SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: Degree

Branch:Electrical Engineering

Subject Code: BE100602

Subject Name : Integrated Personality Development Course

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

Prerequisite:	An open attitude toward personal growth, with basic self-awareness and willingness to reflect on values, behavior, and responsibilities.
Rationale:	The Integrated Personality Development Course (IPDC) aims to nurture students' overall growth by developing essential life skills, ethics, emotional intelligence, and self-awareness. It prepares students to face personal and professional challenges confidently, with a strong sense of responsibility, discipline, and positive attitude, enabling them to lead meaningful and successful lives.

Teaching and Examination Scheme –

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

Detailed Syllabus –

Unit	Content		Hours	% Of Weight
1	**Remaking Yourself-**Begin with the End in Mind	Students will learn to visualize their future goals and will structuretheir lives through smart goals to give themselves direction and ultimately take them to where they want to go.	2	5
2	**Remaking Yourself-** Being Addiction-Free	Students will explore the detrimental effects of addictions on one's health, personal life, and family life. They will learn how to take control of their life by becoming addiction free.	2	10
3	**Selfless Service-** Case Study: DisasterRelief	Students will apply previous lessons of seva, to analyse the case study of the Bhuj earthquake relief work.	2	5

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4	**Soft Skills-** Teamwork & Harmony	Students will learn the six steps of teamwork and harmony that are essential for students' professional and daily life.	**2**	**10**
5	**My India My Pride-** Present Scenario	To implement the transformation of India from a developing country into a developed country it is necessary to have a value- based citizen. Students will see how the transformation to a greaterIndia relies on the vision and efforts of themselves as a youth.	**2**	**10**
6	**Learning from Legends-** Leading WithoutLeading	Students will explore a new approach to leadership, throughhumility.	**2**	**10**
7	**My India My Pride-** An Ideal Citizen - 1	Students will learn that to become value-based citizens, they must first develop good values in their lives. They start by exploring thevalues of responsibility and integrity.	**2**	**5**
8	**My India My Pride-** An Ideal Citizen - 2	Students will learn that by developing the values of loyalty, sincerity, and punctuality; they become indispensable and can leavea strong impression. They will start developing these values by trying to keep perfection in every small task and by looking at the bigger picture.	**2**	**5**
9	**Facing Failures** Timeless Wisdom forDaily Life	Students will learn the role wisdom plays in finding long-term stability. They will use ancient wisdom to solve their modern-daychallenges.	**2**	**5**
10	**From House to Home-** Forgive & Forget	Students will understand the importance and benefits that forgiveness plays in their personal and professional life. They willlearn to apply this knowledge in realistic situations.	**2**	**5**
11	**Remaking Yourself-** Stress Management	Students will learn to cope with current and future causes of stress.	**2**	**5**
12	**Remaking Yourself-** Better Health Better Future	A healthy body prevents disease and stress; increases positivity, productivity, and brainpower. Students will learn to maintain good health through regular exercise, healthy eating habits, and regular and sufficient sleep.	**2**	**5**

SWAMINARAYAN UNIVERSITY
Program Name: Engineering
Level: Degree
Branch:Electrical Engineering
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13	**Learning from Legends -** Words of Wisdom	A panel of learned and experienced mentors will personally answerpractical questions that students face in their daily life.	**2**	**5**
14	**Soft Skills –** Financial Planning	Students will develop a variety of practical financial skills that prepare them to become financially stable throughout their futurecareers.	**2**	**5**
15	**Remaking Yourself** Impact of Company	Students will understand that the type of company that we keep, hasa crucial role in determining who we are and who we will become. They will develop the ability to create a positive environment around them.	**2**	**5**
Concluding	**Life After IPDC**	This concluding lecture encourages students to keep practicing these priceless lessons and prepares them for the next steps in their lives.	**2**	**5**
	Teaching Hours		**32**	**100**

Course Outcomes-

CO No	Course Outcome Description	RBT Level
CO1	**Apply value-based education to achieve success in academic, professional, and social life.**	**Applying**
CO2	**Develop effective habits that support personal growth, wellbeing, and productivity.**	**Applying**
CO3	**Demonstrate empathy, unity, forgiveness, and effective communication to strengthen family and social connections.**	**Understanding**
CO4	**Practice soft skills such as time management, teamwork, leadership, and communication to complement professional skills.**	**Applying**
CO5	**Recognize India's cultural heritage and global values to become responsible and considerate citizens.**	**Understanding**
CO6	**Reflect on lives of value-based role models to develop higher character and principled living.**	**Analyze**

CO\PO MATRIX

CO \ PO	CO1	CO2	CO3	CO4	CO5	CO6
PO1 Engineering Knowledge	-	-	-	-	-	-
PO2 Problem Analysis	-	-	-	-	-	-
PO3 Design/Development of Solutions	-	-	-	-	-	

SWAMINARAYAN UNIVERSITY
Program Name: Engineering
Level: Degree
Branch:Electrical Engineering
Subject Code: BE100602
Subject Name : Integrated Personality Development Course

PO4 Conduct Investigations of Complex Problems	-	-	-	-	-	-
PO5 Modern Tool Usage	2	2	-	3	-	-
PO6 The Engineer and Society	2	2	3	-	3	3
PO7 Environment and Sustainability	-	-	2	3	-	-
PO8 Ethics	2	2	3	-	3	3
PO9 Individual and Team Work	-	-	2	3	-	-
PO10 Communication	2	2	2	3	1	-
PO11 Project Management and Finance	-	-	-	2	-	-
PO12 Life-long Learning	3	3	3	2	2	2

CO\PSO MATRIX

CO \PSO	PSO1(Values and Ethics in Life)	PSO2(Personality and Professional Development)
CO1	3	3
CO2	2	3
CO3	3	3
CO4	2	3
CO5	3	2
CO6	3	2

Reference Books –

Module No.	Module	References
1	Facing Failure	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 Again on the Mountain: A Story of Losing Everything and Finding It Back, ArunimaSinha, 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

SWAMINARAYAN UNIVERSITY
Program Name: Engineering
Level: Degree
Branch:Electrical Engineering
Subject Code: BE100602
Subject Name : Integrated Personality Development Course

		7. Failing Forward: Turning Mistakes Into Stepping Stones for Success, John C. Maxwell,Thomas Nelson, 2007
2	Learningfrom Legend	1. Chase Your Dreams: My Autobiography, Sachin Tendulkar, Hachette India, 2017 2. Playing It My Way: My Autobiography, Sachin Tendulkar, Hodder & Stoughton, 2014 3. The Wit and Wisdom of Ratan Tata, Ratan Tata, Hay House, 2018 4. The Tata Group: From Torchbearers to Trailblazers, Shashank Shah, Penguin Portfolio,2018 5. The Leader Who Had No Title, Robin Sharma, Jaico Publishing House, 2010 6. In the Joy of Others: A Life-Sketch of Pramukh Swami Maharaj, Mohanlal Patel and BAPSSadhus, Swaminarayan Aksharpith, 2013
3	My IndiaMy Pride	1. Rishis, Mystics, and Heroes of India, Sadhu Mukundcharandas, Swaminarayan Aksharpith,2011 2. Physics in Ancient India, Narayan Dongre, Shankar Nene, National Book Trust, 2016 3. The Rise of Civilization in India and Pakistan, Raymond Allchin, Bridget Allchin, 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, TEDTalk, 2017
5	From Houseto Home	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

SWAMINARAYAN UNIVERSITY
Program Name: Engineering
Level: Degree
Branch:Electrical Engineering
Subject Code: BE100602
Subject Name : Integrated Personality Development Course

6	Soft Skills	1. The 17 Indisputable Laws of Teamwork, John Maxwell, HarperCollins, 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 OurDecisions, Dan Ariely, Harper Perennial, 2010
7	Selfless Service	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]

SWAMINARAYAN UNIVERSITY
THE RESERVOIR OF ALL KNOWLEDGE

Faculty of Engineering (Degree)

Semester –6TH IT

Course Title – Software Engineering

Course Code – BE104601

Types of Course - Professional Core

Teaching and Examination Scheme –

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

Course contain

Sr. No.	Content	Total Hrs
1	**Introduction to Software and Software Engineering** The Evolving Role of Software, Software: A Crisis on the Horizon and Software Myths, Software Engineering: A Layered Technology, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Process Models, Agile Process Model, Component-Based Development, Process, Product and Process.	05
2.	**Agile Development** Agility and Agile Process model, Extreme Programming, Other process models of Agile Development and Tools.	03

3	**Managing Software Project** Software Metrics (Process, Product and Project Metrics), Software Project Estimations, Software Project Planning (MS Project Tool), Project Scheduling & Tracking, Risk Analysis &Management (Risk Identification, Risk Projection, Risk Refinement , Risk Mitigation).	04
4	**Requirement Analysis and Specification** Understanding the Requirement, Requirement Modeling, Requirement Specification (SRS), Requirement Analysis and Requirement Elicitation, Requirement Engineering.	03
5	**Software Design** Design Concepts and Design Principal, Architectural Design, Component Level Design (Function Oriented Design, Object Oriented Design), User Interface Design, Web Application Design.	04
6.	**Software Coding & Testing** Coding Standard and coding Guidelines, Code Review, Software Documentation, Testing Strategies, Testing Techniques and Test Case, Test Suites Design, Testing Conventional Applications, Testing Object Oriented Applications, Testing Web and Mobile Applications, Testing Tools (Win runner, Load runner).	05
7	**Quality Assurance and Management** Quality Concepts and Software Quality Assurance, Software Reviews (Formal Technical Reviews), Software Reliability, The Quality Standards: ISO 9000, CMM, Six Sigma for SE, SQA Plan.	03
8	**Software Maintenance and Configuration Management** Types of Software Maintenance, Re-Engineering, Reverse Engineering, Forward Engineering, The SCM Process, Identification of Objects in the Software Configuration, Version Control and Change Control	03
9.	**DevOps:** Overview, Problem Case Definition, Benefits of Fixing Application Development Challenges, DevOps Adoption Approach through Assessment, Solution Dimensions, What is DevOps?, DevOps Importance and Benefits, DevOps Principles and Practices, 7 C's of DevOps Lifecycle for Business Agility, DevOps and Continuous Testing, How to Choose Right DevOps Tools, Challenges with DevOps Implementation, Must Do Things for DevOps, Mapping My App to DevOps - Assessment, Definition, Implementation, Measure and Feedback	04

10	**Advanced Topics in Software Engineering** Component-Based Software Engineering, Client/Server Software Engineering, Web Engineering, Reengineering, Computer-Aided Software Engineering, Software Process Improvement, Emerging Trends in software Engineering.	02

Course Outcomes –

1. Prepare SRS (Software Requirement Specification) document and SPMP (Software Project Management Plan) document.
2. Apply the concept of Functional Oriented and Object Oriented Approach for Software Design.
3. Recognize how to ensure the quality of software product, different quality standards and software review techniques.
4. Apply various testing techniques and test plan in.
5. Able to understand modern Agile Development

Reference Books:

1. Roger S.Pressman, Software Engineering- A practitioner's Approach, McGraw-Hill International Editions
2. Ian Sommerville, Software engineering, Pearson education Asia
3. Pankaj Jalote, Software Engineering – A Precise Approach Wiley
4. Behhforoz & Frederick Hudson, Software Engineering Fundamentals, OXFORD
5. Rajib Mall, Fundamentals of software Engineering, Prentice Hall of India.
6. Deepak Gaikwad, Viral Thakkar, DevOps Tools from Practitioner's ViewPoint, Wiley
7. Merlin Dorfman (Editor), Richard H. Thayer (Editor) ,Software Engineering
8. Robert C. "Uncle Bob" Martin , Clean Architecture: A Craftsman's Guide to Software Structure and Design

SWAMINARAYAN UNIVERSITY
THE RESERVOIR OF ALL KNOWLEDGE

Faculty of Engineering (Degree)

Semester –6TH IT

Course Title – Cryptography and Network security

Course Code – BE104602

Types of Course - Professional Core

Teaching and Examination Scheme –

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

Course contain

Sr. No.	Content	Total HRS
1	Introduction – Security services, security services, securitymechanisms Finite fields – group, ring, fields, modular arithmetic, TheEuclidean algorithm.	5
1	Symmetric Cipher Model, Cryptography, Cryptanalysis andAttacks; Substitution and Transposition techniques	3
2	Stream ciphers and block ciphers, Block Cipher structure, Data Encryption standard (DES) with example, strength of DES, Design principles of block cipher, AES with structure, its transformation functions, key expansion, example and implementation	5

3	Multiple encryption and triple DES, Electronic Code Book, Cipher Block Chaining Mode, Cipher Feedback mode, Output Feedback mode, Counter mode	4
4	Public Key Cryptosystems with Applications, Requirements and Cryptanalysis, RSA algorithm, its computational aspects and security, Diffie-Hillman Key Exchange algorithm, Man-in-Middle attack	7
5	Cryptographic Hash Functions, their applications, Simple hashfunctions, its requirements and security, Hash functions based on Cipher Block Chaining, Secure Hash Algorithm (SHA)	4
6	Message Authentication Codes, its requirements and security, MACs based on Hash Functions, Macs based on Block Ciphers	3
7	Digital Signature, its properties, requirements and security, variousdigital signature schemes (Elgamal and Schnorr), NIST digital Signature algorithm	4
8	Key management and distribution, symmetric key distribution using symmetric and asymmetric encryptions, distribution of publickeys, X.509 certificates, Public key infrastructure	4
9	Remote user authentication with symmetric and asymmetric encryption, Kerberos	4
10	Web Security threats and approaches, SSL architecture and protocol, Transport layer security, HTTPS and SSH	5

Course Outcomes –

•	Define terms related to cryptography, hashing, message authentication code, digital signature.
•	Describe and discuss symmetric key cryptography algorithms, publickey cryptography algorithms, hashing algorithms, Message authentication code generation algorithms, digital signature algorithms, key generation and key management, issues in web security and solution, issues in Transport layer security and solution.

•	Demonstrate the generation of keys and execution of symmetric andpublic key algorithms from given data.
•	Implement cryptography solution for given security problem by identifying strength and weaknesses of algorithms based on cryptanalytic and brute force attack.

Reference Books:

1. Cryptography And Network Security, Principles And Practice Sixth Edition, WilliamStallings, Pearson
2. Information Security Principles and Practice By Mark Stamp, Willy India Edition
3. Cryptography & Network Security, Forouzan, Mukhopadhyay, McGrawHill
4. Cryptography and Network Security Atul Kahate, TMH
5. Cryptography and Security, C K Shyamala, N Harini, T R Padmanabhan, Wiley-India
6. Information Systems Security, Godbole, Wiley-India
7. Information Security Principles and Practice, Deven Shah, Wiley-India
8. Security in Computing by Pfleeger and Pfleeger, PHI
9. Build Your Own Security Lab : A Field Guide for network testing, Michael Gregg, WileyIndia

SWAMINARAYANUNIVERSITY

Program Name: Engineering

Level: Degree

Course/ Subject Code: BE104603

Course/Subject Name:– Image Processing

w.e.f.Academic Year:	2024-25
Semester:	6th Semester / 3rd Year (IT)
Category of the Course:	PCE

Prerequisite:	1. Knowledge of Fourier transform 2. Probability theory 3. Good programming skills.
Rationale:	This course will provide students with more techniques in the digital image processing for image enhancement as well as restoration of noisy images. Emphasis is given more on implementation of various algorithms so that students will able to develop their own algorithm. The techniques covered in the syllabus have wide applicability in any field which needs to handle the image data.

Teaching and Examination Scheme:

Teaching Scheme(in Hours)			TotalCredits 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 Weight age
1	**Digital image fundamentals:** Light and Electromagnetic spectrum, Components of Image processing system, Image formation and digitization concepts, Neighbors of pixel adjacency connectivity, regions and boundaries, Distance measures, Applications.	5	15
2	**Image Enhancements:** In spatial domain: Basic gray level transformations, Histogram processing, Using arithmetic/Logic operations, smoothing spatial filters,Sharpening spatial filters. In Frequency domain: Introduction to the Fourier transform and frequency domain concepts, smoothing frequency-domain filters, Sharpening frequency domain filters.	15	30
3	**Image Restoration:** Various noise models, image restoration using spatial domain filtering, image restoration using frequency domain filtering, Estimating the degradation function, Inverse filtering.	5	15

4	**Colour Image processing:** Colour fundamentals, Colour models, Colour transformation, Smoothing and Sharpening, Colour segmentation.	3	10
5	**Wavelet and Multi-resolution processing:** Image pyramids, Multi-resolution expansion, wavelet transform.	3	10
6	**Image compression:** Introduction, Image compression model, Error-free compression, Lossy compression.	3	10
7	**Image segmentation:** Detection of discontinuities, Edge linking and boundary detection, thresholding.	3	10
	Total	48	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	15	5

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 digital image processing techniques in spatial/ frequency domain	Understand
2	Apply various tools and techniques for digital image quality enhancement in spatial/frequency domain	Apply
3	Analyse image to evaluate quality of the digital image	Apply

SWAMINARAYANUNIVERSITY

Program Name: Engineering

Level: Degree

Course/ Subject Code: BE104603

Course/Subject Name:– Image Processing

4	Design real time application using digital image processing concepts	Apply

Course Outcome to Programme Outcome (CO-PO) Mapping

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

References/Suggested Learning Resources:

(a)Books:

1. Digital Image Processing, Second Edition by Rafel C. Gonzalez and Richard E. Woods, Pearson Education
2. Digital Image Processing by Bhabatosh Chanda and Dwijesh Majumder, PHI
3. Fundamentals of Digital Image Processing by Anil K Jain, PHI
4. Digital Image Processing Using Matlab, Rafel C. Gonzalez and Richard E. Woods, Pearson Education

(a) Open source software and website:

1. MATLAB with image processing toolbox. 2. Scilab (SIP)

List of Laboratory/Learning Resources Required:

Experiments will be based on the topics taught in the theory.

1. Computer system with high computing power and main memory.

SWAMINARAYAN UNIVERSITY
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Faculty of Engineering (Degree)

Semester –6TH IT

Course Title – Big Data Analytics

Course Code – BE104604

Types of Course - Professional Elective – 2

Teaching and Examination Scheme –

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

Course contain

Sr. No.	Content	Total Hrs	
1	**Introduction to Big Data:** Introduction to Big Data, Big Data characteristics, Challenges of Conventional System, Types of Big Data, Intelligentdataanalysis,Traditionalvs.BigDatabusinessapproach,Case StudyofBigData Solutions.	04	
2	**Hadoop**: History of Hadoop, Hadoop Distributed File System: Physical organization of Compte Nodes, Components of Hadoop Analyzing the Data with Hadoop, Scaling Out, Hadoop Streaming, Design of HDFS,Java interfaces to HDFS Basics, Developing a Map Reduce Application, How Map Reduce Works, Anatomy of a Map Reduce Job run, Failures, Job Scheduling, Shuffle and Sort, Task execution, Map Reduce Types and Formats, Map Reduce Features, Hadoop environment. Setting up a Hadoop Cluster, Cluster specification, Cluster Setup and Installation, Hadoop Configuration,ecurityinHadoop,AdministeringHadoop,Monitoring-Maintenance,Hadoopbenchmarks,Hadoopinthecloud	12	

3	**NoSQL:** What is NoSQL? NoSQL business drivers; NoSQL case studies; NoSQL data architecture patterns: Key-value stores, Graph stores, Column family (Bigtable) stores, Document stores, Variations of NoSQLarchitectural patterns; Using NoSQL to manage big data: What is a big data NoSQL solution? Understanding the types of big data problems; Analyzing bigdatawithashared-nothingarchitecture;Choosingdistributionmodels: master-slave versus peer-to-peer; Four ways that NoSQL systems handle big data problems	07	
4	**Mining Data Stream:** Introduction to Streams Concepts, Stream Data Model and Architecture, Stream Computing, Sampling Data in a Stream, Filtering Streams, Counting Distinct Elements in a Stream, Estimating moments, Counting oneness in a Window, Decaying Window,Real time Analytics Platform (RTAP) applications, Case Studies, Real Time SentimentAnalysis,StockMarketPredictions.UsingGraphAnalyticsfor BigData:Graph Analytics	10	
5	**Frameworks:** Applications on Big Data Using Pig and Hive, Data processingoperatorsinPig,Hiveservices,HiveQL,QueryingDatainHive, fundamentalsofHBaseandZooKeeper,IBMInfoSphereBigInsightsand Streams.	05	
6	**Spark:**IntroductiontoDataAnalysiswithSpark,In-MemoryComputing withSpark,SparkBasics,InteractiveSparkwithPySpark,WritingSpark Applications	04	

Course Outcomes –

- identifybigdataapplicationareas
- usebigdata framework
- modelandanalyzedatabyapplyingselectedtechniques
- demonstrateanintegratedapproachtobigdata

Reference Books:

1) MichaelBerthold,DavidJ.Hand,“IntelligentDataAnalysis”,Springer, 2007
2) Bill Franks , “Taming The Big Data Tidal Wave: Finding Opportunities In Huge Data Streams With Advanced Analytics”, Wiley
3) AnandRajaramanandJeffUllman“MiningofMassiveDatasets”,CambridgeUniversityPress,
4) Michael Minelli, Michele Chambers, Ambiga Dhiraj, “Big Data Big Analytics: Emerging BusinessIntelligence And Analytic Trends For Today's Businesses”, Wiley India
5) Borislublinsky,Kevint.Smith,AlexeyYakubovich,“ProfessionalHadoopSolutions”,Wiley.
6) ChrisEaton,Dirkderoosetal.,“UnderstandingBigdata”,McGrawHill, 2012.
7) BIGDataandAnalytics,SeemaAcharya,SubhashiniChhellappan,Willey
8) MongoDBinAction,KyleBanker,PiterBakkum,ShaunVerch,Dreamtech Press
9) TomWhite,“HADOOP:TheDefinitiveGuide”,OReilly2012.

10) VigneshPrajapati,“BigDataAnalyticswithRandHadoop”,PacketPublishing2013.

Faculty of Engineering (Degree)

Semester –6TH IT

Course Title – Artificial Intelligence

Course Code – BE104605

Types of Course - Professional Elective – 2

Teaching and Examination Scheme –

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

Course contain

Sr. No.	Course Contents	Teaching hours
1	**What is AI? :** The AI Problems, The Underlying Assumption, What is anAI Techniques, The Level Of The Model, Criteria For Success, Some General References, One Final Word.	2
2	**Problems, State Space Search & Heuristic Search Techniques :** Defining The Problems As A State Space Search, Production Systems, Production Characteristics, Production System Characteristics, And IssuesIn The Design Of Search Programs, Additional Problems. Generate-And-Test, Hill Climbing, Best-First Search, Problem Reduction, ConstraintSatisfaction, Means-Ends Analysis, A* and AO* search.	8
3	**Logical Agents:** Knowledge–based agents, The Wumpus world, Logic, Propositional logic, Propositional theorem proving, Effective propositional model checking, Agents based on propositional logic. **First Order Logic:** Representation Revisited, Syntax and Semantics of First Order logic, Using First Order logic.	4

4	**Inference in First Order Logic:** Propositional Versus First Order Inference, Unification, Forward Chaining, Backward Chaining, Resolution	4
5	**Uncertainty** – Acting under Uncertainty, Basic Probability Notation, TheAxioms of Probability, Inference Using Full Joint Distributions,	4
6	**Probabilistic Reasoning** – Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks, Efficient Representation ofConditional Distribution, Exact Inference in Bayesian Networks, Approximate Inference in Bayesian Networks	3
7	**Game Playing: Overview, and Example Domain :** Overview, MiniMax, Alpha-Beta Cut-off, Refinements, Iterative deepening, The Blocks World, Components of a Planning System, Goal Stack Planning,Nonlinear Planning Using Constraint Posting, Hierarchical Planning, Reactive Systems, Other Planning Techniques.	5
8	**Statistical Learning Methods** – Statistical Learning, Learning with Complete Data, Learning with Hidden Variables: EM Algorithm.	4
9	**Introduction to Prolog :** Introduction To Prolog: Syntax and Numeric Function, Basic List Manipulation Functions In Prolog,	8

Course Outcomes –

- Ability to understand problem solving methods and their applications
- Ability to analyze Searching, knowledge representation and Inferencing Techniques
- Ability to apply problem solving, knowledge representation and reasoning techniques for various applications.
- Ability to demonstrate practical applications of AI Techniques.

Reference Books:

1. "Artificial Intelligence" -By Elaine Rich And Kevin Knight (2nd Edition) Tata Mcgraw-Hill
2. Artificial Intelligence: A Modern Approach, Stuart Russel, Peter Norvig, PHI
3. Nils J Nilsson, Artificial Intelligence: A New Synthesis, Morgan Kaufmann Publications, 2000.
4. Introduction to Prolog Programming By Carl Townsend.
5. "PROLOG Programming For Artificial Intelligence" -By Ivan Bratko(Addison-Wesley)
6. "Programming with PROLOG" –By Klocksin and Mellish.

List of Experiments:

1. Write a program to implement Tic-Tac-Toe game problem.
2. Write a program to implement BFS (for 8 puzzle problem or Water Jug problem or any AIsearch problem).
3. Write a program to implement DFS (for 8 puzzle problem or Water Jug problem or anyAI search problem)
4. Write a program to implement Single Player Game (Using Heuristic Function)
5. Write a program to Implement A* Algorithm.
6. Write a program to solve N-Queens problem using Prolog.
7. Write a program to solve 8 puzzle problem using Prolog.
8. Write a program to solve travelling salesman problem using Prolog.
9. Develop a expert system for medical diagnosis of childhood diseases using prolog.
10. Write a Prolog program to count even and odd elements from list and count elements up tospecific index in list.

SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: BE

Course/ Subject Code: BE104606

Course/Subject Name: Enterprise Application Development

w.e.f.Academic Year:	2024-25
Semester:	3rd Year 6th sem
Category of the Course:	Professional Elective – 3

Prerequisite:	Java Programming
Rationale:	To develop server side Java application The Java platform Enterprise Edition (Java EE) is used which consists of set of application programming interface

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT level
1	Understand the components and architecture of Java EE for enterprise application development	Understand
2	Develop and deploy enterprise applications using Servlets, JSP, JSF, and EJB	Apply
3	Integrate RESTful and SOAP web services using JAX-RS and JAX-WS	Apply
4	Implement data persistence and JSON processing using JPA and JSON-P/JSON-B	Apply
5	Utilize WebSocket, JMS, CDI, and Microservices architecture in modern Java EE applications	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	3	3
PO-2 Problem Analysis	2	3	3	2	2
PO-3 Design/Development	2	3	3	3	3
PO-4 Investigations	1	2	2	2	2
PO-5 Modern Tool Usage	2	3	3	3	3
PO-6 Engineer & Society	-	-	-	-	-
PO-7 Environment & Sustainability	-	-	-	-	-
PO-8 Ethics	1	1	1	1	1
PO-9 Individual & Team Work	2	2	2	2	2
PO-10 Communication	2	2	2	2	2
PO-11 Project Management	2	2	2	2	2
PO-12 Lifelong Learning	3	3	3	3	3

SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: BE

Course/ Subject Code: BE104606

Course/Subject Name: Enterprise Application Development

CO-PSO Mapping					
PSO \ CO	**CO-1**	**CO-2**	**CO-3**	**CO-4**	**CO-5**
SO-1 Programming Skills	3	3	3	3	3
PSO-2 Analytical Ability	2	2	2	2	2
PSO-3 Software Tools Use	2	3	3	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)	
3	0	2	4	60	40	30	20	150

Course Content:

Unit No.	**Content**	**No. of Hours**	**% of Weightage**
1.	Introduction to Java EE Java EE API	1	0
2.	Java Server Faces Introducing JSF, Developing first JSF application, Custom Data Validation, Customizing JSF's default messages, JSF HTML5 support, JSF 2.2 Faces flows	4	20
3.	Object relation mapping with Java Persistent API The customer database, The Java Persistent API	3	5
4.	Enterprise JavaBeans Session beans, Asynchronous method calls, Message Driven beans, Transactions in enterprise JavaBeans, Enterprise JavaBean life cycles, EJB timer service,	5	20
5.	Contexts and Dependency Injection Named beans Dependency injection Qualifiers Named bean scopes CDI event	5	5
6.	JSONprocessing with JSON-P and JSON-B The JSON-P model API, The JSON – P streaming API, JSON pointer, JSON patch Populating Java Objects from JSON with JSON-B Generating JSON strings from Java objects with JSON-B	5	10

7.	WebSocket Developing a WebSocket server endpoint Developing WebSocket clients Java Messaging Service Message queue, Message Topics	3	10
8.	Restful Web Services with JAX-RS Introduction,Developing a simple RESTful web service, Developing a RESTful web service client, Query and path parameters, Server sent events Microseervices development with Java EE Introduction to microservices, Microservices and Java EE, Developing Microservices with Java EE Web services with JAX-WS Developing web services with JAX-WS, Exposing EJBs as web services	8	15
9.	Servlet Development and Deployment Introduction, Request forwarding and response redirection, persisting application data across requests, passing initialization parameter, Servlet filters, Servlet listeners, Pluggability, Configuring web applications, asynchronous processing,	8	15
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**
10	40	20	-	-	-

Where R:Remember;U:Understanding;A:Application,N:AnalyzeandE:EvaluateC:Create(as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Java EE 8 Application Development by David Heffelfinger, Packt
2. Java EE and HTML 5 Enterprise application development by John brock, Arun Gupta, Geertjan wpelenga McGrawhill Oracle
3. Black Book " Java server programming" J2EE, 1st ed., Dream Tech Publishers, 2008. 3. Kathy walrath "
4. Complete Reference J2EE by James Keogh mcgraw publication
5. Professional Java Server Programming by Subrahmanyam Allamaraju, Cedric Buest

Wiley Publication

6. Core Java, Volume II: Advanced Features by Cay Horstmann and Gary Cornell Pearson Publication
7. Java Persistence with Hibernate by Christian Bauer, Gavin King
8. Hibernate 2nd edition, Jeff Linwood and Dave Minter, Beginning Après publication
9. Java Server Faces in Action, Kito D. Mann, Manning Publication
10. JDBC™ API Tutorial and Reference, Third Edition, Maydene Fisher, Jon Ellis, Jonathan Bruce, Addison Wesley
11. Beginning JSP, JSF and Tomcat, Giulio Zambon, Apress
12. JSF2.0 CookBook, Anghel Leonard, PACKT publication

(b) Open source software and website:

1. https://www.tutorialspoint.com/
2. https://www.geeksforgeeks.org/introduction-java-servlets/

Suggested Course Practical List:

1. Write an application for transferring files using WebSocket.
2. Implement the shopping cart for users for the online shopping. Apply the concept of session.
3. Implement student registration form with enrollment number, first name, last name, semester, contact number. Implement with Java Beans
4. Write a Servlet program to print system date and time.
5. Design a web page that takes the Username from user and if it is a valid username prints “Welcome Username”. Use JSF to implement.
6. Develop a Restful web service for user management with username and profession.

List of Laboratory/Learning Resources Required:

1. Computers with Java SDK 8/11 or higher
2. Apache Tomcat/GlassFish Server
3. MySQL or PostgreSQL server
4. IDEs like Eclipse/IntelliJ IDEA
5. REST API testing tools (e.g., Postman)
6. Reference books and documentation

SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: BE

Course/ Subject Code: BE104606

Course/Subject Name: Enterprise Application Development

Suggested Project List:

1. Develop a secure online banking application using Java EE
2. Design and implement a RESTful Student Information System
3. Create a Hotel Booking system using EJB, JSF, and JPA
4. Build a Chat application using WebSocket API
5. E-Commerce platform with cart, checkout, and order tracking using microservices

SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: BE

Course/ Subject Code: BE104607

Course/Subject Name: Data Warehousing and Mining

w.e.f.Academic Year:	2024-25
Semester:	3rd Year 6th sem
Category of the Course:	Professional Elective – 3

Prerequisite:	NA
Rationale:	This course builds students' understanding of data warehousing concepts, data preprocessing, and advanced data mining techniques like classification, clustering, and association rule mining. It introduces data science tools to extract knowledge from large datasets for actionable insights in research, business, and industry.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT level
1	Understand the importance of data warehousing in addition to database systems	Understand
2	Perform preprocessing and apply data mining techniques	Apply
3	Identify association rules, classification, and clusters in large datasets	Analyze
4	Solve real-world business and scientific problems using data mining	Apply
5	Use data analysis tools for scientific applications	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	3	3
PO-2 Problem Analysis	2	3	3	3	2
PO-3 Design/Development	1	2	3	3	3
PO-4 Investigations	1	2	2	3	2
PO-5 Modern Tool Usage	2	3	3	3	3
PO-6 Engineer & Society	-	-	-	-	-
PO-7 Environment & Sustainability	-	-	-	-	-
PO-8 Ethics	-	-	-	-	-
PO-9 Individual & Team Work	2	2	2	2	2

SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: BE

Course/ Subject Code: BE104607

Course/Subject Name: Data Warehousing and Mining

PO-10 Communication	2	2	2	2	2
PO-11 Project Management	2	2	2	2	2
PO-12 Lifelong Learning	3	3	3	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)	
3	**0**	**2**	**4**	60	40	20	30	150

Course Content:

Unit No.	**Content**	**No. of Hours**	**% of Weightage**
1.	**Data Warehousing:** OLAP & OLTP, Data warehouse & Data mart, OLAM architecture, Extraction, Transform & Loading (ETL) concept for generic, two-tier, three - tier architecture, Data warehousing schema - Star, Snowflake, Fact Constellation (Galaxy) - Data Cube , Operations on Data cube (slicing, roll up, roll down, drill up etc)	**5**	**10**
2.	**Introduction to data mining (DM):** Motivation for Data Mining - Data Mining-Definition and Functionalities – Classification of DM Systems - DM task primitives - Integration of a Data Mining system with a Database or a Data Warehouse - Issues in DM – KDD Process	**3**	**10**
3.	**Data Pre-processing:** Data summarization, data cleaning, data integration and transformation, data reduction, data discretization and concept hierarchy generation, feature extraction , feature transformation, feature selection, introduction to Dimensionality Reduction, CUR decomposition	**4**	**15**

SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: BE

Course/ Subject Code: BE104607

Course/Subject Name: Data Warehousing and Mining

4.	**Mining Frequent Patterns, Associations and Correlations:** Efficient and scalable frequent item-set mining methods, mining various kindof association rules, from association mining to correlation analysis, Advanced Association Rule Techniques, Measuring the Quality of Rules.	**7**	**15**
5.	**Classification and Prediction:** Classification vs. prediction, Issues regarding classification and prediction, Statistical-Based Algorithms, Distance-Based Algorithms, Decision Tree- Based Algorithms, Neural Network-Based Algorithms, Rule-Based Algorithms, Combining Techniques, accuracy and error measures, evaluation of the accuracy of a classifier or predictor. Neural Network Prediction methods: Linear and nonlinear regression, Logistic Regression Introduction oftools such as DB Miner / WEKA / DTREG DM Tools	**10**	**20**
6.	**Cluster Analysis:** Clustering: Problem Definition, Clustering Overview, Evaluation of Clustering Algorithms, Partitioning Clustering -K-Means Algorithm, K- Means Additional issues, PAM Algorithm; Hierarchical Clustering – Agglomerative Methods and divisive methods, Basic Agglomerative Hierarchical Clustering, Strengths and Weakness; Outlier Detection, Clustering high dimensional data, clustering Graph and Network data.	**10**	**20**
7.	**Advance topics:** Introduction to Web Mining, Spatial Data Mining, Temporal Mining, TextMining and Multimedia Mining.	3	10
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**
10	20	15	15	5	5

Where R:Remember;U:Understanding;A:Application,N:AnalyzeandE:EvaluateC:Create(as per Revised Bloom's Taxonomy)

SWAMINARAYAN UNIVERSITY

Program Name: Engineering

Level: BE

Course/ Subject Code: BE104607

Course/Subject Name: Data Warehousing and Mining

References/Suggested Learning Resources:

(a) Books:

1. J. Han, M. Kamber, "Data Mining Concepts and Techniques", Morgan Kaufmann
2. M. Kantardzic, "Data mining: Concepts, models, methods and algorithms, John Wiley &Sons Inc.
3. Paulraj Ponnian, "Data Warehousing Fundamentals", John Willey.
4. M. Dunham, "Data Mining: Introductory and Advanced Topics", Pearson Education.
5. Ning Tan, Vipin Kumar, Michael Steinbanch Pang, "Introduction to Data Mining", Pearson Education

(b) Open source software and website:

1. WEKA
2. RapidMiner
3. Orange
4. Python (with libraries like Pandas, Scikit-learn)
5. https://www.kdnuggets.com
6. https://scikit-learn.org
7. https://archive.ics.uci.edu/ml/index.php

Suggested Course Practical List:

Laboratory work will be based on the above syllabus with minimum 10 experiments to be incorporated.

List of Laboratory/Learning Resources Required:

1. Computers with WEKA, Python, R, or equivalent tools installed
2. Dataset repositories like UCI or Kaggle
3. Research papers or case studies for analysis

Faculty of Engineering (Degree)

Semester –6TH IT

Course Title – Advanced Web Programming

Course Code – BE104608

Types of Course - Professional Elective – 3

Teaching and Examination Scheme –

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

Course contain

Sr. No.	Contents	Total Hrs	% Weight
1	**Refreshing Java Script and CSS** CSS syntax, benefits, Responsive design, Bootstrap introduction, Java script syntax, Java script inbuilt objects, Error handling and event handling, DOM, Asynchronous Programming	06	10%
2	**Introduction to Angular JS** Basics and Syntax of Angular JS, Features, Advantages, Application Structure, Basics of routes and navigation, MVC with Angular JS, Services	08	15%
3	**Angular JS in Details** Modules, Directives, Routes, Angular JS Forms and Validations, Data binding, Creating single page website using Angular JS	10	20%

4	**Introduction to Node JS** Setup Node JS Environment, Package Manager, Features, Console Object, Concept of Callbacks	08	15%
5	**Node JS in details** Events and Event Loop, timers, Error Handling, Buffers, Streams, Work with File System, Networking with Node (TCP, UDP and HTTP clients and servers), Web Module, Debugging, Node JS REST API, Sessions and Cookies, Design patterns, caching, scalability	12	20%
6	**Database Programming with Node JS and MongoDB** Basics of MongoDB, Data types, Connect Node JS with MongoDB, Operations on data (Insert, Find, Query, Sort, Delete, Update) using Node JS	10	20%

Course Outcomes –

1. Learn the concepts of client side programming using CSS and Java Script
2. Understand the concepts of Angular JS to extend basic HTML features
3. Learn Node JS framework to build dynamic server side applications
4. Study the concept of database using Mongo DB and connect database with application.
5. Design and implement full featured web application using the concepts of Angular JS and Node JS

Reference Books:

2. Angularjs in Action ISBN 9789351198383 Ruebbelke, Wiley Publication
3. Node.js in Action ISBN 9789386052049 Alex Young, Bradley Meck, Mike Cantelon, Tim Oxley, Marc Harter, T.J. Holowaychuk, Nathan Rajlich, Wiley Publication
4. Node.Js in Practice ISBN 9789351197744 Alex Young, Marc Harter, Ben Noordhuis Wiley Publication
5. Pro AngularJS Freeman Apress publication
6. Professional Node.js By Pedro Teixeira 9781118240564 Wiley Packt Publishing

List of Experiments:

Practical list should be prepared based on the content of the subject with following guidelines in mind.

1. Entire syllabus should be covered.
2. Practical list should be designed with real life examples.
3. List should be prepared to cover individual concepts and integration of different concepts on real life problems.

SWAMINARAYAN UNIVERSITY

Program Name: Engineering
Level: UG
Branch: Electrical Engineering
Subject Code: BE100601
Subject Name : Contributor Personality Development Program

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

Prerequisite:	Basic communication skills and an openness to self-reflection, with a willingness to develop personal and professional effectiveness.
Rationale:	This course demands a better understanding of the construction, material used and principle of operation of various types of measuring instruments. This course is therefore designed to meet these needs and hence it is a core course for any electrical engineer.

Teaching and Examination Scheme –

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

Detailed Syllabus –

Unit	Content	Hours	% OF Weight
1	**Finding Solutions:** The market environment in which organizations are operating, is becoming increasingly dynamic and uncertain. So, employers are increasingly seeking out people who can innovate and figure out solutions in the face of any challenge (unlike in the past when it was the people who were most efficient and productive, who were valued by organizations). At the heart of innovation lies this way of thinking of "finding solutions" rather than "seeing problems or roadblocks". Students learn how to build this way of thinking, in this topic.	**1.5**	16.67%
2	**Creating Value:** Companies are also looking for employees who do not just work hard, or work efficiently or productively - but those who will make a valuable difference to the fortunes of the company. This difference may come from innovation, but it may also come from focusing on the right	**1.5**	16.67%

	things and identifying what really matters – both to the company and to the customers. In this topic, students learn how to build this capability.		
3	**Engaging deeply:** The environment we live in is becoming increasingly complex because more and more things are getting interconnected, new fields are emerging, technologies are rapidly changing, capabilities and knowledge one is trained in will become fast obsolete. In such a scenario, the student's ability to quickly understand and master what is going on, dive deep, get involved in any area, rapidly learn new capabilities that a job demands, is important. Engaging deeply is a core way of thinking that can help them in this. In this topic, students learn how to engage deeply.	**1.5**	16.67%
4	**Enlightened self-interest & collaboration at work:** The changing nature of work in organizations and in the global environment is increasingly demanding that people work more collaboratively towards shared goals and more sustainable goals. A key to working successfully when multiple stakeholders are involved is "thinking in enlightened self-interest". In this topic, students learn how to develop this way of thinking (going beyond "narrow self-interest").	**1.5**	16.67%
5	**Human-centered thinking & Empathy:** In this topic, students explore a human-centric approach to work – where the ability to recognize and respond to other people (whether they are users or customers or team members) as a human being with human needs and difficulties, is essential. This is at the heart of user-centric design of products and solutions, at the heart of genuine customer- centricity in services, and of any successful interaction with other people.	**1.5**	16.67%
6	**Trust Conduct:** The biggest currency in a sustainable career is "trust" i.e. being trusted by team members, bosses, and customers. When we are trusted, people listen to us, they are willing to give us the chance to grow, give us the space to make mistakes, and work seamlessly with each other without always having to "prove ourselves". In this topic, students learn how to demonstrate conduct that builds the trust of people.	**1.5**	16.67%
	Teaching Hours	**9**	100

SWAMINARAYAN UNIVERSITY
Program Name: Engineering
Level: UG
Branch: Electrical Engineering
Subject Code: BE100601
Subject Name : Contributor Personality Development Program

Course Outcomes:

CO No	Course Outcome Description	RBT Level
CO1	Students will be able to recognize & appreciate the thinking required to find solutions in the face of any challenge	Understand
CO2	Students will be able to recognize & appreciate the thinking required to find solutions in the face of any challenge.	Understand
CO3	Students will be able to recognize & appreciate different types of value that can be created and the different ways to create value for others.	Apply
CO4	Students will be able to recognize & appreciate how to engage deeply, and its need, value, payoffs and consequences in different contexts.	Analyze
CO5	Students will be able to differentiate between 'enlightened self-interest' and 'narrow self-interest' & appreciate the payoffs/ consequences of both when working with multiple stakeholders.	Apply
CO6	Students will be able to recognize & appreciate the human side of situations or interactions or projects that will help them develop a more human-centric approach/ response to work.	Analyze

CO\PO MATRIX

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

SWAMINARAYAN UNIVERSITY
Program Name: Engineering
Level: UG
Branch: Electrical Engineering
Subject Code: BE100601
Subject Name : Contributor Personality Development Program

CO\PSO MATRIX

CO \PSO	PSO1(Demonstrate ethical and empathetic decision-making in personal and professional contexts.	PSO2(Apply human values, communication, and trust-building practices to work collaboratively and socially.)
CO1	3	-
CO2	3	2
CO3	3	3
CO4	3	3
CO5	3	3
CO6	3	3

Reference Books –

- Contributor Personality Program textbook cum workbook developed by Illumine
- Web-based Active Guide TM 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