Re-Accredited 'B++' 2.86 CGPA by NAAC
VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
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ક્રમાંક :ઓથો./પરિપત્ર/૧૨૨૬૩/૨૦૨૫
તા.૨૦/૦૫/૨૦૨૫

પ્રતિ,
વડાશ્રી,
જે.પી.દાવર ઈન્સ્ટીટયૂટ ઓફ ઈન્ફોર્મેશન
સાયન્સ એન્ડ ટેકનોલોજી,
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી,
સુરત.

વિષયઃ– M.Sc.(IT) Sem.- 9 & 10 નો અભ્યાસક્રમ અંગે.

સુજ્ઞશ્રી,

સવિનય જણાવવાનું કે, શૈક્ષણિક વર્ષ–૨૦૨૫–૨૬ થી અમલમાં આવનાર M.Sc.(IT) Sem.-9 & 10 નો પેટાસમિતિ દ્વારા તૈયાર કરવામાં આવેલ અભ્યાસક્રમ ઈન્ફોર્મેશન એન્ડ કોમ્યુનિકેશન ટેકનોલોજી વિષયની અભ્યાસ સમિતિના ચેરમેનશ્રીએ અભ્યાસ સમિતિવતી મંજૂર કરી કોમ્પ્યુટર સાયન્સ વિદ્યાશાખાને કરેલ ભલામણ સ્વીકારી કોમ્પ્યુટર સાયન્સ વિદ્યાશાખા તથા કોમ્પ્યુટર સાયન્સ વિષયની અભ્યાસ સમિતિની સંયુકત તા.૩૦/૦૪/૨૦૨૫ ની સભાનાં ઠરાવ ક્રમાંકઃ ૧૧ થી કરેલ ભલામણ સ્વીકારી એકેડેમિક કાઉન્સિલની તા.૦૫/૦૫/૨૦૨૫ની સભાનાં ઠરાવ ક્રમાંકઃ ૧૫૬ થી મંજુર કરેલ છે. જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

બિડાણઃ ઉપર મુજબ

કુલસચિવ

પ્રતિ,
૧) ઈ.ચા.ડીનશ્રી, કોમ્પ્યુટર સાયન્સ વિદ્યાશાખા.
૨) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

.....તરફ જાણ તેમજ અમલ સારૂ.

Revised - 3

Master of Science (Information Technology)

Name of Program	Master of Science (Information Technology)
Abbreviation	M.Sc. (I.T.)
Duration	5 Years Integrated Course B.Sc.(I. T.) – 3 years – Semester 1 to 6 M.Sc.(I. T.) – 2 years – Semester 7 to 10
Eligibility	H S C / Equivalent Examination from Science Stream (A / B / AB Group) or Vocational Stream or General Stream (Commerce) with English as one of the subject.
Objective of Program	The objective of the program is to transform students into professionals by indoctrinating advanced technical knowledge, enhancing technical skills, communication skills and provide outstanding placement in reputed I.T. companies.
Program Outcome	After the completion of the course, students will be able to develop and manage various types of software based on technologies learnt throughout the course and emerging technologies in IT industry which will give them excellent career prospects.
Effective From	June 2025

Program Structure		**M.Sc. (I.T.) – Semester 9 (M.Sc. (I.T.) 5 years Integrated Course)**						
Course Code	Title	Teaching per week (Hrs.)		Course Credits	University Examination		Internal Marks	Total Marks
		Theory	Practical		Duration	Marks		
901	Internet of Things	4	0	4	3 Hrs	70	30	100
902	Deep Learning	4	0	4	3 Hrs	70	30	100
903	Microservices Architecture and DevOps Engineering	4	0	4	3 Hrs	70	30	100
904	Business Intelligence	4	0	4	3 Hrs	70	30	100
905	Practical 19	-	3	3	2 Hrs	70	30	100
906	Practical 20	-	3	3	2 Hrs	70	30	100
907	Part Time Project 3	-	3	3	-	70	30	100
	Total	16	9	25	-	490	210	700

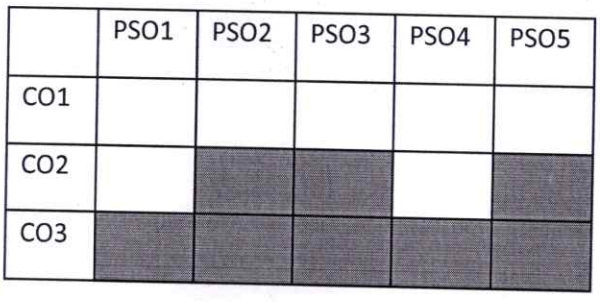
Program Structure		**M.Sc. (I.T.) – Semester 10 (M.Sc. (I.T.) 5 years Integrated Course)**						
Course Code	Title	Teaching per week (Hrs.)		Course Credits	University Examination		Internal Marks	Total Marks
		Theory	Practical		Duration	Marks		
1001	Project	-	-	25	-	490	210	700
	Total			25	-	490	210	700
Program Passing Rules		**As per University rules**						

P. Y Deshpande

Subject Code [2211000609010001]

M.Sc. (I.T.) 9th Semester

Course: 901: Internet of Things

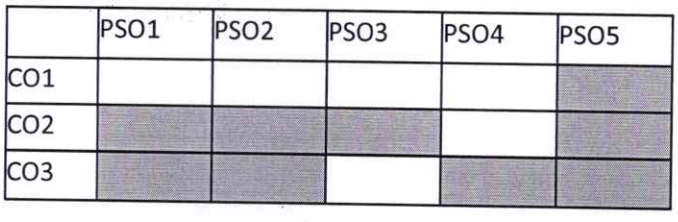
Course Code	901
Course Title	Internet of Things
Credit	4
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June 2025
Purpose of Course	The purpose of this course to provides way to understand concept of Internet of Things (IoT) Architecture, various protocols and implementation of IOT Applications.
Course Objective	To provide understanding of IoT application development process, IOT reference architecture, concept of data communication in IoT and usage of development platforms & Tools.
Course Outcomes	CO1: Explain theoretical and practical concepts of the Internet of Things (IoT). CO2: Develop IoT-based applications using Python programming. CO3: Analyze and utilize IoT hardware platforms like Raspberry Pi and Arduino for real-world applications.
Mapping between COs with PSOs	
Pre-requisite	Basic concepts of Programming and Computer Network
Course Content	**Unit : 1: Introduction of IOT** 1.1 Introduction of IOT, 1.2 Introduction of IOT reference architecture. 1.3 IOT application fields. 1.4 Threads and security issues with IOT system. 1.5 IOT case studies: consumer domain, smart city domain, Manufacturing Domain, Agriculture Domain. **Unit : 2 : IOT hardware platforms of IOT end devices** 2.1 Sensing devices and smart IOT end points : Sensors, sensor devices and Input devices, actuators 2.2 Introduction of Embedded system and its role in IOT 2.3 Embedded system microcontroller architecture :8-bit microcontroller: 8051, 32 bit microcontroller: ARM

	2.4 Introduction IOT system educational Hardware development platforms: Arduino and Raspberry Pi 2.5 Introduction of Raspberry Pi hardware Peripherals
	Unit : 3 : IOT communication Protocols and information theory 3.1 Introduction Of feild Bus (wire) communication for embedded system. 3.2 Short range communication used in IOT: Non-IP based and IP based WPAN (Wireless personal area network) and its protocols 3.3 Long rang communication(LPWAN) used in IOT and its protocols 3.4 Introduction of IOT edge to cloud protocols 3.5 Introduction of MQTT and COAP protocol 3.6 Introduction of Data management system for IOT **Unit : 4 : Software Installation and Python Programming** 4.1 Overview of Raspberry Pi (RPi) hardware platforms and Compatible operating systems 4.2 Setup and Install of Operating System on Raspberry Pi 4.3 Raspbian OS package Installation and updating process. 4.4 Overview of Super user privileges, Linux commands, Navigating file system, Integration with file and source code through command line interface in Raspberry Pi 4.5 Working with Python script. 4.6 Dictionary concept in Python. 4.7 Formatting number and dates in Python. 4.8 File handing in Python 4.9 Exception handling in Python 4.10 Command line arguments in Python 4.11 Introduction the python Paho- MQTT client Library. **Unit : 5 : Building IoT Applications using various Development Platforms** 5.1 Interface with various types of sensors using Arduino and Raspberry Pi. 5.2 Working with various types of I/O and Peripherals of Raspberry Pi 5.3 Working with database in IOT. 5.4 Introduction of open source tools supported by Raspberry pi for IoT. 5.5 IOT Application development using open source tool. 5.5.1 Implementation of IoT Communication Models and Protocols. 5.5.2 IoT Applications with Data Logging and Reporting

Reference Book	1. Architecture Pattern and Techniques for Developing IoT Solutions, Jasbir Singh Dhaliwal, PaCkt publication,2023 2. Robitics at home with Rasberry Pi Pico, Dhani Staple, Packt publication,2023 3. Raspberry Pi and MQTT Essentials.,DhariyaParikh,publication,2022 4. Building IoT visualizations using Grafana, Rodrigo Jaun Hernandez,PACkt publication,2022 5. Practical Arduino Robotics, Lukas Kaul, Packt publication,2023 6. Artificial Intelligence for IoT. Michael Roshak, Packt publication,2021 7. Mastering Embedded Linux Programming, third edition, Fank Vasquez, Chris Simmonds, Packt publication,2021 8. IoT and Edge Computing for Architects, Perry Lea, Packt,2020 9. Practical Python Programming for IoT, Gary Smart, Packt publication,2020 10. Internet of Things architecture and Design Principles, Raj Kamal, McGrawhill Education private limited, 2017 11. ARM Cortex M4 Cookbook, Dr. Mark Fisher, PaCkt publication,2016 12. Learning Internet of Things, Peter Waher, / Packt Publishing Limited, 2015 13. Internet of Things: Technologies and Applications for a New Age of Intelligence,Vlasios Tsiatsis, Stamatis Karnouskos and Jan Holler, Academic Press,2018 14. Raspberry Pi Cookbook,Simon Monk,, O'Reilly Publishing Limited, 2014 15. The Internet of Things, Olivier Hersent, David Boswarthick, Omar Elloumi, Wiley,2018 16. Designing the Internet of Things, Adrian McEwen & Hakim Cassimally, Wiley,2018 17. The Internet of Things, Hakima Chaouchi, Wiley,2017 18. Linux Lab: Hands on Linux, dreamtech Press,2012 19. Python Machine Learning by Sebastian Raschka and Vahid Mirjalili, Packt, 2017 20. Machine Learning using Python by U Dinesh Kumar and Manaranjan Pradhan, Wiley, 2019 21. ARM Assembly Language fundamental of Technique, William Hohl, CRC press,2009 22. The 8051 Microcontroller,Kenneth Ayala, Cengage learning publiaton,2009
Teaching Methodology	Discussion, Independent Study, Seminars and Assignment

Subject Code [2511000609020002]

Course : IT 902 : Deep Learning

Course Code	902
Course Title	Deep Learning
Credit	4
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June 2025
Purpose of Course	This course helps students to understand and implement Artificial Neural Network and Deep Learning concepts using Python language
Course Objective	To impart a comprehensive knowledge of Artificial Neural Network and Deep Learning concepts.
Course Outcomes	CO1: Explain the fundamental concepts of Artificial Intelligence and its applications. CO2: Analyze and apply supervised machine learning algorithms in various domains. CO3: Implement deep learning models using libraries for CNN and RNN development.
Mapping between COs with PSOs	
Pre-requisite	Python Programming Language and basics knowledge of Linear Algebra
Course Out come	After completing the course student will be able to develop Artificial Neural Network model and Deep Learning model like CNN and RNN.
Course Content	**Unit : 1 : Foundations of Deep Learning** Overview of Supervised Learning Fundamentals of Neural Network and Deep Learning Vector, Matrix and Calculus Biological neuron, Mc-Culloch Pitts Neuron, Perceptron, Perceptron Learning Multilayer Perceptron: Linearly separable, linearly non-separable classes Machine Learning vs. Deep Learning Applications of Deep Learning Deep Learning libraries Keras, Tensorflow, Scipy, etc **Unit : 2 : Working with Deep Neural Network** Multi Layered Feed Forward Neural Network, Activation functions: Tanh, Logistic, Linear, Softmax, ReLU, etc... Loss functions: Squared Error loss, Cross Entropy Learning with back propagation Optimization with Gradient Descent Overview of Over fitting Types of biases

	Bias Variance Tradeoff **Unit : 3 : Working With Convolution Neural Network(CNN)** Convolution operation, Padding, Stride, Relation between input, output and filter size, CNN architecture: Convolution layer, Pooling Layer, Flatten Fully Connected NN vs CNN, Variants of basic Convolution function Applications of CNN Introduction to Modern Deep Learning Architectures: LeNET, AlexNET, etc... **Unit : 4 : Sequence Modeling** Introduction to Sequence Modeling Recurrent Neural Network (RNN) Vanishing and Exploding Gradients Long Short Term Memory (LSTM) Applications of LSTM Introduction to LLM: Transformers, BERT, XLNet **Unit : 5 : Advanced Deep Learning** Generative Adversarial Networks – Generator, Discriminator, Training, GAN variants Auto Encoders -- Under complete Auto encoder, Regularized Auto encoder, stochastic Encoders and Decoders, Contractive Encoderss
Reference Book	Neural Networks and Deep Learning: A Textbook By Charu C. Aggarwal, Springer publication Fundamentals of Deep Learning By Nithin Buduma, Nikhil Buduma, and Joe Papa, O'Reilly publication Deep Learning By Ian Goodfellow, Yoshua Bengio, and Aaron Courville, MIT Press Publication Deep Learning from Scratch By Seth Weidman, O'Reilly publication Deep Learning: A Practitioner's Approach By Josh Patterson and Adam Gibson, O'Reilly publication
Teaching Methodology	Lectures, Discussion, Independent Study, Seminars and Assignment

P. Y Desai

Subject Code [2511000609030002]

M.Sc. (I.T.) 9th Semester

Course : 903 : Microservices Architecture and DevOps Engineering

Course Code	903
Course Title	Microservices Architecture and DevOps Engineering
Credit	4
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June 2025
Purpose of Course	This course helps students to understand concepts of Micro Service Architecture, DevOps Engineering and implementations on Cloud.
Course Objective	To learn and implement Micro services design pattern and deployment of the same on cloud using DevOps tool chain.
Course Out come	CO1: Design and develop Microservices Architecture (MSA) applications. CO2: Explain and utilize cloud computing services for deploying MSA-based applications. CO3: Apply and evaluate DevOps tools to deploy, monitor, and manage MSA-based applications efficiently.
Mapping between COs with PSOs	
Pre-requisite	Basic concepts of Programming and fundamentals of cloud computing
Course Content	**Unit : 1: Design and development of Applications based on Micro services Architecture** 1.1 An Overview of Current Design Architectural Patterns 1.1.1 Monolithic architecture 1.1.2 Enterprise Architecture 1.1.3 Service Oriented Architecture 1.1.4 Micro Services Architecture 1.2 Designing MSA 1.2.1 Decomposition of Monoliths 1.2.2 Decompose by Business Capability 1.2.3 Decompose by Subdomain 1.2.4 Service per Team 1.2.5 Domain Driven Design 1.3 Developing MSA based Application 1.3.1 Ecology for MSA 1.3.2 Micro Servers 1.3.3 Rest API for MSA 1.3.4 Packaging Microservices Applications 1.3.5 Security Propagation across Micro Services 1.3.6 Developing Micro Profile based Application for MSA 1.3.7 Deploying application on micro servers **Unit : 2 : Data and Transaction Management in Micro services Architecture** 2.1 Database and MSA 2.2 ACID vs BASE transactions 2.3 Event outsourcing 2.4 Eventual Consistency 2.5 Saga Design Pattern for Database Transactions in MSA 2.6 Micro Services with asynchronous Messaging 2.7 Working with Apache Kafka 2.8 Kafka commands

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1					
CO2					
CO3					

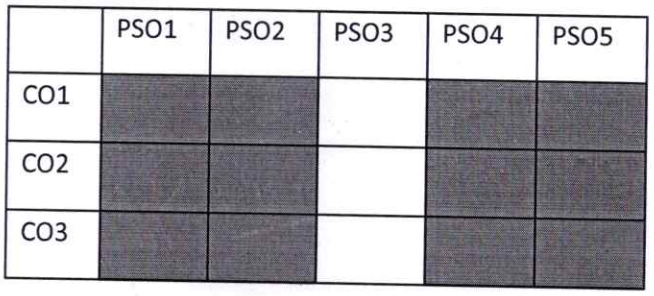
	2.9 Creating MSA with Kafka 2.10 Handling transaction with Kafka 2.11 Command Query Responsibility Segregation (CQRS) 2.12 Introduction to microstreams 2.13 Design Patterns for MSA **Unit : 3 : Realizing Micro services with DevOps** 3.1 Containerization MSA Apps with Docker 3.2 Docker Client Commands 3.3 Docker Security Features 3.4 Containerising Databases 3.5 Introduction to Kubernetes 3.6 Kubernetes Components 3.7 Kubectl commands 3.8 Writing config files for services and deployments 3.9 Working with pods and services 3.10 Auto Scaling 3.11 Using API gateways and Load balancers 3.12 Service Discovery **Unit : 4 : Cloud Services and Micro services Application Deployment** 4.1 Compute Services 4.1.1 Instance Based Compute Services : AWS EC2, Azure Virtual Machines, Google Compute Engine 4.1.2 Server less Compute Services : AWS Lambda, Azure Functions, Google Cloud run 4.1.3 Container Based Compute Services : AWS EKS, Azure AKS, Google GKS 4.2 Storage Services 4.2.1 AWS S3. Azure Blob Storage, Google Cloud Storage 4.2.2 AWS Elastic Block Storage, Azure Disk Storage, Google Cloud Hyperdisk 4.3 Networking Services 4.3.1 AWS VPC, Azure Virtual Network, Google VPC 4.3.2 AWS Elastic Load Balancing, Azure Load Balancer, Google Cloud Load Balancing 4.4 Database Services 4.4.1 AWS RDS, AWS Aurora, Azure SQL, Google Cloud SQL 4.4.2 AWS DynamoDB, Azure CosmosDB, Google Datastore 4.5 Security Services 4.6 Deploying MSA based Applications on cloud. **Unit : 5 : DevOps for CI/CD and Observability** 5.1 Introduction to CI/CD 5.2 Working with Jenkins 5.3 MSA Observability 5.4 Fault Tolerance and Disaster Recovery 5.5 Circuit Breakers and Bulkheads 5.6 Health Checkups 5.7 Logging and Tracing 5.8 Observability tools
Reference Book	1. Cloud Computing and Virtualization by Dac-Nhuong Le, Raghvendra Kumar, Gia Nhu Nguyen, Jyotir Moy Chatterjee, WILEY, 2018 2. Cloud Computing : A Practical Approach by Anthony Velte, Toby Velte, 2. Robert Elsenpeter, Mc Graw Hill, 2017 3. Cloud Computing – Black Book by Kailash Jayaswal, Jagannath 3. kallakurchi, Donald Houde, Deven Shah, Dreamtech Press, 2014 4. Architecting The Cloud by Michael Kavis, WILEY, 2014

	4. Learning AWS by Aurobindo Sarkar, Amit Shah, Packt Publication, 2015 5. Google Cloud Platform Cookbook by LegorieRajan, Packt Publication, 2018 6. Building Your Next Big Thing with Google Cloud Platform by S.P.T. Krishnan, Jose L. Ugia Gonzalez, Apress, 2015 7. Microsoft Azure Fundamentals by Jim Cheshire, Pearson, 2019 8. Microservice Architecture: Aligning Principles, Practices, and Culture by Mike Amundsen, Ronnie Mitra, SPD publications, 2016 9. Building Microservices Paperbackby Sam Newman, SPD Press, 2017 11. Microservices for Java EE Architects: Addendum for The Java EE Architect's Handbook by Derek C. Ashmore, 2017 10. Kubernetes Microservices with Docker by Deepak Vohra, Apress Publication, 2018 11. Docker Quick Start Guide: Learn Docker like a boss, and finally own your applications by Earl Waud, PACKT publications, 2018 12. Apache ZooKeeper Essentials by Saurav Haloi, PACKT publications, 2015 13. Hazelcast A Complete Guide - 2019 Edition by Gerardus Blokdyk publication: 5STARCooks, 2019 14. Microservices Patterns: With examples in Java by Chris Richardson, Publisher: Manning Publications, 2018 15. Microservices and Containers 1st Edition by Parminder Singh, Kocher Publisher - Addison-Wesley Professional, 2018 16. Hands-On Microservices with Kubernetes: Build, deploy, and manage scalable microservices on Kubernetes, by Gigi Sayfan, Packt Publications
Teaching Methodology	Lectures, Discussion, Independent Study, Seminars and Assignment

P. Y Jaya

Subject Code [2211000609040001]

Course : IT 904 : Business Intelligence

Course Code	904
Course Title	Business Intelligence
Credit	4
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June 2025
Purpose of Course	This course provides a comprehensive introduction to modern data engineering and business intelligence practices using the Business Intelligence Tools. Students will learn to build ETL projects and visualization through Power BI. They will understand data warehouses and the advancement in the field.
Course Objective	To impart knowledge on modern data management practices, ETL and Business Intelligence Tools
Pre-requisite	Basic understanding of relational databases and SQL.
Course Out come	CO1: Explain the architecture and components of data lakes and data warehouses. CO2: Implement ETL processes using SSIS to extract, transform, and load data. CO3: Analyze and visualize data effectively using Power BI for decision-making.
Mapping between COs with PSOs	
Course Content	**Unit :1: Introduction to Data Warehouse** 1.1 The Need for Data Warehousing 1.2 Increasing Demand for Strategic Information 1.3 Inability of Past Decision Support System 1.4 OLTP Vs OLAP 1.5 Data Warehouse Components 1.6 Benefits of Data Warehousing 1.7 Features of a Data Warehouse 1.8 The Information Flow Mechanism 1.9 Role of Metadata 1.10 Classification of Metadata 1.11 Data Warehouse Architecture 1.12 Different Types of Architecture 1.13 Data Warehouse and Data Marts 1.14 Applications of DW **Unit :2: ETL (Extraction Transformation and Loading) using SSIS** 2.1 Extraction using SSIS 2.1.1 Connection Managers Introduction 2.1.2 OLE DB Connection Manager 2.1.3 ADO Connection Manager

2.1.4 ADO.NET Connection Manager
2.1.5 Cache Connection Manager
2.1.6 EXCEL Connection Manager
2.1.7 File Connection Manager
2.1.8 FTP and SFTP
2.1.9 SMO

2.2 SSIS Sources
2.2.1 Source Assistant
2.2.2 ADO.NET Source
2.2.3 Excel Source
2.2.4 OLE DB Source
2.2.5 Flat File Source

2.3 SSIS Destinations
2.3.1 ADO.NET Destination
2.3.2 OLE DB Destination
2.3.3 FLAT FILE Destination
2.4 Containers
2.4.1 For Loop Container
2.4.2 ForEach Loop Container
2.4.3 File Enumerator
2.4.4 NodeList Enumerator
2.4.5 SMO Enumerator
2.4.6 Variable Enumerator

3 Transformations using SSIS
3.1 Copy Column Transformation
3.2 Data Conversion Transformation
3.3 Control flow
3.4 Data flow
3.5 Derived Column Transformation
3.6 Sort Transformation
3.7 Union All Transformation
3.8 Merge Transformation
3.9 Aggregate Transformation
3.10 Export Column Transformation
3.11 Multicast and Merge Join
3.12 Import Column Transformation
3.13 Lookup Introduction
3.14 Event handlers
3.15 Merge Join Transformation
- 3.15.1 Inner join
- 3.15.2 Left outer join
- 3.15.3 Right outer join
- 3.15.4 Full outer join

3.16 Multicast Transformation
3.17 Delete, Update Operations
3.18 Union All Transformation
3.19 Script task

Unit 4: Data Lakes and OneLake
4.1 Introduction to Data Storage and OneLake
4.1.1 Overview of data storage evolution: from traditional databases to data lakes and lakehouses.

P. Y Desai

	4.1.3 The need for Data Lakes in modern data architectures 4.1.4 Introduction to Microsoft Fabric and OneLake: a unified data lake for the entire organization 4.1.5 Data Ingestion and Integration with OneLake 4.1.6 Data ingestion methods: Copy Activity in Data Factory, Spark notebooks (basic usage) **Unit 5: Power BI** 5.1 Introduction to Power BI and Direct Lake 5.2 Overview of Power BI: Desktop, Service, Mobile 5.3 Data modeling in Power BI: star schema design, relationships 5.4 Basic DAX for calculated columns and measures 5.5 Data Visualization and Report Design Creating interactive visualizations: charts, graphs, maps 5.6 Designing effective dashboards and reports
Reference Book	1. Learn Microsoft Fabric: A Practical Guide to Performing Data Analytics in the Era of AI, Dirk Strauss, O'Reilly, 2023. 2. Fundamentals of Microsoft Fabric, Nikola Ilic & Ben Weissman, O'Reilly, 2024. 3. Microsoft Fabric Documentation (Official Microsoft Documentation) 4. Learn Microsoft Fabric: A practical guide to performing data analytics in the era of artificial intelligence , 338 pages,Packt Publishing,29 February 2024,ISBN-13 - 978-1835082287 5. Microsoft Fabric: A Comprehensive Beginner's Guide to Leveraging Microsoft Fabric for End-to-End Analytics: Exploring Power BI, Azure Synapse, SQL, and Azure Data, Pleasure Green, Paperback – 28 June 2023, ASIN : B0C9S7KKPF, Independently Published (28 June 2023, 156 pages,ISBN-13 : 979-8850086640, rigin : United Kingdom 6. Data Warehousing in the Real World, Sam Anahory and Dennis Murray, Pearson Education, ISBN – 81-317-0459-9 , 2007 7. Microsoft SQL Server 2008 Integration Services, Kirk Haselden, Pearson ,ISBN- 978- 81- 317- 3477-3, 2011 8. Data Warehouse Fundamentals, Paulraj Ponniah, Wiley India Edition, ISBN- 81-265-0919-8,2006
Teaching Methodology	Lectures, Discussion, Independent Study, Seminars and Assignment

P. Y Das

Subject Code [2211000609050001]

Course : IT 905 : Practical 19

Course Code	905
Course Title	Practical 19
Credit	3
Teaching Per Week	3 Hrs
Minimum Weeks Per Semester	15 (Including Practical Work, Examination, Preparation, Holidays etc.)
Review/Revision	June 2025
Purpose of Course	The purpose of the course is to provide practical knowledge of IoT and Deep Learning algorithms.
Course Objective	The objective of the course is to impart knowledge of implementation of IoT and Deep Learning.
Course Outcomes	CO1: Explain the fundamental concepts of Embedded Systems and IoT programming. CO2: Describe the concepts of Artificial Neural Networks and their real-world applications. CO3: Implement Convolutional Neural Networks (CNN) and Recurrent Neural Networks (RNN) using relevant libraries.
Mapping between COs with PSOs	
Prerequisite	Basics concepts of Embedded system, applied mathematics and linear algebra.
Course Outcome	After completion of this course, students will be able to develop IoT based applications and implement Deep Learning algorithms.
Course Content	Practical based on Paper No. 901 – Internet of Things and 902 – Deep Learning
Reference Books	NIL
Teaching Methodology	Lab Work

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1					
CO2					
CO3					

Subject Code [2211000609060001]

M.Sc. (I.T.) 9th Semester

Course : IT 906 : Practical 20

Course Code	906
Course Title	Practical 20
Credit	3
Teaching Per Week	3 Hrs
Minimum Weeks Per Semester	15 (Including Practical Work, Examination, Preparation, Holidays etc.)
Review/Revision	June 2025
Purpose of Course	The purpose of this course is to provide practical knowledge of Business Intelligence and application development using Micro Services Architecture.
Course Objective	The objective of the course is to impart practical knowledge of Data Warehouse, Data Mining, Data Visualization and application development using Micro Services Architecture.
Prerequisite	Basic concepts of RDBMS and Programming
Course Out come	CO1: Apply SSIS for data integration and develop interactive visualizations using Power BI. CO2: Design and develop REST/Event-driven applications using Microservice Architecture. CO3: Implement deployment strategies for applications using DevOps tools and automation pipelines.
Mapping between COs with PSOs	(see table below)
Course Content	Practical based on Paper No. 903 – Microservices Architecture and DevOps Engineering and 904 – Business Intelligence
Reference Books	NIL
Teaching Methodology	Lab Work

Mapping between COs with PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1					
CO2					
CO3					

M.Sc. (I.T.) 9th Semester

Course : IT 907 : Part Time Project 3

Course Code	907
Course Title	Part Time Project 3
Credit	3
Teaching Per Week	3 Hrs
Duration	-
Minimum Weeks Per Semester	15 (Including Practical Work, Examination, Preparation, Holidays etc.)
Review/Revision	June 2025
Purpose of Course	The purpose of this course is to develop skills to solve real world problems using Mobile / MEAN stack / IoT / BI / Cloud technologies.
Course Objective	CO1: Students will be able to design and develop software applications using Mobile, MEAN stack, IoT, BI, or Cloud technologies. CO2: Students will be able to analyze and evaluate various software architectures and frameworks for scalable and efficient application development. CO3: Students will be able to integrate and deploy applications on cloud platforms, utilizing best practices for security, performance, and scalability.
Prerequisite	Fundamental of software application development
Course Outcome	After completion of this course, students will be able to develop and demonstrate software applications based on Mobile / MEAN stack / IoT / BI / Cloud technologies.
Course Content	The students are required to develop project using Mobile / MEAN stack / IoT / BI / Cloud technologies. The students must prepare documentation of the project completed as per the Software Engineering Guidelines. At the end of the semester, the students have to submit their project report in bounded form to the institution. The Project Presentation and Viva – Voce will be conducted as per the University exam schedule. The students have to submit the following reports at the institution: 1. Project Joining Report 2. Project Title Report 3. Progress Report 4. Project Completion Certificate 5. Institution Certificate 6. Non-disclosure of Source Code Certificate (In case the student is unable to demonstrate project source code) Note : If student's performance is not satisfactory then as per the direction of the internal project guide / external examiner student may have to do coding in the lab according to the project work submitted during internal submission / external examination.
Reference Books	NIL
Teaching Methodology	Project guidance, Review

Subject Code [2211000610010001]

Course : IT 1001 : Project

Course Code	1001
Course Title	Project
Credit	25
Teaching Per Week	-
Duration	-
Minimum Weeks Per Semester	15 (Including Practical Work, Examination, Preparation, Holidays etc.)
Review/Revision	June 2025
Purpose of Course	To acquaint students with technological practices followed in the IT industry by making them work on project for 6 months.
Course Objective	To familiarize students with IT projects development and management practices in industry.
Prerequisite	Fundamental of software application development
Course Outcome	After completion of this course, students will be ready to work as an IT professional.
Course Content	The students are required to do 6 months full time project preferably in industry. The students must prepare documentation of the project completed as per the Software Engineering Guidelines. At the end of the semester, the students have to submit their project report in bounded form to the institution. The Project Presentation and Viva – Voce will be conducted as per the University exam schedule. The students have to submit the following reports at the institution: 1. Project Joining Report 2. Project Title Report 3. Progress Report 4. Project Completion Certificate 5. Institution Certificate 6. Non-disclosure of Source Code Certificate (In case the student is unable to demonstrate project source code) Note : If student's performance is not satisfactory then as per the direction of the internal project guide / external examiner student may have to do coding in the lab according to the project work submitted during internal submission / external examination.
Teaching Methodology	Project guidance, Review