject Name : IPDC-1(Integrated
Personality Development Course)**

w. e. f. Academic Year:	2024-25
Semester:	5TH
Category of the Course:	Elective

Prerequisite:	An open mindset with basic self-awareness and a willingness to explore personal growth, ethics, and values
Rationale:	The Integrated Personality Development Course (IPDC-1) is designed to help students develop a holistic, value-based personality that supports success in academic, professional, and personal life. The course nurtures self-awareness, positive habits, ethical thinking, emotional intelligence, communication skills, and national pride. It introduces students to the lives of great personalities and emphasizes applying values such as empathy, unity, responsibility, and discipline. It also helps bridge the gap between soft skills and technical skills, producing ethically sound, socially responsible, and emotionally stable professionals.

Teaching and Examination Scheme –

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



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Branch: Electrical Engineering

Subject Code: BE100502

Subject Name : IPDC-1(Integrated Personality Development Course)

Detailed Syllabus –

Lecture No.	Module-Lecture	Lecture Description	Hours	% Of Weight
1	Remaking Yourself Restructuring Yourself	Students learn how self-improvement enables them to secure a bright future for themselves. They will learn 6 powerful thought-processes that can develop their intellectual, physical, emotional, and spiritual quotients.	2	6
2	Remaking Yourself- Power of Habit	Students will undergo a study of how habits work, the habits of successful professionals, and the practical techniques that can be used to develop good habits in their life.	2	6
3	Learning from Legends- Tendulkar & Tata	Students will learn from the inspiration allives of India's two legends, Sachin Tendulkar and RatanTata. They will implement these lessons through relatable case studies.	2	6
4	From House to Home- Listening & Understanding	Active listening is an essential part of academic progress and communications. Students will learn to listen with their eyes, ears, mind, and heart.	2	6
5	Facing Failures- Welcoming Challenges	This lecture enables students to revisit the way in which they b approach challenges. Through the study of successful figures such as Disney, Lincolnand Bachchan, students will earn to face difficulties through a positive perspective.	2	6
6	Facing Failures- Significance of Failures	Failure is a student's daily source of fear, negativity, and depression. Students will be given the constructive skills to understand failure as formative learning experiences.	2	6
7	My India My Pride- GloriousPast-Part1	India's ancient Rishis, scholars, and intellectuals have made tremendous contributions to the world, they developed an advanced, sophisticated culture and civilization which began thousands of years ago. Students will learn the importance of studying India's glorious past so that they could develop a strong passion and pride for our nation.	2	8



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8	My India My Pride-Glorious Past-Part2	Our ancient concepts can be used to seek revolutionary ideas and to generate inspiration. Students will develop a deeper interest in India's Glorious Past – by appreciating the need to read about it, research it, write about it, and share it.	2	6
9	Learning from Legends-A.P.J.Abdul Kalam	Dr Kalam's inspirational life displayed legendary qualities which apply to students (1) Dare to Dream (2) Work Hard (3) Get Good Guidance (4) Humility (5) Use Your Talents for the Benefit of Others.	2	6
10	Soft Skills-Networking & Leadership	Students are taught the means of building a professional network and developing a leadership attitude.	2	6
11	Soft Skills-Project Management	Students will learn the secrets of project management through the Akshardham case study. They will then practice these skills through an activity relevant to student life.	2	8
12	Remaking Yourself-Handling Social Media	Students will learn how social media can become addictive and they will imbibe simple methods to take back control.	2	6
13	Facing Failures-Power of Faith	Students will learn about the power and necessity of faith in our daily lives.	2	6
14	From House to Home- Bonding the Family	Students will understand the importance of strong family relationships. They will learn how to overcome the generation gap and connect with their family more.	2	6
15	Selfless Service- Seva	Students will learn that performing sevas is beneficial to one's health, wellbeing, and happiness. It also benefits and inspires others.	2	5
Teaching Hours			30	100



SWAMINARAYAN UNIVERSITY

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Subject Code: BE100502

Subject Name : IPDC-1(Integrated Personality Development Course)

Course Outcomes –

CO No	Course Outcome Description	RBT Level
CO1	To provide students with a holistic value-based education that will enable them to be successful in their academic, professional, and social lives.	Remember
CO2	To give the students the tools to develop effective habits, promote personal growth, and improve their wellbeing, stability, and productivity.	Understand
CO3	To allow students to establish a stronger connection with their family through critical thinking and development of qualities such as unity, forgiveness, empathy, and effective communication.	Understand
CO4	To provide students with soft skills that complement their hard skills, making them more marketable when entering the workforce.	Apply
CO5	To enhance awareness of India's glory and global values, and to create considerate citizens who strive for the betterment of their family, college, workforce, and nation.	Apply
CO6	To inspire students to strive for a higher sense of character by learning from role models who have lived principled, disciplined, and value-based lives.	Evaluate

CO\PO MATRIX

CO \ PO	CO1	CO2	CO3	CO4	CO5	CO6
PO1 Basic knowledge	2	2			1	
PO2 Discipline knowledge	2	2	1	2		
PO3 Experiments and practice						
PO4 Engineering tools				2		
PO5 The engineer and society	-	-	-	-	-	
PO6 Environment and sustainability	-	-	-	-	3	



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Subject Name : IPDC-1(Integrated Personality Development Course)

PO7 Ethics	2	2	3	2	2	3
PO8 Individual and team work	-	-	2	3	-	2
PO9 Communication	-	-	2	2		
PO10 Life-long learning	3	3	2	3	2	2

CO\PSO MATRIX

CO \ PSO	PSO1(Apply the concepts of value-based education to build an ethically and emotionally balanced personality.)	PSO2(Use self-discipline, communication, and leadership traits to become a contributor in society and workplace.
CO1	3	2
CO2	3	2
CO3	3	3
CO4	2	3
CO5	3	2
CO6	3	3

Reference book-

Module No.	Module	References
1	Facing Failures	<ol style="list-style-type: none"> 1. Thomas Edison's factory burns down, New York Times Archives, Page 1, 10/12/1914 2. Lincoln Financial Foundation , Abraham Lincoln's "Failures": Critiques , Forgotten Books, 2017 3. J.K. Rowling Harvard Commencement Speech Harvard University Commencement, 2008 4. Born A gain on the Mountain: A Story of Losing Everything and Finding It Back, Arunima Sinha, Penguin, 2014 5. Failing Forward: Turning Mistakes Into Stepping Stones for Success, John C. Maxwell, Thomas Nelson, 2007 6. Steve Jobs: The Exclusive Biography Paperback, Walter Isaacson, Abacus, 2015



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**Subject Name : IPDC-1(Integrated
Personality Development Course)**

		7. Failing Forward: Turning Mistakes Into Stepping Stones for Success, John C. Maxwell, Thomas Nelson, 2007
2	Learning from Legends	8. Chase Your Dreams: My Auto biography, Sachin Tendulkar, Hachette India, 2017 9. Playing It My Way: My Autobiography, Sachin Tendulkar, Hodder & Stoughton, 2014 10. The Wit and Wisdom of Ratan Tata, Ratan Tata, Hay House, 2018 11. The Tata Group: From Torchbearer to Trailblazers, Shashank Shah, Penguin Portfolio, 2018 12. The Leader Who Had No Title, Robin Sharma, Jaico Publishing House, 2010 13. In the Joy of Others : A Life-Sketch of Pramukh Swami Maharaj, Mohanlal Patel and BAPSS adhus, Swaminarayan Aksharpath, 2013
3	My India My Pride	1. Rishis, Mystics, and Heroes of India, Sadhu Mukundcharandas, Swaminarayan Aksharpath, 2011 2. Physics in Ancient India, Narayan Dongre, Shankar Nene, National Book Trust, 2016 3. The Rise of Civilization in India and Pakistan, Raymond All chin, Bridget All chin, Cambridge University Press, 1982 4. The Āryabhaṭīya of Āryabhaṭa: An Ancient Indian Work on Mathematics and Astronomy (1930), Walter Eugene Clark, University of Chicago Press, reprint, Kessinger Publishing, 2006
4	Remaking Yourself	1. Power of Habit, Charles Duhigg, Random House Trade Paperbacks, 2014 2. Change Your Habit, Change Your Life, Tom Corley, North Loop Books, 2016 3. The Seven Habits of Highly Effective People, Stephen Covey, Simon & Schuster, 2013 4. Seven Habits of Highly Effective Teens, Sean Covey, Simon & Schuster, 2012 5. Atomic Habits, James Clear, Random House, 2018 6. How a handful of tech companies control billions of minds every day, Tristan Harris, TED Talk, 2017



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**Subject Name : IPDC-1(Integrated
Personality Development Course)**

5	From House to Home	<ol style="list-style-type: none"> 1. “What Makes a Good Life? Lessons from the Longest Study on Happiness”, R.Waldinger, Ted Talks, 2015 2. Long Walk To Freedom, Nelson Mandela, Back Bay Books, 1995 3. Outliers, Malcolm Gladwell, Back Bay Books, 2011
6	Soft Skills	<ol style="list-style-type: none"> 1. The 17 Indisputable Laws of Team work, John Maxwell, Harper Collins, 2013 2. Team of Teams: New Rules of Engagement for a Complex World, Stanley McChrystal, Portfolio, 2015 3. Predictably Irrational, Revised and Expanded Edition: The Hidden Forces That Shape Our Decisions, Dan Ariely, Harper Perennial, 2010
7	Selfless Service	<ol style="list-style-type: none"> 1. Open: An Autobiography, Andre Agassi, Vintage, 10 August 2010 2. The Physiological Power of Altruism [online], James Hamblin, The Atlantic, December 30, 2015, https://www.theatlantic.com/health/archive/2015/12/altruism-for-a-better-body/422280/ [last accessed June 10, 2020] 3. TBIB logs: From Entrepreneurs to Doorkeepers, Every body Serves with Love & Warmth at This Ahmedabad Café [online], The People Place Project, The Better India, May 29, 2017, https://www.thebetterindia.com/102551/small-way-serve-ahmedabad-seva-cafe/, [last accessed June 10, 2020]



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Branch: Electrical Engineering

Subject Code: BE101506

Subject Name : Operation Research

w. e. f. Academic Year:	2024-25
Semester:	5TH
Category of the Course:	Open Elective- I

Prerequisite:	Basic knowledge of mathematics, algebra, and logical reasoning, with familiarity in matrix operations and analytical problem-solving techniques.
Rationale:	Operations Research now a day widely used in the area of decision making for the real life problems. Managers and decision makers get idea for optimizing and approximating industrial problems. They not only strive to devise appropriate measures for problem solving but also apply scientific techniques to monitor the organizations ongoing activities such as Production mix, Transportation, Assignment, Queuing, Game theory, Replacement and Project Management problem.

Teaching and Examination Scheme –

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

Detailed Syllabus –

Unit	Content	Hours	% Of Weight
1	Operations Research: Origin of Operation Research, Historical Standpoint, Methodology, Different Phases, Characteristics, Scope and Application of Operations Research. Linear Programming Problem: Introduction, Requirement of LP, Basic Assumptions, Formulation of LP, General Statement of LP, Solution techniques of LP: Graphical Methods, Analytical Methods: Simplex, Big M and Two Phase, Special Case of LP Problem, Graphical Sensitivity Analysis. Introduction of Primal and Dual Problems, Economic Interpretation. Introduction of Goal and Integer Programing. Dynamic Programming: Steps involved in dynamic programming, characteristics and explanation of dynamic programming,	12	30



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Branch: Electrical Engineering

Subject Code: BE101506

Subject Name : Operation Research

	formulation of Deterministic and probabilistic dynamic programming.		
2	Transportation and Assignment: Transportation Problems definition, Linear form, Solution methods: North west corner method, least cost method, Vogel's approximation method. Degeneracy in transportation, Modified Distribution method, Unbalanced problems and profit maximization problems. Transshipment Problems. Assignment Problems and Travelling sales man Problem.	09	20
3	Queuing Theory: Basis of Queuing theory, elements of queuing theory, Kendall's Notation, Operating characteristics of a queuing system, Classification of Queuing models, Preliminary. examples of M/M/1:∞/∞/FCFS.	04	7
4	Replacement theory: Introduction, Replacement of capital equipment which depreciated with time, replacement by alternative equipment, Group and individual replacement policy.	04	7
5	Game Theory: Introduction, Characteristics of Game Theory, Two Person, Zero sum games, Pure strategy. Dominance theory, Mixed strategies (2x2, M x2), Algebraic and graphical methods.	04	8
6	Decision Theory: Introduction, Decision under certainty, Decision under risk, Decision under uncertainty: Laplace criterion, MaxiMin criterion, MiniMax criterion, savage MiniMax regret criterion, Hurwicz criterion, Decision tree.	04	8
7	Project Management: Introduction to PERT and CPM, Critical Path calculation, float calculation and its importance. Cost reduction by Crashing of activity.	08	20
	Teaching Hours	45	100

Course Outcomes:

CO No	Course Outcome Description	RBT Level
CO1	Develop models for optimizing the management and production systems from the verbal description of the real system.	Analyze
CO2	Make use of LPP techniques for optimization of Production mix problem in industry.	Applying
CO3	Evaluate transportation, transshipment, assignment and travelling salesman and Queuing problem.	Evaluate



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Branch: Electrical Engineering

Subject Code: BE101506

Subject Name : Operation Research

CO4	Apply quantitative techniques in machine replacement, game theory, business decision making under conditions of certainty, risk and uncertainty.	Applying
CO5	Demonstrate Project management Problem.	Applying

CO\PO MATRIX

CO \ PO	CO1	CO2	CO3	CO4	CO5
PO1 Basic knowledge	3	2	2	2	1
PO2 Discipline knowledge	2	3	3	2	2
PO3 Experiments and practice	-	1	-	-	2
PO4 Engineering tools	-	2	2	2	2
PO5 The engineer and society	1	1	1	1	1
PO6 Environment and sustainability	-	-	-	-	-
PO7 Ethics	-	-	-	-	-
PO8 Individual and team work	-	-	-	-	-
PO9 Communication	-	-	-	-	-
PO10 Life-long learning	-	-	-	-	-

CO\PSO MATRIX

CO \ PSO	PSO1(Apply concepts of electrical engineering to solve practical problems)	PSO2(Use modern tools and techniques to analyze electrical systems)
CO1	2	1
CO2	3	1
CO3	2	2
CO4	2	1
CO5	2	2

Reference Books –

- Operations Research: An Introduction by HamdyTaha, Pearson Education Inc
- Operations Research: Principles and Practice by Pradeep PrabhakarPai, Oxford Higher Education, Oxford University press
- Operations Research: Principles and Practice by Ravindran Phillips and Solberg by Wiley India Edition,
- Operations Research by P Mariappan, Pearson



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Branch: Electrical Engineering

Subject Code: BE101506

Subject Name : Operation Research

- Operations Research by A M Natarajan, P Balasubramani, A Tamilarasi, Pearson Education Inc
- Operations Research by H N Wagner, Prentice hall.
- Optimization in Operations Research by Ronald Rardin, Pearson Education Inc.
- Operations Research by R. Paneerselvam, Prentice Hall of India Pvt. Ltd.
- Quantitative Techniques in Management by N D Vohra, Tata McGraw-Hill



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level:UG

Branch: Electrical Engineering

Subject Code: BE103502

Subject Name : Professional Ethics

w. e. f. Academic Year:	2024-25
Semester:	5TH
Category of the Course:	Humanities and Social Science

Prerequisite:	Basic understanding of human behavior, cultural values, and an interest in ethical decision-making in personal and professional life.
Rationale:	<p>In today's complex and diverse professional environments, engineers not only require technical expertise but also a strong foundation in ethical behavior and moral reasoning. The course Professional Ethics is designed to help students develop an ethical mindset that is essential for responsible engineering practice. It enables them to recognize and resolve ethical dilemmas that may arise in their careers, whether in industry, public service, or entrepreneurship.</p> <p>This subject explores key ethical theories, moral philosophies, and Indian value systems, emphasizing their relevance in real-life professional situations. It builds awareness of ethical responsibilities, enhances decision-making skills, and promotes values such as honesty, integrity, accountability, and respect for societal and environmental well-being.</p> <p>By studying this course, students will gain the ability to integrate ethical thinking with engineering knowledge, uphold professional standards, and contribute meaningfully to society. It forms a vital component of holistic engineering education aimed at shaping well-rounded professionals.</p>

Teaching and Examination Scheme –

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



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level:UG

Branch: Electrical Engineering

Subject Code: BE103502

Subject Name : Professional Ethics

Detailed Syllabus –

Unit	Content	Total Hrs	% Of Weight
1	Concepts and theories of Business Ethics: Definitions of Ethics, Personal ethics and Business ethics, Morality and law, How are moral standards formed? Religion and Morality, Morality, Etiquette and Professional codes, Indian Ethical Traditions.	6	10
2	Business Ethics: Principles of personal Ethics, Principles of Professional ethics, Evolution of Ethics Over the years, Honesty, Integrity and Transparency are the touchstones of Business Ethics, Distinction Between Values and Ethics, Roots of unethical Behaviour, Ethical Decision – Making.	6	10
3	Ethical Dilemmas, Sources and Their resolutions: What is an Ethical Dilemma, Sources of Ethical Behavior, Code of Personal Ethics for Employees, how to Resolve an Ethical Problem, How to Resolve Ethical Dilemmas.	5	10
4	Ethical Decision – marking in Business: Ethical Models that Guide Decision making, Which Approach to use, Ethical Decision Marking with Cross – holder conflicts and competition, Applying Moral Philosophy to Ethical Decision Making, Kohlberg's Model of Cognitive Moral Development, Influences on Ethical Decision Making, Personal values and Ethical Decision Marking.	10	30
5	Individual factors: Moral Philosophies and values – Moral Philosophy defined, Moral philosophies, Applying Moral Philosophy to Ethical decision Making, Cognitive moral Development, White – Collar Crime, Individual factors in Business Ethics.	9	20
6	Human Values for Indian Managers, Lessons from Ancient Indian Education system, The law of Karma, Quality of Working life, Ethics of Vivekananda, Gandhiji, Aurobindo and Tagore.	9	20
Teaching hours		44	100

Course Outcomes:

CO No	Course Outcome Description	RBT Level
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SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level:UG

Branch: Electrical Engineering

Subject Code: BE103502

Subject Name : Professional Ethics

CO1	Awareness of types of ethical challenges and dilemmas confronting members of a range of professions (business, media, police, law, medicine, research)	Remembering
CO2	Identify and describe relevant theoretical concepts related to profession ethics in engineering.	Understanding
CO3	Understand the basic perception of profession, professional ethics, various moral issues & uses of ethical theories	Understanding
CO4	Distinguish among morals, values, ethics, and the law and to explore how they each impact engineering practice	Analyzing
CO5	Apply learning from Indian history and ethos to ethical practices in engineering.	Applying

CO\PO MATRIX

CO \ PO	CO1	CO2	CO3	CO4	CO5
PO1 Basic knowledge	1	2	2	2	-
PO2 Discipline knowledge	1	2	2	2	-
PO3 Experiments and practice	-	-	1	-	-
PO4 Engineering tools	-	-	-	2	-
PO5 The engineer and society	-	-	-	-	-
PO6 Environment and sustainability	2	-	-	1	3
PO7 Ethics	1	-	-	-	2
PO8 Individual and team work	3	3	3	3	3
PO9 Communication	-	1	-	-	-
PO10 Life-long learning	-	-	-	-	-

CO\PSO MATRIX

CO \ PSO	PSO1(Apply ethical principles and commit to professional ethics and responsibilities in engineering)	PSO2(Demonstrate understanding of the impact of engineering solutions in a global, economic, environmental, and societal context)
CO1	3	2
CO2	3	1
CO3	3	1
CO4	3	2
CO5	3	3



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level:UG

Branch: Electrical Engineering

Subject Code: BE103502

Subject Name : Professional Ethics

After learning the course the students will able to

- Awareness of types of ethical challenges and dilemmas confronting members of a range of professions (business, media, police, law, medicine, research)
- Identify and describe relevant theoretical concepts related to professional ethics in engineering
- Understand the basic perception of profession, professional ethics, various moral issues & uses of ethical theories
- Distinguish among morals, values, ethics, and the law and to explore how they each impact engineering practice
- Apply learning from Indian history and ethos to ethical practices in engineering.

Reference book-

- Business Ethics by AC Fernando
- Business Ethics by Ferrell, Fraedrich and Ferrell.
- Ethics in Management and Indian Ethos by Biswanath Gosh



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Branch: Electrical Engineering

Subject Code: BE105501

Subject Name : Signals and Systems

w. e. f. Academic Year:	2024-25
Semester:	5TH
Category of the Course:	Professional Core

Prerequisite:	Basic knowledge of calculus, differential equations, and fundamentals of electrical/electronic circuits and systems.
Rationale:	Automation in industries and domestic level has made engineers to understand about various systems and signals. The interfacing of the machines with the different controllers specifically needs to calculate and estimate the basics about the signals and systems. Every domain expects engineers to be fundamentally clear about the signals and systems. This subject clears mainly the classification of the signals and systems with their various time and frequency domain analysis for future applications.

Teaching and Examination Scheme –

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

Detailed Syllabus –

Unit	Content	Hours	% Of Weight
1	Introduction to Signals and Systems: Signals and systems everyday life, biomedical, instrumentation domestic and industries. Representations of Signals, Classifications of Signals – Continuous time, Discrete time, comparison among Analog, Digital and Discrete Signals, Signal properties: periodicity, absolute integrability, determinism and stochastic character. Some special signals of importance: the unit step, the unit impulse, the sinusoid, and the complex exponential. System properties: linearity:	06	20



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Branch: Electrical Engineering

Subject Code: BE105501

Subject Name : Signals and Systems

	additivity and homogeneity, shift-invariance, causality, stability, realizability. Examples.		
2	Mathematical operations on Signals and Systems: Addition, subtraction, multiplication and division of the signals, parallel and series combinations of the systems, cascading of the systems, impulse response characterization and convolution integral for CT- LTI system, signal responses to CT LTI system, properties of convolution, LTI system response properties from impulse response, Examples. Impulse response characterization and convolution sum, Causal signal response to DT-LTI systems. Properties of convolution summation, Impulse response of DT-LTI system. DT-LTI system properties from Impulse response. System analysis from difference equation model, examples.	10	25
3	Fourier, Laplace and z-transforms: Representation of periodic functions, Fourier series, Frequency spectrum of aperiodic signals, Fourier Transform, Relation between Laplace Transform and Fourier Transform and its properties. Parseval's Theorem. Review of the Laplace Transform for continuous time signals and systems, system functions, poles and zeros of system functions and signals, Laplace domain analysis, solution to differential equations and system behavior. The z-Transform for discrete time signals and systems, system functions, poles and zeros of systems and sequences, z-domain analysis.	14	30
4	Sampling & reconstruction: The Sampling Theorem and its implications. Spectra of sampled signals. Reconstruction: ideal interpolator, zero-order hold, first-order hold. Aliasing and its effects. Relation between continuous and discrete time systems. Introduction to the applications of signal and system theory: modulation for communication, filtering, feedback control systems.	05	15
5	Applications based on IoT: Introduction of the Internet of Things, Types of sensors, Types of actuators, Introduction of Arduino Interfacing of the sensors and actuators with Arduino. Programming in Arduino. Signals storage and its analysis using Arduino, Design of a minor project based on Arduino.	05	10
	Teaching Hours	40	100



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Branch: Electrical Engineering

Subject Code: BE105501

Subject Name : Signals and Systems

Course Outcomes:

CO No	Course Outcome Description	RBT Level
CO1	Describe the type of system and signal in Industries and Domestic level for Interfacing.	Understand
CO2	Derive mathematical model of the systems and signals for the applications.	Apply
CO3	Analyze the response of system for the efficient usage of the systems.	Analyze
CO4	Design of the system from the available input signals and expected output signals of the industrial model.	Evaluate

CO\PO MATRIX

CO \ PO	CO1	CO2	CO3	CO4
PO1 Basic knowledge	2	3	3	3
PO2 Discipline knowledge	1	3	3	3
PO3 Experiments and practice	-	2	2	3
PO4 Engineering tools	-	2	3	3
PO5 The engineer and society	2	2	3	3
PO6 Environment and sustainability	-	-	-	-
PO7 Ethics	-	-	-	-
PO8 Individual and team work	-	-	-	-
PO9 Communication	-	-	-	-
PO10 Life-long learning	-	-	-	-



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Branch: Electrical Engineering

Subject Code: BE105501

Subject Name : Signals and Systems

CO\PSO MATRIX

CO \ PSO	PSO1(Apply concepts of signals, systems, and controls.)	PSO2(Use embedded and automation tools for system development)
CO1	3	2
CO2	3	3
CO3	3	3
CO4	3	3

Reference Books –

- Signals and Systems by Alan V. Oppenheim, Alan S. Willsky and Nawab, Prentice Hall
- Signals and Systems by K. Gopalan, Cengage Learning (India Edition)
- Signals and Systems by Michal J. Roberts and Govind Sharma, Tata Mc-Graw Hill Publications
- Signals and Systems by Simon Haykin and Bary Van Veen, Wiley- India Publications
- Linear Systems and Signals by B.P.Lathi, Oxford University Press
- Signal, Systems and Transforms by Charles L. Philips, J. M. Parr and E. A. Riskin, Pearson Education
- Signal and Systems by Anand Kumar, 3rd Edition, PHI
- Internet of Things: Technologies, Applications, Challenges and Solutions by B. K. Tripathy & J. Anuradha, CRC Press, 2017.

List of Practical –

- Generation and capturing various continuous time signals from sensors.
- Generation and capturing of discrete time signals and plot them.
- Discretization using different sampling rate and observing aliasing effect.
- Observing the effects of lower sampling rate and higher sampling rate on CT signal.
- Performing various operations on the signal using circuits and computational software.
- Using digital circuit building block to perform operations on signals.
- Simulation of continuous time LTI system.
- Simulation of discrete time LTI systems.
- Obtaining impulse response of the systems.
- Computing FT and DTFT of the CT signals and DT sequences.
- Interfacing of the IR sensors and measurement of distance using arduino.



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: UG

Branch: Electrical Engineering

Subject Code: BE105501

Subject Name : Signals and Systems

- Automation of single phase load using Arduino.

Major equipment-

- Analog & Digital signal generator kits, CRO, DSO, Mathematical operations kit using OPAMP, sensors, actuators, Arduino and necessary interfacing wires, relays, switches, etc.

List of Software/learning website-

- <http://www.scilab.org/>
- <http://www.gnu.org/software/octave/>
- <http://www.vlab.co.in>
- <http://www.arduino.cc>



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level:UG

Branch: Electrical Engineering

Subject Code: BE105502

Subject Name : Electrical Power System - 2

w. e. f. Academic Year:	2024-25
Semester:	5 TH
Category of the Course:	Professional Core

Prerequisite:	Basic understanding of electrical circuit theory, AC fundamentals, phasor analysis, and electromagnetic principles.
Rationale:	The course is aimed to provide exposure about the modeling of power systems components and transmission line, its analysis and performance including the fault analysis of power systems, brief introduction to corona and transients in power system.

Teaching and Examination Scheme –

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

Detailed Syllabus –

Unit	Content	Hours	% Of Weight
1	Basic Principles: Power in single phase AC circuits, Complex power, Complex power balance, Complex power flow, Balanced Three Phase Circuits, Star connected loads, Delta connected loads, Delta-star transformation, Per phase analysis, Balanced three phase power.	04	10
2	Representation of Power System Components: One line and impedance diagram, Per unit system, Per unit representation of transformer, Per unit impedance diagram of power system, Examples – per unit system and impedance diagram, Synchronous machine, Power factor and power control, Salient pole synchronous generator, Operating chart of a synchronous generator, Representation of loads.	08	10



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level:UG

Branch: Electrical Engineering

Subject Code: BE105502

Subject Name : Electrical Power System - 2

3	Transmission Line Modeling and Performance: Introduction, Short transmission line, Medium transmission line, Long transmission line – Rigorous solution, Evaluation of ABCD constants, Interpretation of long line equations, Ferranti effect, Tuned power lines, Power through a transmission line, Circle diagrams, Methods of voltage control, Examples.	14	20
4	Symmetrical Fault Analysis: Introduction, Transient on a transmission line, Short circuit of a synchronous machine on no load, short circuit of a loaded synchronous machine, Selection of circuit breakers, Examples, ZBUS formulation – by inverting YBUS, current injection technique, ZBUS building algorithm (Type – 1, 2, 3, 4 modifications).	08	10
5	Symmetrical Components: Symmetrical component transformation, Phase shift in star-delta transformers, Sequence impedances of transmission lines, Sequence - impedances and networks of synchronous machines, Sequence impedances and networks of transformers, Construction of sequence networks of a power system, Examples.	07	10
6	Unsymmetrical Fault Analysis: Introduction, Symmetrical component analysis of unsymmetrical faults, Single line to ground fault, Line to line fault, Double line to ground fault, Open conductor faults.	07	10
7	Corona: Critical Disruptive Voltage, Corona Loss, Line Design based on Corona, Disadvantages of Corona, Radio Interference, Inductive interference between Power and Communication lines, Examples.	04	10
8	Over-voltages in Power Systems: Causes of over-voltages, Internal causes of over-voltages, Mechanism of lightning discharge, Types of lightning strokes, Harmful effects of lightning, Protection against lightning, Earthing screen, Overhead ground wires, Lightning arresters, Surge absorber.	05	10
9	Transients in Power Systems: Travelling waves on transmission lines, Open end line, Short circuited line, Line terminated through a resistance, Line connected to a cable, Reflection and refraction at a T-junction, Line terminated through a capacitance, capacitor connection at T, Attenuation of travelling waves. Capacitance switching, Over-voltages due to arcing ground.	07	10
	Teaching Hours	64	100



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level:UG

Branch: Electrical Engineering

Subject Code: BE105502

Subject Name : Electrical Power System - 2

Course Outcomes:

CO No	Course Outcome Description	RBT Level
CO1	Prepare the model of transmission line, generator and transformer of power system for single line diagram representation and per unit quantity calculation.	Remember, Understand, Apply
CO2	Evaluate performance of short, medium and long transmission lines.	Analyze, Evaluate
CO3	Analyze symmetrical and unsymmetrical faults in power system.	Analyze, Evaluate
CO4	Describe various aspects of over-voltages and corona in power transmission.	Remember, Understand,
CO5	Describe travelling wave and transients in power system.	Understand, Analyze

CO\PO MATRIX

CO \ PO	CO1	CO2	CO3	CO4	CO5
PO1 Basic knowledge	3	3	3	2	2
PO2 Discipline knowledge	2	3	3	1	2
PO3 Experiments and practice	-	2	-	-	-
PO4 Engineering tools	2	2	3	-	2
PO5 The engineer and society	3	2	3	1	2
PO6 Environment and sustainability	-	-	-	-	-
PO7 Ethics	-	-	-	-	-
PO8 Individual and team work	-	-	-	-	-
PO9 Communication	-	-	-	-	-
PO10 Life-long learning	-	-	-	-	-



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level:UG

Branch: Electrical Engineering

Subject Code: BE105502

Subject Name : Electrical Power System - 2

CO\PSO MATRIX

CO \ PSO	PSO1(Apply concepts of power system modeling, analysis and fault computation..)	PSO2(Use software tools for simulation and fault analysis in power systems..)
CO1	3	2
CO2	3	3
CO3	3	3
CO4	2	1
CO5	2	2

Reference Books –

- Modern Power system Analysis: I. J.Nagrath, D. P. Kothari, McGraw Hill Education
- Power System Analysis: HadiSaadat, McGraw Hill Education India Pvt Ltd.
- Electrical Power systems: C. L .Wadhwa, New Age International Publishers
- Principles of Power System: V. K. Mehta, Rohit Mehta, S. Chand Publications
- Power System Analysis and Design: J. Duncan Glover, Thomas J. Overbye, Mulukutla S. Sarma, Cengage Learning India Pvt. Ltd.
- Elements of Power Systems Analysis: W. D. Stevenson Jr., McGraw Hill Education.
- Power System Analysis : John J. Grainger, William D. Stevenson Jr., McGraw Hill Education

List of Practical –

- To write computer program for plotting instantaneous voltage, current and power in a single phase ac circuit.
- To write computer program and obtain voltage regulation and efficiency of short transmission line for different specified set of receiving end quantities (different load at leading, unity and lagging power factor).
- To write computer program and obtain voltage regulation and efficiency of short transmission line for different specified set of sending end quantities (sending end leading, unity and lagging power factor).
- To write computer program and obtain voltage regulation and efficiency of a Medium transmission line (using π model & T model) for different specified set of receiving end quantities (different load at leading, unity and lagging power factor).



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level:UG

Branch: Electrical Engineering

Subject Code: BE105502

Subject Name : Electrical Power System - 2

- To write computer program and obtain voltage regulation and efficiency of a Medium transmission line (using π model & T model) for different specified set of sending end quantities (sending end leading, unity and lagging power factor).
- To write computer program to calculate voltage regulation and efficiency of a Long transmission line using distributed capacitance model for different specified set of receiving end quantities (different load at leading, unity and lagging power factor) and compare the results with results obtained with program for equivalent π model.
- To write computer program to calculate voltage regulation and efficiency of a Long transmission line using distributed capacitance model for different specified set of sending end quantities (sending end leading, unity and lagging power factor) and compare the results with results obtained with program for equivalent π model.
- To analyze the performance of long transmission line for specified load impedance.
- To obtain voltage profile and load ability curve for a transmission line.
- To compute shunt reactor compensation and performance of open circuited line.
- To compute shunt capacitor compensation and performance of loaded line.
- To compute series capacitor compensation and performance of loaded line.
- To develop program for formulation of ZBUS matrix through ZBUS building algorithm.
- To simulate transient in series R-L circuit with special attention to change in DC offset current for application of excitation at different instant.
- Dynamic simulation of three phase fault on terminal of unloaded synchronous generator. The simulation should show the waveforms of all three-line current for fault at different instant on voltage wave of phase A.
- To develop program to transform three phase unbalanced phasor into its symmetrical components.
- To develop program to transform symmetrical components into its original phasors.
- To analyze line to line fault in power system (Using program/simulation).
- To analyze line to ground fault in power system (Using program/simulation).
- To analyze double line to ground fault in power system (Using program/simulation).
- To write a computer program for animation of travelling waves of a long transmission line with different operating conditions.

Major equipment-

- MATLAB, C/C++, SciLab, Power World Simulator

List of Software/learning website-

- <https://www.scilab.org/>



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level:UG

Branch: Electrical Engineering

Subject Code: BE105502

Subject Name : Electrical Power System - 2

- <https://www.powerworld.com/download-purchase/demo-software/simulator>
demodownload
- https://swayam.gov.in/nd1_noc19_ee61/preview
- https://swayam.gov.in/nd1_noc19_ee62/preview
- <http://vp-dei.vlabs.ac.in/Dreamweaver/list.html>



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level:UG

Branch: Electrical Engineering

Subject Code: BE105503

Subject Name : Electrical Machine

w. e. f. Academic Year:	2024-25
Semester:	5 TH
Category of the Course:	Professional Core

Prerequisite:	Fundamental knowledge of electromagnetism, single-phase and three-phase circuits, and the basic principles of rotating electrical machines.
Rationale:	Electrical power sector is the backbone of industries, agriculture, irrigation, urban development and almost all the segments of society. In view of this, the rotating electrical equipments play a vital role for the society. This subject deals with the theory and performance analysis of various electrical machines.

Teaching and Examination Scheme –

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

Detailed Syllabus –

Unit	Content	Hours	% Of Weight
1	Induction Machines: Revision of the concept of rotating magnetic field. Construction, working and types of induction motor (squirrel cage and slip-ring), Torque Slip Characteristics, Starting and Maximum Torque. No-load & blocked rotor test, Equivalent circuit. Phasor Diagram, Losses and Efficiency. Effect of parameter variation on torque speed characteristics (variation of rotor and stator resistances, stator voltage, frequency). Methods of starting, braking and speed control for induction motors. Induction generator operation. Self-excitation of induction generator. Double cage induction motor. Circle diagram of induction motor. Effect of harmonics, Cogging & Crawling, Effect of unbalanced voltages on performance of motor.	16	25



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2	Single-phase induction motors: Constructional features double revolving field theory, equivalent circuit, Determination of parameters. Split-phase starting methods and applications. Universal motor. Repulsion motor. Shaded pole single phase motor.	08	15
3	Synchronous machines: Constructional features, cylindrical rotor synchronous machine - generated EMF, equivalent circuit and phasor diagram, armature reaction, synchronous impedance, voltage regulation. Methods to find voltage regulation: Synchronous impedance method, MMF method, ZPF method. Operating characteristics of synchronous machines, Salient pole machine – two reaction theory, power angle characteristics. Parallel operation of alternators - synchronization and load division.	16	30
4	Synchronous motors: Methods of starting of synchronous motors, Different torques in Synchronous motor, Stability, Synchronous condenser, Synchronous phase modifiers, V-curves of Synchronous motors, Auto Synchronous Motor: Construction, principle of operation, equivalent excitation current for various rotor connections, circle diagram.	08	15
5	Special machines: Magnetic levitation principle, advantages and applications of linear induction motor. Introduction to axial flux machines. Construction, working and applications of Permanent magnet brushless DC motor, Stepper motor and Switched reluctance motor.	08	15
	Teaching Hours	56	100

Course Outcomes:

CO No.	Course Outcome	RBT Level
CO1	Describe the construction, working principle and applications of induction machines and synchronous machines	Remember, Understand
CO2	Analyze the performance of rotating electrical machines using the tools like equivalent circuit, phasor diagram and circle diagram	Analyze
CO3	Evaluate the performance parameters of rotating machines with different operating conditions	Evaluate
CO4	Illustrate the construction, working, applications and advantages of special machines	Understand, Apply



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CO\PO MATRIX

CO \ PO	CO1	CO2	CO3	CO4
PO1 Basic knowledge	3	2	2	2
PO2 Discipline knowledge	2	3	3	2
PO3 Experiments and practice	-	2	2	1
PO4 Engineering tools	-	2	3	-
PO5 The engineer and society	1	2	2	1
PO6 Environment and sustainability	-	-	-	-
PO7 Ethics	-	-	-	-
PO8 Individual and team work	-	-	-	-
PO9 Communication	-	-	-	-
PO10 Life-long learning	-	-	-	-

CO\PSO MATRIX

CO \ PSO	PSO1(Ability to apply concepts of electrical machines in real-time applications)	PSO2(Proficiency in modeling and analysis of electrical systems)
CO1	3	2
CO2	3	3
CO3	3	3
CO4	2	2

Reference Books –

- E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
- I J Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.
- J B Gupta, "Theory and Performance of Electrical Machines", Katson Publication, 2009.
- B L Theraja, "Electrical Technology – Part II", S Chand Publications, 2011
- M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
- P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
- G C Garg, "Electrical machines – II", Khanna Publishers,
- S K Sen, "Principle of Electrical Machine Design with Computer Programs" Oxford & IBH



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List of Practical –

- To perform no load and blocked rotor test on three phase induction motor to obtain the parameters of equivalent circuit
- To perform no load and blocked rotor test on three phase induction motor to evaluate the performance parameters using circle diagram
- To perform no load and blocked rotor test on single phase induction motor to obtain the parameters of equivalent circuit
- To obtain the performance parameters of three phase induction motor using direct load test.
- To find out the voltage regulation of three phase alternator using direct load test
- To perform open circuit, short circuit and resistance measurement tests on alternator to find out its voltage regulation using synchronous impedance method and MMF method.
- To perform open circuit, short circuit, zero power factor and resistance measurement tests on alternator to find out its voltage regulation using ZPF method.
- To perform synchronization of alternator using dark lamp method, two bright one dark lamp method and synchro scope.
- To obtain direct axis and quadrature axis reactance of salient pole synchronous machine using slip test.
- To obtain the v-curves of a synchronous motor.
- To study the construction and working of special electric machines like stepper motor, permanent brushless DC motor and switched reluctance motor.

Major equipment-

- Required number of machines, panels, meters, accessories and instruments etc... to be provided to conduct the above experiments in a group of maximum 4 students. Charts and cut section models of various machines should be provided for better understanding.

List of Software/learning website-

- <http://www.scilab.org/>
- <http://www.gnu.org/software/octave/>
- <http://www.vlab.co.in>
- <http://www.femm.info>



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Program Name: Engineering

Level: Diploma

Branch: Electrical Engineering

Subject Code: BE105504

Subject Name : Disaster Management

w. e. f. Academic Year:	2024-25
Semester:	5TH
Category of the Course:	Open Elective -I

Prerequisite:	Basic understanding of geography, environmental science, and social issues related to public safety and community resilience.
Rationale:	This subject is conceptual applications of principles of management to mitigate various disasters.

Teaching and Examination Scheme –

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

Detailed Syllabus –

Unit	Content	Hours	% Of Weight
1	Understanding Disasters Understanding the Concepts and definitions of Disaster, Hazard, Vulnerability, Risk, Capacity – Disaster and Development, and disaster management.	04	10
2	Types, Trends, Causes, Consequences and Control of Disasters Geological Disasters (earthquakes, landslides, tsunami, mining); Hydro-Meteorological Disasters (floods, cyclones, lightning, thunder-storms, hail storms, avalanches, droughts, cold and heat waves); Biological Disasters (epidemics, pest attacks, forest fire); Technological Disasters (chemical, industrial, radiological, nuclear) and Manmade Disasters (building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters); Global Disaster Trends – Emerging Risks of Disasters – Climate Change and Urban Disasters.	08	15



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Program Name: Engineering

Level: Diploma

Branch: Electrical Engineering

Subject Code: BE105504

Subject Name : Disaster Management

3	Disaster Management Cycle and Framework Disaster Management Cycle – Paradigm Shift in Disaster Management Pre-Disaster – Risk Assessment and Analysis, Risk Mapping, zonation and Micro zonation, Prevention and Mitigation of Disasters, Early Warning System; Preparedness, Capacity Development; Awareness During Disaster – Evacuation – Disaster Communication – Search and Rescue – Emergency Operation Centre – Incident Command System – Relief and Rehabilitation – Post-disaster – Damage and Needs Assessment, Restoration of Critical Infrastructure – Early Recovery – Reconstruction and Redevelopment; IDNDR, Yokohama Strategy, Hyogo Framework of Action.	08	15
4	Disaster Management in India Disaster Profile of India – Mega Disasters of India and Lessons Learnt Disaster Management Act 2005 – Institutional and Financial Mechanism National Policy on Disaster Management, National Guidelines and Plans on Disaster Management; Role of Government (local, state and national), Non-Government and Intergovernmental Agencies.	10	30
5	Applications of Science and Technology for Disaster Management & Mitigation Geoinformatics in Disaster Management (RS, GIS, GPS and RS) Disaster Communication System (Early Warning and Its Dissemination) Land Use Planning and Development Regulations Disaster Safe Designs and Constructions Structural and Non-Structural Mitigation of Disasters S&T Institutions for Disaster Management in India.	12	30
	Teaching Hours	42	100

Course Outcomes:

CO No.	Course Outcome	RBT Level
CO1	Explain types, trends, causes, consequences and control of disasters	Understand
CO2	Recall disaster management cycle and framework	Remember
CO3	Relate applications of science and technology for disaster management and mitigation	Apply, Understand
CO4	Summarize disaster management agencies and their roles in India	Understand



SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: Diploma

Branch: Electrical Engineering

Subject Code: BE105504

Subject Name : Disaster Management

CO\PO MATRIX

PO\CO	CO1	CO2	CO3	CO4
PO1 Basic knowledge	2	2	2	1
PO2 Discipline knowledge	2	1	-	-
PO3 Experiments and practice	-	-	2	-
PO4 Engineering tools	-	-	1	-
PO5 The engineer and society	1	-	3	1
PO6 Environment and sustainability	3	2	2	3
PO7 Ethics	3	2	2	3
PO8 Individual and team work	-	-	-	1
PO9 Communication	-	-	-	2
PO10 Life-long learning	2	1	-	2

CO\PSO MATRIX

CO \ PSO	PSO1 (Apply interdisciplinary knowledge to solve societal issues)	PSO2 (Use technology and tools for planning and mitigation of disasters)
CO1	3	2
CO2	2	1
CO3	3	3
CO4	2	2

Reference Books –

1. **"Disaster Management"** by Harsh K. Gupta
Publisher: Universities Press India Pvt. Ltd.
2. **"Disaster Management and Preparedness"** by Thomas D. Schneid, Larry Collins
Publisher: CRC Press
3. **"Introduction to International Disaster Management"** by Damon P. Coppola
Publisher: Elsevier



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4. **"Disaster Science and Management"** by Tushar Bhattacharya
Publisher: McGraw Hill Education
5. **"Natural Hazards and Disaster Management: Vulnerability and Mitigation"** by R.B. Singh
Publisher: Rawat Publications
6. **"Disaster Management: Future Challenges and Opportunities"** by Satish Modh
Publisher: Macmillan Publishers India
7. **"Environment and Disaster Management"** by R.B. Singh & Suresh Misra
Publisher: Concept Publishing Company
8. **"Disaster Management Handbook"** by Jack Pinkowski
Publisher: CRC Press

Open Sources –

1. National Disaster Management Authority (NDMA), India
 - Website: <https://ndma.gov.in>
 - Resources: National disaster guidelines, case studies, frameworks (DM Act 2005, National Policy), early warning systems, risk mitigation plans.