



Estd. 1962
NAAC 'A' Grade
MHRD-NIRF- 28th Rank

SHIVAJI UNIVERSITY, KOLHAPUR-416 004. MAHARASHTRA

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शिवाजी विद्यापीठ, कोल्हापूर – 416004.

दुरध्वनी (ईपीएबीएक्स) २६०९००० (अभ्यास मंडळे विभाग- २६०९०९४)

फॅक्स : ००९१-०२३१-२६९१५३३ व २६९२३३३.e-mail:bos@unishivaji.ac.in

SU/BOS/Sci. & Tech/

No 0 0 3 5 8

Date: 15/09/2021

To,

17 SEP 2021

The Principal/ Director,
All affiliated Engineering Colleges/ Institute,
Shivaji University, Kolhapur.

Subject : Regarding revised Syllabus and equivalence of CBCS Final Year B.Tech.
Part-IV Sem-VII-VIII Program under Faculty of Science and Technology.

Sir/Madam,

With reference to the subject mentioned above, I am directed to inform you that the University Authorities have accepted and granted approval to structure and Syllabus of CBCS Final Year B.Tech. Part-IV Sem-VII-VIII under the Faculty of Science & Technology.

B. Tech. Programme (Branch)

1.	Civil Engineering & Technology
2.	Mechanical Engineering & Technology
3.	Electrical Engineering & Technology
4.	Chemical Engineering & Technology
5.	Electronics Engineering & Technology
6.	Electronics and Telecommunication Engineering & Technology
7.	Computer Science Engineering & Technology
8.	Information Technology Engineering & Technology
9.	Production

This revised syllabus and equivalence shall be implemented with effect from the academic year 2021-2022 (i.e. from June 2021) onwards. A soft copy containing syllabus is attached herewith and it is available on university website www.unishivaji.ac.in.

The question papers on the pre-revised syllabi of above mentioned course will be set for the examinations to be held in October /November 2021 & March/April 2022. These chances are available for repeater students, if any.

You are, therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

Yours faithfully,

Dy. Registrar

Copy to:

1	The I/c Dean, Faculty of Science & Technology	7	Computer Centre
2	The Chairman, Respective Board of Studies	8	Affiliation Section (T.1)
3	Director, Examination and Evaluation	9	Affiliation Section (T.2)
4	Eligibility Section	10	P.G.Admission Section
5	O.E. - 4	11	P.G Seminar Section



SHIVAJI UNIVERSITY KOLHAPUR

REVISED SYLLABUS AND STRUCTURE

FINAL YEAR (B.Tech)

INFORMATION TECHNOLOGY

To be introduced from the academic year 2021-22

(i.e... from June 2021) onwards

(Subject to the modifications will be made from time to time)

FINAL YEAR INFORMATION TECHNOLOGY – CBCS PATTERN

SEMESTER – VII																									
Sr. No	Course (Subject Title)	TEACHING SCHEME											EXAMINATION SCHEME												
		THEORY				TUTORIAL				PRACTICAL			THEORY					PRACTICAL			TERM WORK				
		Credits	No. of Lecture	Hours		Credits	No. of Lecture	Hours		Credits	No. of Lecture		Hours	Hours	Mode	Marks	Total Marks	Min	Hours	Max	Min	Hours	Max	Min	
1	PCC-IT701	4	4	4		-	-	-		1	2	2			CIE	30	100	40	As per BOS Guidelines	-	-		50	20	
2	PCC-IT702	3	3	3		1	1	1		-	-	-			ESE	70							50	20	
3	PCC-IT703	3	3	3		-	-	-		1	2	2			CIE	30	100	40			-	-		50	20
4	PCE-IT704	3	3	3		1	1	1		-	-	-			ESE	70					50	20		50	20
5	PCC-IT705	3	3	3		1	1	1		-	-	-			CIE	30	100	40			-	-		25	10
6	PW-IT706	-	-	-		-	-	-		2	4	4			ESE	70					50	20		50	20
7	WI-IT707	-	-	-		-	-	-		2	4	4									50	20		25	10
						-	-	-		1	2	2			CIE	30	100	40			-	-		25	10
						-	-	-		-	-	-			ESE	70					-	-		-	-
	TOTAL	16	16	16		2	2	2		7	14	14				400					150			250	
SEMESTER –VIII																									
1	PCC-IT801	4	4	4		-	-	-		1	2	2			CIE	30	100	40	As per BOS Guidelines	50	20		50	20	
2	PCC-IT802	4	4	4		1	1	1		-	-	-			ESE	70							25	10	
3	PCE-IT803	3	3	3		1	1	1							CIE	30	100	40					25	10	
4	PCE-IT804	3	3	3		1	1	1		-	-	-			ESE	70					-	-		25	10
5	PCC-IT805	3	3	3		-	-	-		2	4	4			CIE	30	100	40			50	20		50	20
6	PW-IT806	-	-	-		-	-	-		2	4	4			ESE	70					50	20		25	10
7	WI-IT807	-	-	-		-	-	-		-	-	-									-	-		50	20
						-	-	-		-	-	-			CIE	30	100	40			-	-		-	-
						-	-	-		-	-	-			ESE	70					-	-		-	-
	TOTAL	17	17	17		3	3	3		5	10	10				400				150			250		
	TOTAL	33	33	33		5	5	5		12	24	24				800				300			500		

CIE- Continuous Internal Evaluation

• Candidate contact hours per week : 30 Hours (Minimum)	• Total Marks for B.E. Sem VII & VIII : 800 + 800 = 1600
• Theory and Practical Lectures : 60 Minutes Each	• Total Credits for B.E. Sem VII & VIII : 50 (SEM-I: 25, WI + SEM – II: 25)
• In theory examination there will be a passing based on separate head of passing for examination of CIE and ESE.	
• There shall be separate passing for theory and practical (term work) courses.	

Note :

1. **PCC-IT:** Professional Core Course – Information Technology are compulsory.
2. **PCE-IT:** Professional Core Elective – Information Technology are compulsory.
3. **MC-IT:** Mandatory Course- Information Technology are compulsory.
4. **SI-IT:** Summer Internship- Information Technology are compulsory.
5. **PW-IT:** Project Work- Information Technology are compulsory

Semester -VII

Sr. No	Code No.	Subject	Semester	Credits
1.	PCC-IT701	Distributed Computing	7	5
2.	PCC-IT702	Mobile Computing	7	4
3.	PCC-IT703	Advanced Database Systems	7	4
4.	PCE-IT704	Elective –I	7	4
		Image processing		
		Soft Computing		
5.	PCC-IT705	Web Technology	7	5
6.	PW-IT706	Project – I	7	2
7.	WI-IT707	Winter Internship	7	1

Semester - VIII

Sr.No	Code No.	Subject		Semester	Credits
1.	PCC-IT801	Machine Learning		8	5
2.	PCC-IT802	Cloud Computing		8	5
3.	PCE-IT803	Elective -II	Enterprise Resource Planning	8	4
			Information Retrieval		
			Business Intelligence		
4.	PCE-IT804	Elective -III	Software Testing	8	4
			Artificial Intelligence		
			Project Management		
5.	PCC-IT805	Advance Web Technology		8	5
6.	PW-IT806	Project - II		8	2
7.	WI-IT807	Winter Internship		8	0

B.Y.B.Tech (INFORMATION TECHNOLOGY) Sem – VII

PCC- IT701 – Distributed Computing

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 4Hr/week	Term work: -50
Tutorial:-	Theory:- ESE 70 Marks CIE 30 Marks
Practical: -2Hr/Week	Credits:- 5

Prerequisite:

1. Distributed System and Computing
2. Basic knowledge of Operating system and Cloud computing

Course Objectives:

1. To expose students to both the abstraction and details of file systems.
2. To introduce concepts related to distributed computing systems.
3. To focus on performance and flexibility issues related to systems design decisions
4. To prepare students for life-long learning.
5. To understand why and not just thememorize the details.
6. To expose students to current literature in distributed systems.
7. To prepare students for an industrial programming environment

Course Outcomes:

1. Upon Completion of the course, the students will be able to
2. List the principles of distributed systems and describe the problems and challenges associated with these principles.
3. Understand Distributed Computing techniques, Synchronous and Processes.
4. Apply Shared Data access and Files concepts.
5. Design a distributed system that fulfills requirements with regards to key distributed systems properties.
6. Understand Distributed File Systems and Distributed Shared Memory.
7. Apply Distributed web-based system.
8. Understand the importance of security in distributed systems

Unit no.	Course Content	No. of lectures required
1	Fundamentals Fundamentals Evolution of Distributed Computing Systems, System models, issues in design of Distributed Systems, Distributed computing environment, web based distributed model, computer networks related to distributed systems and web based protocols.	05
2.	Message Passing Inter process Communication, Desirable Features of Good Message-Passing Systems, and Issues in IPC by Message, Synchronization, Buffering, Multidatagram Messages, Encoding and Decoding of Message Data, Process Addressing, Failure Handling, Group Communication.	06
3.	Remote Procedure Calls Remote Procedure Calls The RPC Model, Transparency of RPC, Implementing RPC Mechanism, Stub Generation, RPC Messages, Marshaling Arguments and Results, Server Management, Communication Protocols for RPCs, Complicated RPCs, Client-Server Binding, Exception Handling, Security, Some Special Types of RPCs, Lightweight RPC, Optimization for Better Performance	06
4	Distributed Shared Memory Distributed Shared Memory Design and Implementation issues of DSM, Granularity, Structure of Shared memory Space, Consistency Models, replacement Strategy, Thrashing, Other Approaches to DSM, Advantages of DSM.	06
5	Synchronization Synchronization Clock Synchronization, Event Ordering, Mutual Exclusion, Election Algorithms	06
6	Resource and Process Management Resource and Process Management Desirable Features of a good global scheduling algorithm, Task assignment approach, Load	06

TEXT BOOKS:

1. A S Tanenbaum, Martin Steen, "Distributed Systems: Principles and Paradigms", 2/E, PHI, 2006
2. Nancy A. Lynch, "Distributed Algorithms", Morgan Kaufmann, 1996
3. W Richard Stevens, "Unix Network Programming: Vol 1, Networking APIS: Sockets & XTI", 2/E, Pearson Education, 1998
4. Colouris, Dollimore, Kindberg, "Distributed Systems Concepts & Design", 4/E, Pearson Ed. 2005
5. Mukesh Singhal, Niranjan G. Shivaratri, "Advanced concepts in operating systems: distributed, database, and multiprocessor operating systems", MGH, 1/E, 1994.

REFERENCE BOOKS:

1. Distributed OS by Pradeep K. Sinha (PHI)
2. Tanenbaum S.: Distributed Operating Systems, Pearson Education
3. Tanenbaum S. Maarten V.S.: Distributed Systems Principles and Paradigms, (Pearson Education)
4. George Coulouris, Jean Dollimore. Tim Kindberg: Distributed Systems concepts and design.

TERMWORK:**Experiment List**

1. To study Client Server based program using RPC
2. To study Client Server based program using RMI
3. To Study Implementation of Clock Synchronization (logical/physical)
4. To Study Implementation of Election algorithm
5. To study Implementation of Mutual Exclusion algorithms
6. To write Program multi-threaded client/server processes.
7. To write Program to demonstrate process/code migration.
8. Write a distributed application using EJB
9. Write a program using CORBA to demonstrate object brokering
10. Use .Net framework to deploy a distributed application.
11. Implement concurrent echo client-server application
12. Implement concurrent day-time client-server application.
13. Configure following options on server socket and tests them: SO_KEEPALIVE, SO_LINGER, SO_SNDBUF, SO_RCVBUF, TCP_NODELAY
14. Design XML Schema and XML instance document
15. Test open source ESB using web service.

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VII

PCC-IT702– Mobile Computing

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 3 Hrs/week	Term work: -50 marks
Tutorial:- 1 hr /week	Theory:- ESE 70 Marks CIE 30 Marks
Practical: -	Credits:- 4

Prerequisite:

Basic Knowledge of Data Communication (PCC- IT303) and Computer Networks (PCC-IT402).

Course Objectives:

This course aims at giving students knowledge of Mobile Computing along with its applications in terms of the following

1. Define Mobile Computing , study its applications and look at current trends
2. Distinguish between different types of Mobility.
3. Analyze the performance of MAC protocols used for wired network and wireless networks.
4. Explore Theory and Research areas related to Mobile Computing
5. Acquire solid knowledge about mobile networks and mobile computing.

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. Understand basics of wireless communications.
2. Analyze the applications that are mobile-device specific and express current practice in mobile computing contexts.
3. Understand and recognize the GSM, GPRS and Bluetooth software model for mobile computing.

Unit no.	Course Content	No. of lectures required
1	Introduction to wireless communication Need and Application of wireless communication. Wireless Data Technologies Market for mobile.	03
2	Wireless transmission and Medium access Control Frequency for radio transmission signal antennas, signal propagation Multiplexing Modulation, Spread and Cellular systems. Medium access control: Specialized MAC, SDMA, FDMA, TDMA & CDMA.	07

3	Telecommunications systems GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, New data services. UMTS and IMT-2000: UMTS releases and standardization, UMTS system architecture.	07
4	Wireless LAN Introduction, Infrared v/s Radio transmission, Infrastructure and ad-hoc Network, IEEE 802.11, Bluetooth.	06
5	Mobile Network Layer and Transport Layer Mobile IP, DHCP, Mobile ad-hoc networks, Traditional TCP, Classical TCP improvements, TCP over 2.5/3G wireless networks.	06
6	Wireless application protocol Architecture, Wireless datagram protocol, Wireless transport layer, security Wireless transaction protocol,, Wireless session protocol, Wireless application environment , Wireless markup language, WMLScript, Mobile communications, Wireless telephony application, Push architecture, Push/pull services, Example stacks with WAP 1.x 429	07

TEXT BOOKS :

1. Mobile Communications - Jochen Schiller - 2nd edition, Publication-Pearson Education.

REFERENCE BOOKS :

1. Introduction to Wireless Telecommunications systems and Networks - Gary J. Mullett.
Publications- Cengage Learning (India Edition).
2. Mobile Computing – Ashok K Talukdar, Roopa R Yavagal, Publication-TATA McGRAW HILL

TERMWORK :

Tutorial work to be considered for awarding term work marks. It should consist of 8-10 assignments based on above topics.

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VII

PCC-IT 703 – Advance Database Systems

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 3 Hr/week	Term work: - 50 Marks
Tutorial:- --	Theory:- ESE 70 Marks CIE 30 Marks
Practical: - 2 Hr/week	POE:- 50 Marks

Prerequisite: Database Engineering.

Course Objectives:

1. Introduce the basics of query optimization and its cost estimation.
2. Understand the different types of database systems and their silent features.
3. Understand the concept of data warehousing.
4. Understand the concept of data mining and Web mining

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. Implement a database management system in a complex domain, making the best use of the available tools and techniques.
2. Learn and experiment advanced database techniques, models and products, and to provide them with the knowledge to take decisions concerning implementation issues.
- 3.

Unit no.	Course Contents	No. of lectures required
1	Query Processing and Optimization : Overview, Catalog Information for cost estimation, Measures of Query cost, Selection operation, Sorting, Join operation, Selection size estimation, Join size estimation, Transformation of relational expression.	06
2	Object Relational Databases: Motivating example, Structured data types, Operations on structured data, Encapsulation and ADTs, Inheritance, Objects, OIDS and Reference types, Database design for an ORDBMS, Object identity, Nested collections, Storage and access methods, Query processing and optimization, Comparison of RDBMS and ORDBMS.	05
4	Decision Support : Introduction to decision support, Data Warehousing, OLAP, Implementation Techniques for OLAP, Views and decision support, View materialization, Maintaining materialized views.	05

5	Data Mining and Information Retrieval : Introduction, Counting Co-occurrences, Mining for rules, Tree structured rules, Clustering: K-means algorithm and BIRCH algorithm, Similarity search over sequences, Introduction to Information Retrieval: Vector space model, TF/IDF weighting of terms, indexing for text search, Web Mining: Web content mining- Crawlers, Web structure mining- Page Rank and HITS algorithm & Web usage mining (only introduction).	09
6	Advanced Transaction Processing: Transaction-processing monitors, transactional workflows, main-memory databases, real-time transaction systems, long-duration transactions, transaction management in multi-databases.	09

TEXT BOOKS :

1. Database System Concepts – Silberschatz, Korth, Sudarshan, 4th edition onwards [McGraw Hill] – Unit No. 1, 6. 2
2. Database Management Systems - Raghu Ram Krishnan, 3rd edition [McGraw Hill] Unit No. 2, 3, 4, 5.
3. Data Mining – Introductory & Advanced Topics -M. H. Dunham [Pearson Education] Unit No. 5 (For Web Mining)

REFERENCE BOOKS :

1. Fundamentals of Database Systems -Elmasri and Navathe, 5th edition [Pearson Education]
2. Database Systems – A Practical Approach to Design, Implementation and Management-Thomas Conolly, Carolyn Begg, Fourth Edition [Pearson].
3. Decision Support and Data Warehouse Systems -Mallach [TMH]
4. Data Mining Techniques- Linoff, Berry, 3rd edition [WILEY].

TERMWORK :

It should consist of minimum 10 to 12 experiments based on the syllabus and experiment list mentioned below should be implemented using JAVA and any RDBMS like ORACLE / MySQL /IBM-DB2 / MSSQL SERVER , etc.

1. Implement merge join.
4. Implement hash join.
5. Create structured data types of ORDBMS and perform operations- create table using structured data types, insert data and solve queries.
6. Implement parallel joins, sorting and aggregates.
7. Implement vertical and horizontal fragmentation in distributed DBMS.
8. Implement semi join in distributed DBMS.
9. Implement bloom join in distributed DBMS.
10. Implement two phase commit in distributed DBMS.

11. Implementation of concurrency control in distributed DBMS.
12. Implementation of OLAP queries.
13. Implementation of cube operator in OLAP queries in data warehousing and decision support System.
14. Implement bitmap indexes.
15. Implement Apriori algorithm in data mining.
16. Implement K-Means clustering algorithm.
17. Implement Decision Tree of Data Mining problem.
18. Installation & Configuration - Case Study of IBM-DB2 database/MS-SQL server/Oracle/MySQL or any open source RDBMS

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VII

PCE-IT704 – IMAGE PROCESSING

TEACHING SCHEME	EXAMINATION SCHEME
Theory:- 3 Hr/week	Term work:- 25 marks
Tutorial:- 1 Hr/week	Theory:- ESE 70 Marks CIE 30 Marks
Practical:- -----	Credits:- 4

Prerequisite:

Engineering Mathematics and Digital System.

Course Objectives:

- To become familiar with digital image fundamentals.
- To get exposed to different image transforms as well as filtering techniques.
- To learn concepts of different Morphological operations and segmentation techniques.
- To become familiar with different color image processing techniques.

Course Outcomes:

Upon successful completion of this course, the student will be able to –

- Know and understand the basics and fundamentals of digital image processing such as digitization, sampling, quantization and 2D-transforms.
- Operate on images using different image transforms and filtering techniques.
- Understand the image enhancement techniques.
- Learn the basics of color image processing.
- Demonstrate an application based on image processing.

Unit No.	Course Contents	No. of lectures required
1	Digital Image Fundamentals: Fundamentals steps in DIP, Components of image processing system, elements of Visual Perception, Image sensing and acquisition, image Sampling and quantization, basic relations between pixels.	5
2	Image Transforms: Basic intensity transformation: image negation, Log transformation, Power law transformation, Piecewise linear transformation functions, arithmetic and Logic operation, Histogram processing (equalization and matching) , sine cosine, Hadamard , Haar, Slant transform.	6

3	Image Filtering: Fundamentals of spatial filtering, smoothening and Sharpening in spatial domain, smoothening and Sharpening in frequency domain.	7
4	Morphological Image Processing: Dilation & erosion, opening and closing operation, Hit- or –miss Transformation, Basic morphological algorithms: Boundary extraction, region filling, thinning and thickening, skeletons.	5
5	Image Segmentation: Detection of discontinuities: Point detection, line detection, edge detection, (Sobel, Prewitt, Laplacian), global and adaptive thresholding, Region based segmentation (region growing, region splitting and merging).	6
6	Image Compression and Color Image Processing: Fundamentals, Coding redundancy , Inter pixel redundancy,fidelity criteria ,image compression model, lossless predictive coding, Lossy predictive coding.Color fundamentals, Color models , pseudo color, image processing , full color image processing, Color transformations.	7

TEXT BOOKS:

1. Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing, Pearson, Third Edition, 2010.
2. Anil K. Jain, Fundamentals of Digital Image Processing, Pearson, 2002.

REFERENCE BOOKS:

1. Kenneth R. Castleman, Digital Image Processing, Pearson, 2006.
2. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, Digital Image Processing using MATLAB, Pearson Education, Inc., 2011.
3. D. E. Dudgeon and RM, Mersereau, Multidimensional Digital Signal Processing, Prentice Hall Professional Technical Reference, 1990.
4. William K. Pratt, Digital Image Processing, John Wiley, New York, 2002.
5. Milan Sonka et al Image processing, analysis and machine vision, Brookes/Cole, Vikas Publishing House, 2nd edition, 1999.

TERMWORK: Minimum Eight Tutorials based on above syllabus.

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VII

PCE-IT704 – SOFT COMPUTING

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 3 Hr/week	Term work: - 25
Tutorial:- 1 Hr/week	Theory:- ESE 70 Marks CIE 30 Marks
Practical: - NIL	Credits:- 4

Prerequisite:

Basic Knowledge.

Course Objectives:

1. Soft Computing is a consortia of methodologies which collectively provide a body of concepts and techniques for designing intelligent systems.

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. Understand basic concept of Soft Computing.
2. Know different Soft Computing Techniques.
3. Understand Concept related Neural Networks and Fuzzy Systems.

Unit no.	Course Contents	No. of lectures required
1	Introduction: What is Soft Computing? Difference between Hard and Soft computing, Requirement of Soft computing, Major Areas of Soft Computing, Applications of Soft Computing.	05
2	Neural Networks: What is Neural Network, Learning rules and various activation functions, Single layer Perceptrons , Back Propagation networks, Architecture of Back propagation (BP) Networks, Back propagation Learning, Variation of Standard Back propagation Neural Network, Recent Applications.	07
3	Fuzzy Systems: Fuzzy Set theory, Fuzzy versus Crisp set, Fuzzy Relation, Fuzzification, Minmax Composition, Defuzzification Method, Fuzzy Logic, Fuzzy Rule based systems, Predicate logic, Fuzzy Decision Making, Fuzzy Control Systems, Fuzzy Classification.	06
4	Fuzzy Backpropagation Networks: LR type Fuzzy numbers, Fuzzy Neuron, Fuzzy BP Architecture, Learning in Fuzzy BP, Application of Fuzzy BP Networks.	06

5	Hybrid Systems: Sequential Hybrid Systems, Auxiliary Hybrid Systems, Embedded Hybrid Systems, Neuro-Fuzzy Hybrid Systems, Neuro-Genetic Hybrid Systems, Fuzzy-Genetic Hybrid Systems.	06
6	Genetic Algorithms Introduction, Basic GA framework and different GA architectures, GA based Weight Determination, K - factor determination in Columns.	06

TEXT BOOKS :

1. Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis & Applications, S.Rajasekaran, G. A. Vijayalakshami, PHI.

REFERENCE BOOKS :

1. Genetic Algorithms: Search and Optimization, E. Goldberg.
2. Neuro-Fuzzy Systems, Chin Teng Lin, C. S. George Lee, PHI.
3. Build_Neural_Network_With_MS_Excel_sample by Joe choong.

TERMWORK :

B. Y.B.Tech (INFORMATION TECHNOLOGY) Sem – VII

PCE-IT704– Data Science

TEACHING SCHEME	EXAMINATION SCHEME
Theory: -3Hr/week	Term work: -25
Tutorial:- 1Hr/Week	Theory:- ESE 70 Marks CIE 30 Marks
Practical: - ____	Credits:- 4

Prerequisite:

1. Programming concepts, Statistical and numerical methods

Course Objectives:

1. To acquire programming skills in core Python
2. To acquire Object Oriented Skills in Python
3. To develop the skill of designing Graphical user Interfaces in Python
4. To develop the ability to write database applications in Python

Course Outcomes:

1. Apply various Python data structures to effectively manage various types of data.
2. Explore various steps of data science pipeline with role of Python.
3. Design applications applying various operations for data cleansing and transformation.
4. Use various data visualization tools for effective interpretations and insights of data.
5. Perform data Wrangling with Scikit-learn applying exploratory data analysis.
6. Apply various Python data structures to effectively manage various types of data.

Unit no.	Course Contents	No. of lectures required
1	Overview of Python and Data Structures Basics of Python including data types, variables, expressions, objects and functions. Python data structures including String, Array, List, Tuple, Set, Dictionary and operations them.	06
2.	Data Science and Python Discovering the match between data science and python: Considering the emergence of data science, Outlining the core competencies of a data scientist, Linking data science, big data, and AI , Understanding the role of programming, Creating the Data Science Pipeline, Preparing the data,	04

3.	Getting Your Hands Dirty With Data Using the Jupyter Console, Interacting with screen text, Changing the window appearance, Getting Python help, Getting IPython help, Using magic functions, Discovering objects, Using Jupyter Notebook, Working with styles, Restarting the kernel, Restoring a checkpoint, Performing Multimedia and Graphic Integration, Embedding plots and other images, Loading examples from online sites, Obtaining online graphics and multimedia.	10
4	Data Visualization Visualizing Information: Starting with a Graph, Defining the plot, Drawing multiple lines and plots, Saving your work to disk, Setting the Axis, Ticks, Grids, Getting the axes, Formatting the axes, Adding grids, Defining the Line Appearance, Working with line style, Using colors, Adding markers, Using Labels, Annotations, and Legends, Adding labels, Annotating the chart, Creating a legend. Visualizing the Data: Choosing the Right Graph, Showing parts of a whole with pie charts, Creating comparisons with bar charts, Showing distributions using histograms, Depicting groups using boxplots, Seeing data patterns using scatterplots, Creating Advanced Scatterplots, Depicting groups, Showing correlations, Plotting Time Series, Representing time on axes, Plotting trends over time, Plotting Geographical Data, Using an environment in Notebook, Getting the Basemap toolkit, Dealing with deprecated library issues, Using Basemap to plot geographic data, Visualizing Graphs, Developing undirected graphs, Developing directed graphs	06
5	Data Wrangling Wrangling Data: Playing with Scikit-learn, Understanding classes in Scikit-learn, Defining applications for data science, Performing the Hashing Trick, Using hash functions, Demonstrating the hashing trick, Working with deterministic selection, Considering Timing and Performance, Benchmarking, with, timeit,.	06
6	Data Measure Working with the memory profiler, Running in Parallel on Multiple Cores, Performing multicore parallelism, Demonstrating multiprocessing. Exploring Data Analysis: The EDA Approach, Defining Descriptive Statistics for Numeric Data, Measuring central tendency, Measuring variance and range, Working with percentiles, Defining measures of normality, Counting for Categorical Data, Understanding frequencies, Creating contingency tables, Creating Applied Visualization for EDA, Inspecting boxplots	06

TEXT BOOKS:

- 1 Python for data science for dummies John Paul Mueller, Luca Massaron Wiley
- 2 Programming through Python M. T. Savaliya, R. K. Maurya, G. M. Magar STAREDU Solutions
3. Pandas for everyone: Python Data Analysis Daniel Y. Chen Pearson

REFERENCE BOOKS:

1. Introducing Data Science: Big Data, Machine Learning, and More, Using Python Tools Davy Cielen, Arno D.B. Meysman, Mohamed Ali
2. Applied Data Science with Python and Jupyter Alex Galea Packt
3. Data Analytics Paperback Anil Maheshwari McGrawHill
4. Data Science From Scratch: First Principles with Python Joel Grus O'REILLY
5. Star Data Science Specialist STAR CERTIFICATION

TERMWORK:

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VII

PCC-IT705 – WEB TECHNOLOGY-I

TEACHING SCHEME	EXAMINATION SCHEME
Theory: -3 Hr/week	Term work: -50
Tutorial:- --	POE:- 50
Practical: - 4 Hr/week	Credits:- 05

Prerequisite:

Basic Knowledge of OOP.

Course Objectives:

1. To introduce students to HTML/CSS for front end design .
2. To introduce students to perform client side form validation
3. Understand emerging Web technologies concepts and tools.
4. To enable students to write web applications/services using different technologies

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. Apply knowledge of different HTML/CSS elements for designing web pages
2. Construct client side scripts for validating HTML form data using Javascript technology
3. Develop web applications using HTML/CSS/JavaScript/Server side technologies

Unit no.	Course Contents	No. of lectures required
1	HTML5 and CSS HTML Structure, XHTML, DOCTYPE, Header Elements, Conditional Style Sheet, Structural Block Elements, Terminal Block Elements, Multipurpose Block Elements, Inline Elements, Class and ID Attributes,	05
2	CSS Selector and Inheritance: Type, Class and ID Selector, Position and Group Selectors, Attribute Selectors, Pseudo-element Selectors, Pseudo-class Selectors, Subclass Selector, Inheritance, Visual Inheritance Box Model : Display, Box Model, Inline Box, Inline-Block Box, Block Box, Table Box, Absolute Box, Floated Box, Box Extends: Width, Height, Sized, Shrink, wrapped, Stretched, Box Margin, Border, Padding, Background, Overflow, Visibility, Page Break Positioning Models, Closest Positioned Ancestor, Stacking Context, Atomic, Static, Absolute, Fixed Relative, Float and Clear, Relative Float	04
3	JavaScript Introduction to javascript ,Basic program of javascript ,Function & Some data types like array, object , Event In Javascript ,Validating HTML form data using javascript ,Jquery Introduction ,Selectors in Jquery	05

4	Introducing PHP And PHP Functions History, General Language Feature PHP Basics : Embedding PHP code in Your Web Pages, Outputting Data to the Browser, PHP supported Data Types, Identifiers, Variables, Constants, Expressions, String Interpolation, and Control Structures Functions: Invoking a Function, Creating a Function, Function Libraries, Array: Creating an array, outputting a Array, Merging, slicing, splicing and Dissecting Arrays, Other useful Array Functions	05
5	Object-Oriented PHP, Advanced OOP Features, Strings and Regular Expressions, Working with HTML Forms. Object-Oriented PHP: The benefits of OOP, Key OOP Concepts, Constructor and Destructors, Helper Functions. Advanced OOP Features: Object Cloning, Inheritance, Interfaces, Abstract classes, and Introducing namespaces. Strings and Regular Expressions: Regular Expressions, Other String-Specific Functions, Alternatives for Regular Expression Functions Working with HTML Forms: PHP and Web Forms, Validating Form Data Handling File ,Uploads: Uploading Files with PHP	08
6	Using PHP with MySQL, Session Handlers Using PHP with MySQL: Installation Prerequisites, Using the mysqli Extension, Interacting with the Database, Executing Database Transactions. Session Handlers: What Is Session Handling, Configuration Directives, Working with Sessions, Practical Session-Handling Examples, Creating Custom Session Handlers	08

TEXT BOOKS :

1. Pro HTML5 and CSS3 Design Patterns by Michael Bowers, Dionysios Synodinos and Victor Sumner, Apress edition
2. Beginning PHP and MySQL: From Novice to Professional, Fourth Edition - W. Jason Gilmore (Unit 4, 5, 6)

REFERENCE BOOKS :

1. Teach Yourself PHP, MYSQL, Apache - Julie C Meloni [SAMS Publication]
2. PHP5 and MySQL Bible Tim Converse, Joyce Park, Clark Morgan

TERMWORK :

1. Create html pages for website like login, registration and about us pages.
2. Design created pages using CSS
Construct client side scripts to validate HTML form data using Javascript technology
3. Develop a convertor using JavaScript and HTML[e.g. length, area convertor]
4. Installing Apache and PHP on Linux, Configuring PHP at Build Time on Linux. Or
5. Installation of XAMPP.
6. Hello world Program-Embedded HTML with PHP.
7. Program based on PHP variables, Expression, arrays, control structure
8. Experiment Based on OOP and Advance OOP PHP.
9. Experiment based on form validation using PHP using regular expressions etc.
10. Experiment based on upload various types file.
11. Experiment based on send Mail using PHP.
12. Experiment based on database handling using PHP through HTML Forms.(Insert, delete, update records)
13. Experiment based on session Management (create Login Application).
14. Installation of CMS-Joomla/ Drupal/WordPress- Install different modules, plug-ins and learn how to customize it etc.

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VII

PCC-IT706 – Project-I

TEACHING SCHEME	EXAMINATION SCHEME
Theory: -	Term work: -25
Tutorial:-	Practical:- 50
Practical: - 4Hr/Week	Credits:- 2

Prerequisite: Basic Knowledge.

Course Objectives:

1. Identify the area of project work
2. Recognize the need and ability to engage in lifelong learning
3. Function effectively on teams and to communicate effectively
4. Able to prepare the technical report

Course Outcomes:

On completion of the course, student will be able to-

1. Explain the need of a software project for the society.
2. Identify requirement analysis like functional and technical requirements for the Project.
3. Come up with design documents for the project consisting of Architecture, Dataflow diagram, class diagram, Algorithmic descriptions of various modules, collaboration diagram, ER Diagrams, Database Design Documents, Sequence Diagram, Use Case diagram.
4. Able to demonstrate analysis and design of project
5. Prepare the technical report consisting of Requirement specification, Analysis and design of Project

Course Content
<p>The project work is to be carried out in two semesters of Final Year Information Technology. The project should be undertaken preferably by group of 4-5 students who will jointly work and implement the project in the two semesters.</p> <p>In Semester VII, the group will select a project with the approval of the Guide (staff member) and submit the name of the project with a synopsis of the proposed work of not more than 02 to 08 pages before second week of August in the academic year. The group is expected to complete detailed system design, analysis, data flow design, procurement of hardware and/or software, implementation of a few modules of the proposed work at the end of semester –VIII as a part of the term work submission in the form of a joint report.</p> <p>The term work assessment will be done jointly by teachers appointed by Head of the Institution.</p> <p>The oral examination will be conducted by an internal and external examiner as appointed by the University.</p>

Note:

1. Project work should be continually evaluated based on the contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.
2. Two mid-term evaluations should be done, which includes presentations and demos of the work done.
3. Care should be taken to avoid copying and outsourcing of the project work.

TEXT BOOKS :

1. Data

REFERENCE BOOKS :

1. Data

TERMWORK :

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem –VII

WI-IT 707 –Winter Internship

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - Null	Term work: - Null
Tutorial:- Null	Theory:- Null
Practical: - 2 Hr./Week	Credits:- 1

Prerequisite: Interested professional language

Course Objectives:

- 1) Identify the ethical standard of behavior for professional and interns within the industry
- 2) Understand the observation; documentation and assessment are used in industry
- 3) Develop applied professional skills and technique to get place in MNC Company

Course Outcomes:

1. Students build applicable skills through a variety of internship opportunities, and our graduates find positions in public and private organizations
2. Assess and improve upon their, own cultural competency skills.

Course Content

Internship / Industrial training is a very vital part of professional engineering education. All B. Tech. students are required to undergo internship / training during summer / winter vacation for the period of four to eight weeks. Training and Placement Department take various initiatives and interacts with industries.

To get the maximum benefits from these rare opportunities, industrial internship/training is very carefully planned. The training program has following components.

1) Allotment of internship/Training organizations

2) Orientation Lecture: During Orientation Lecture students are taught techniques of learning what to learn, how to learn, etc.

3) Internship / Industrial Training Schedule: B. Tech. = 04 Weeks.

4) Daily Diary: Students undergoing training are required to maintain daily diary regularly in systematic manner.

Note:

1. The students shall undergo 6-8 week internship during summer/winter vacation at industry/R&D organization / Academic Institutes
2. The internship evaluation shall be done in the VIII semester of study and hence the students shall complete the prescribed period of internship before start of VIII semester.
3. The internship evaluation shall be done by Departmental Project Evaluation Committee (DPEC) based on the report submitted by student and oral presentation on VIII semester

B. Tech (INFORMATION TECHNOLOGY) Sem – VIII

PCE-IT801 – MACHINE LEARNING

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 4 Hr/week	Term work: -50 Marks
Tutorial:-NA	Theory:- ESE 70 Marks CIE 30 Marks
	Credits:- 05
Practical: 2 Hr/week	POE :- 50 Marks

Prerequisite: Probability Theory, Computer Programming, Computer Algorithm, Data structures Python Programming.

Course Objectives:

1. To understand the concept of supervised and unsupervised machine learning techniques.
2. To introduce various machine learning algorithms.
3. To understand nature of problems solved with Machine Learning.

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. Explain Machine Learning concepts
2. Distinguish various machine learning algorithms
3. Apply appropriate learning methods for problems
4. Design solution using Machine Learning techniques.

Unit no.	Course Contents	No. of lectures required
1	Introduction to Machine Learning: Machine Learning: Definition, Terminology, Types of learning, Applications of Machine Learning, Supervised v/s Unsupervised Learning, Machine Learning Problem categories, Machine learning architecture, process, Lifecycle, Performance Measures, tools and framework, data visualization techniques	08
2	Regression Techniques in Machine Learning: Simple regression – hypothesis, cost function, parameter learning with gradient descent, learning rate, Gradient Descent for linear regression, examples, simple regression in matrix form. Multivariate Linear Regression – Multiple features, hypothesis functions, Gradient Descent for multiple variables, Feature scaling, polynomial regression, Linear Regression, Non-linear Regression, Model evaluation methods: Bias/Variance trade off, Error Analysis Ensemble methods, Precision/Recall trade off	10
3	Classification- logistic regression & Naïve Bayes : Logistic Regression – Definition, Hypothesis representation, decision boundary, cost function, Gradient Descent for Logistic Regression. Multiclass Classification, Regularization - Over fitting & Under fitting, cost function,	08

	Regularized Linear Regression, Regularized Logistic Regression, Conditional probability and Naïve Bayes Classifier, Instance-based classifier – K- Nearest Neighbour Classifier, Bayesian Network, Hidden Markov Model	
4	Classification Techniques in Machine Learning : Classification- Decision trees and Support Vector Machine: Decision trees: definition, terminology, the need, advantages, and limitations. Constructing and understanding Decision trees, common problems with Decision trees, Decision tree algorithms, random forest, examples, Support Vector Machine: What is SVM, Kernel Trick, Cost Function, Decision Trees vs. Support Vector Machine	08
5	Unsupervised Learning Techniques in Machine Learning: Clustering, K Means clustering, Hierarchical clustering, Association Rule mining	06
6	Neural Networks: Use cases based on supervised ML, unsupervised ML, reinforcement, Shopping mall, recommendation engine, IPL prediction, weather forecast prediction, house price prediction, Market Basket Analysis, classifying emails as spam or not, sentiment analysis, forecast product demand and inventory.	08

TEXT BOOKS :

1. Machine Learning With Python by Abhishek Vijayvargia,BPB Publications
2. Aurelien Geron , “ Hands-On Machine Learning with Scikit-Learn, Keras and Tensor Flow: Concepts, Tools and Techniques to Build Intelligent Systems”, O’Reilly, 2nd Edition, 2019

REFERENCE BOOKS :

1. Tom Mitchell, “Machine Learning”, McGraw-Hill, 2nd Edition, 1997
2. Machine Learning for dummies by John Paul Muller,Willey Publication

TERMWORK :

- Minimum of 12 Experiments to be performed from the list given below.
- 25 marks for performance in practical and experiments as part of continuous evaluation
- 25 marks for Practical Test and oral to be conducted.

Experiment List

Software/Tools required to perform the below experiments –

- a. Anaconda
 - b. Python v3.8+
 - c. Spyder/Jupyter Notebook
 - d. Google Colaboratory (**Optional**)
-
1. Study and prepare a report on different tools, framework and data visualization techniques in Machine Learning
 2. Write a program to perform –
 - a. The hypothesis and cost function
 - b. Gradient descent for linear regression
 3. Write a program to perform linear regression and multivariate regression using multiple features. Display the results using the different data visualization techniques (Perform this using a data set)
 4. Write a program to perform multiclass classification using a data set and display the results using different data visualization techniques
 5. Study and prepare a report on overfitting and underfitting in Machine Learning
 6. Write a program to perform Naïve Bayes classifier with the help of a data set and display the result/s using different data visualization techniques
 7. Write a program to perform KNN (k-Nearest Neighbor) classifier with the help of a data set, and display the result/s using different data visualization techniques
 8. Write a program to perform decision trees with the help of a data set and display the result using the different visualization techniques
 9. Write a program to perform SVM (Support Vector Machines) with the help of a data set and display the result/s using different data visualization techniques
 10. Write a program to perform k-means clustering with the help of a data set and display the result/s using different visualization techniques
 11. Write a program to perform the association rule mining (Apriori algorithm) using a data set and display the associated results in a tabular form and using different data visualization techniques
 12. Write a program to show case the IPL prediction (use different scenarios such as team winning, ground match, stadium, etc...). prepare the summary and report for IPL prediction
 13. Write a program to show case weather forecast prediction using different countries data set and display the results using different data visualization techniques
 14. Write a program to perform the classification of emails as “spam” or “not spam”
 15. Write a program to perform sentiment analysis and display the results using different data visualization techniques (Use of atleast 5 different emotions is mandatory to perform this experiment)

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VIII

PCC-IT802 – Cloud Computing

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 4 Hr/week	Term work: - 25
Tutorial:- 1 Hr/week	Theory:- ESE 70 Marks CIE 30 Marks
Practical: -	Credits:- 5

Prerequisite: Computer Networks, Operating System-I, Information Security

Course Objectives:

This course aims at giving students knowledge of Cloud computing along with its applications in terms of the following

1. Understanding the systems, protocols and mechanisms to support cloud computing.
2. Understanding the architecture of cloud computing
3. Discuss Cloud Platforms in Industry
4. Understanding cloud computing applications.
5. Discuss Cloud Security and various challenges

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. Understanding and familiar with the basic concepts of cloud computing
2. Demonstration of different virtualization techniques
3. Illustrates different cloud applications
4. Understand recent trends in cloud computing
5. Comprehend the importance of cloud security

Unit no.	Course Contents	No. of lectures required
1	Introduction: Definition, Historical Developments, Computing Platforms and Technologies. Building cloud computing environments, Principles of Parallel and Distributed Computing: Parallel versus Distributed Computing, Elements of Parallel Computing, Elements of Distributed Computing, and Technologies for Distributed Computing.	06
2	Virtualization Characteristics, Virtualization Techniques, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples.	06

3	Cloud Computing Architecture Cloud Reference Model, Types of Clouds, And Economics of Clouds, Open Challenges, Cloud Platforms in Industry: Amazon Web Services, Google App Engine, And Microsoft Azure.	07
4	Cloud Applications Scientific Applications in – Healthcare, Biology, Geo-Science; Business Applications in– CRM and ERP, Productivity, Social Networking, Media Applications, Multiplayer Online Gaming.	07
5	Advanced Topics in Cloud Computing: Energy Efficiency in Clouds, Market Based Management of Clouds, Federated Clouds / InterCloud, Third Party Cloud Services.	05
6	Understanding Cloud Security: Securing the Cloud, The security boundary, Security service boundary, Security mapping, Securing Data, Brokered cloud storage access, Storage location and tenancy, Encryption, Auditing and compliance, Establishing Identity and Presence, Identity protocol standards	07

TEXT BOOKS :

1. Mastering Cloud Computing, Buyya R, Vecchiola C, Selvi S T, McGraw Hill Education (India), 2013.
2. Cloud Computing Bible, Barrie Sosinsky ,Wiley Publishing Inc. 2011(Unit,VI)

REFERENCE BOOKS :

1. Buyya R, Broberg J, Goscinski A, “Cloud Computing - Principles and Paradigms”, Wiley, 2011.

TERMWORK :

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VIII

PCE-IT 704– Enterprise Resource Planning

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 3 Hr/week	Term work: -25
Tutorial:- 1 Hr/Week	Theory:- ESE 70 Marks CIE 30 Marks
Practical: - -----	Credits:- 4

Prerequisite: Fundamentals of Economic & Management

Course Objectives:

1. To provide overview of ERP.

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. To impart knowledge about different facets of ERP Systems
2. To impart knowledge of ERP implementation process and get familiar with the common pitfalls.
3. Explain the challenges associated with implementing enterprise systems and their impacts on organizations •
4. Describe the selection, acquisition and implementation of enterprise systems
5. Use one of the popular ERP packages to support business operations and decision-making,
6. Communicate and assess an organization's readiness for enterprise system implementation with a professional approach in written form, •

Unit no.	Course Contents	No. of lectures required
1	Introduction Overview of enterprise systems: Introduction, What is ERP, Why ERP, Need for Enterprise Resource Planning , Definition of ERP. Evolution of Enterprise Resource Planning: Pre material requirement planning (MRP stage), Material requirement planning, MRP- II ,ERP ,Extended ERP , ERP Planning –II , ERP-A manufacturing perspective Risks and benefits – Risk implementation, Fundamental technology of ERP, Issues to be consider in planning design and implementation of cross functional integrated ERP systems	07
2	ERP SOLUTIONS AND FUNCTIONAL MODULE Overview of ERP software solutions, Small, medium and large enterprise vendor solutions, Business process Reengineering, Business process Management, Steps of BPM Functional Modules: ERP Production planning module, ERP purchasing module, ERP Inventory control module, ERP Sales module, ERP Marketing module, ERP Financial module, ERP HR module	05

3	ERP IMPLEMENTATION Planning Evaluation and selection of ERP systems, ERP Implementation life cycle: Pre-evaluation Screening, Package Evaluation, Project Planning Phase, Gap-Analysis, Reengineering, Configuration ERP Implementation: Implementation Team Training, Testing, Going Live, End-user training Post – implementation ERP implementation Methodology and Frame work Training, Data Migration, People Organization in implementation, Consultants and Vendors, Employees.	07
4	POST IMPLEMENTATION ERP Implementation, Maintenance of ERP, Organizational and Industrial impact; Success factors of ERP Implementation, Key success factors, Failure factors of ERP Implementation.	06
5	EMERGING TRENDS ON ERP Extended ERP systems and ERP add-ons, CRM, Benefits of ERP Module, Supply Chain Management (SCM), Business analytics & Intelligence, Wireless Technology used in ERP, Future trends in ERP	05
6	ERP market and case studies: Brief account of ERP market, various ERP packages like SAPAG,Oracle, PeopleSoft, etc, Case studies based on implementation of ERP for various industries in mfg., marketing and other business.	06

TEXT BOOKS :

1. Alexis Leon, ERP demystified, second Edition Tata McGraw-Hill, 2006
2. Enterprise Resource planning, Alexis Leon, Tata McGraw Hill Publication, ISBN 0-07- 463712-6

REFERENCE BOOKS :

1. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill, 2008
2. Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw-Hill, 2008.
3. Mahadeo Jaiswal and Ganesh Vanapalli, ERP Macmillan India, 2006.
4. Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, Prentice Hall of India, 2006.
5. Summer, ERP, Pearson Education, 2008.

TERMWORK :

7-8 Tutorials based on each chapter

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VIII

PCE-IT803 – INFORMATION RETRIEVAL

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 3 Hrs/week	Term work: - 25
Tutorial:- 1 Hr/week	Theory:- ESE-70 CIE-30
Practical: - ----	Credits:- 4

Prerequisite:

1. Advance Database Systems
2. Web-Technology-I

Course Objectives:

1. To understand the need of Information Retrieval
2. To use IR system in Information Search
3. To learn Information Retrieval Modeling and Evaluation
4. To understand Preprocessing in IR Systems
5. To study Text based and Web Based Retrieval Systems

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. To apply Information Retrieval system to search information.
2. To design and develop Retrieval systems.

Unit no.	Course Contents	No. of lectures required
1	Introduction to Information Retrieval Information Retrieval in Libraries and Digital Libraries, The IR Problem, The IR System, How the Web Changed Search. User Interfaces for Search, Search Interfaces Today, Visualization in Search Interfaces	05
2	Information Retrieval Modeling IR Models: Modeling and Ranking, Characterization of an IR Model, A Taxonomy of IR Models, Classic Information Retrieval: Basic Concepts, The Boolean Model, Term Weighting, TF-IDF Weights, Document Length Normalization, The Vector Model, Set-Based Model, Extended Boolean Model, Generalized Vector Space Model, Latent Semantic Indexing Model, The Hypertext Model, Web based Models, Structured Text Retrieval	07
3	Information Retrieval Evaluation Retrieval Metrics: Precision and Recall, Single Value Summaries: P@n, MAP, MRR, F, User-Oriented Measures, DCG: Discounted Cumulated Gain, BPREF: Binary Preferences, Rank Correlation Metrics	06

4	Documents: Languages & Properties Metadata, Text Document Format, Markup Languages, RDF: Resource Description Framework, Text Properties, Information Theory, Text Similarity, Document Preprocessing , Lexical Analysis of the Text , Elimination of Stopwords, Stemming , Keyword Selection, Queries: Languages & Properties, Query Languages: Keyword-Based Querying, Structural Queries, Query Protocols, Query Properties	07
5	Text Classification and Indexing A Characterization of Text Classification, Unsupervised Algorithms, Supervised Algorithms, Feature Selection or Dimensionality Reduction, Evaluation Metrics, Inverted Indexes	06
6	Web Retrieval The Web ,Characteristics , Structure of the Web , Modeling the Web , Link Analysis, Search Engine Architectures, Search Engine Ranking, Managing Web Data, Search Engine User Interaction, Browsing, Beyond Browsing	05

TEXT BOOKS :

1. Modern Information Retrieval The Concepts and Technology behind Search by Ricardo Baeza-Yates Berthier Ribeiro-Neto Second edition Addison-Wesley 2011

REFERENCE BOOKS :

1. Introduction to Information Retrieval by C.D. Manning, P. Raghavan, H. Schütze. Cambridge UP, 2008.
2. Search Engines: Information Retrieval in Practice by Bruce Croft, Donald Metzler, Trevor Strohman Pearson 2010

TERMWORK :

Tutorial work to be considered for awarding term work marks. It should consist of 8-10 assignments based on above topics.

B. Y. B. Tech (INFORMATION TECHNOLOGY) SEM – VIII

PCE-IT803 – Business Intelligence

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 3Hr/week	Term work: -25
Tutorial:- 1Hr/week	Theory:- ESE 70 Marks CIE 30 Marks
Practical: -	Credits:- 4

Prerequisite: Advance Database Systems.

Course Objectives:

1. To introduce the students limitations of transaction processing systems and benefits of Analytical processing systems.
2. Business Intelligence systems, its architecture and to use it as a decision making systems.
3. Designing Dimensional model, Fact table and dimension tables and correlate them using various models like star schema, snow flack schema.
4. Design and development of Business Intelligent Applications.

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. Describe the concepts and components of Business Intelligence (BI).
2. Evaluate use of BI for supporting decision making in an organization.
3. Understand and use the technologies and tools that make up Business Intelligent.
5. Design and development of Business Intelligent Applications.
4. Plan the implementation of a BI system.

Unit no.	Course Contents	No. of lectures required
1	Introducing the Technical Architecture: The value of architecture, Technical Architecture overview, Back room Architecture, Presentation Server Architecture, Front room Architecture, Infrastructure, Metadata, and Security.	07
2	Introducing Dimensional Modeling: Making the Case for Dimensional Modeling, Dimensional Modeling primer, Enterprise Data Warehouse Bus Architecture, More on Dimensions & Facts. Architecture, Presentation Server Architecture, Front room Architecture, Infrastructure, Metadata, and Security.	06
3	Designing the Dimensional Modeling: Modeling Process overview, Getting Organized, Four Step Modeling Process, Design the Dimensional Model.	05

4	Introducing Extract, Transformation & Load Round up the requirements, the 34 subsystems of ETL, Extracting Data, Cleaning & Conforming data, Delivering Data for Presentation.	06
5	Introducing Business Intelligence Applications: Importance of B.I. Applications, Analytical cycle for B.I., Types of B.I. Applications, Navigating Applications via the B.I. portal.	06
6	BI Application Development & Big data analytics overview : B.I. Application Development, B.I. Application maintenance, Big data overview, Recommended best practices for Big Data.	06

TEXT BOOKS:

1. The Data Warehouse Lifecycle Toolkit, by Ralph Kimball, Margy Ross, Warren Thornthwaite, Joy Mundy, Bob Becker 2nd edition, Wiley Publication (Unit 1-6).
2. The Data Warehouse Toolkit, by Ralph Kimball, Margy Ross, 3rd edition, Wiley Publication (Unit-6).

REFERENCE BOOKS:

1. Fundamentals of Business Analytics by R.N. Prasad, Seema Acharya Wiley Publication
2. Data Warehousing in the Real World By Anahory & Murray, Pearson Education.
3. Data Warehousing Fundamentals By Ponniah Wiley Publication.

TERMWORK :

- For term work of 25 marks, batch wise tutorials are to be conducted.
- Number of tutorials should be at least 6-8, covering all the above mentioned topics.

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VIII

PCE-IT804- SOFTWARE TESTING

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 3 Hrs/week	Term work: - 25
Tutorial:- 1 Hr/week	Theory:- ESE- 70 CIE-30
Practical: - ----	Credits:- 4

Prerequisite: Basic Knowledge of Software Engineering.

Course Objectives:

1. To understand fundamentals concepts of Software Testing.
2. To learn different levels of testing
3. To design the Test cases.
4. To understand test management and test automation techniques.
5. To apply test metrics and measurements.

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. Design the test cases and apply for software testing.
2. Identify different levels of Testing to be carried out.
3. Develop and validate a test plan.
4. Prepare test planning based on the document.
5. Use automatic testing tools in Software testing.

Unit no.	Course Contents	No. of lectures required
1	Introduction: Testing as an Engineering Activity, Testing as a Process, Testing axioms, Basic definitions, Software Testing Principles, The Tester's Role in a Software Development Organization, Origins of Defects, Cost of defects, Defect Classes.	06
2	Test Case Design Strategies: Test case Design Strategies, Using Black Box Approach to Test Case Design, Boundary Value Analysis, Equivalence Class Partitioning, State based testing, Cause-effect graphing, Compatibility testing, user documentation testing, Using White Box Approach to Test design, Test Adequacy Criteria, static testing vs. structural testing, code functional testing – Coverage and Control Flow Graphs, Covering Code Logic, Paths, code complexity testing.	07

3	Types of Testing: White Box Testing, Black Box Testing, Integration Testing, System and Acceptance Testing, Performance Testing, Regression Testing, Internationalization Testing, Ad hoc Testing, Testing of OO Systems, Usability and Accessibility testing	07
4	Test Planning And Management: People and organizational issues in testing, Organization structures for testing teams, testing services, Test Planning, test management, test process, Test Reporting.	06
5	Test Metrics And Measurements: What are Test metrics and measurements?, Types of Metrics, project Metrics, productivity metrics.	04
6	Test Automation: Software test automation, skills needed for automation, scope of automation, design and architecture for automation, requirements for a test tool, challenges in automation. Automation Testing Tools: Selenium, Cucumber, Zephyr, Silk test etc.	06

TEXT BOOKS :

1. Srinivasan Desikan and Gopalaswamy Ramesh, —Software Testing – Principles and Practices, Pearson Education, 2006.
2. Ron Patton, —Software Testing, Second Edition, Sams Publishing, Pearson Education, 2007. AU Library.com

REFERENCE BOOKS :

1. Ilene Burnstein, —Practical Software Testing, Springer International Edition, 2003.
2. Edward Kit Software Testing in the Real World – Improving the Process, Pearson Education, 1995.
3. Boris Beizer, Software Testing Techniques – 2nd Edition, Van Nostrand Reinhold, New York, 1990.
4. Aditya P. Mathur, —Foundations of Software Testing _ Fundamental Algorithms and Techniques, Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.

TERM WORK :

Tutorial work to be considered for awarding term work marks. It should consist of 8-10 assignments based on above topics. In tutorial section students should have to prepare Test cases for different types of Testing. They should prepare Test plan to perform software testing.

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VIII

PCE-IT804– Artificial Intelligence

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 3 Hr/week	Term work: - 25 Marks
Tutorial:- 1 Hr/week	Theory:- ESE 70 Marks CIE 30 Marks
Practical: --	Credits:- 4

Prerequisite: Knowledge of data structure and algorithm.

Course Objectives:

1. To Learn fundamentals of Artificial Intelligence, agents, problem solving approaches & searching techniques
2. To analyze local search algorithms, Game playing, solution searching using min-max and CSP problems
3. To understand propositional logic syntax & semantics, inference procedure, first order logic, augmented grammar rules and machine translation systems
4. To learn decision theory, making simple & complex decisions and robot hardware, software motion, and applications

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. Apply fundamentals of AI in various problem-solving approaches for engineering problems
2. Analyze search algorithms, game playing and constraint satisfying problem & solutions.
3. Develop propositional logic, First Order Logic and apply the augmented grammar solutions for machine translation
4. Apply decision theory for simple & Complex problems and illustrate the software & hardware used in robotics.

Unit no.	Course Contents	No. of lectures required
1	Introduction: Introduction to AI, The foundations & history of AI Intelligent Agents: Agents and environments, Nature of environments, Structure of agents Problem Solving: Problem-solving agents,	06
2	Example on problems searching for solutions, Uninformed and informed search strategies, Heuristic functions Classical Search: Local search algorithms & optimization problems, Local search in continuous space, searching in nondeterministic actions,	06

3	Partial observations Adversarial Search:Game playing, The Mini-max search procedure, Alpha-Beta pruning, cutoffs and Additional refinements Constraint Satisfaction Problems(CSP):Constraint propagation, Backtracking search for CSPs	06
4	Logical Agents: Knowledge based agents, Wumpus world, Propositional logic First Order Logic (FOL): Syntax & Semantics, Using FOL, Knowledge engineering Inference in FOL, Forward chaining, Backward chaining	06
5	Resolution Natural Language for Communication: Phrase structure grammars, Syntactic analysis, Augmented grammars, Machine translation Quantifying Uncertainty: Acting under uncertainty, Bayes rule Probabilistic Reasoning Over Time: Time and uncertainty, Inference in temporal models	06
6	Hidden markov models Making Simple and Complex Decisions: Combining beliefs and desires under uncertainty, The basis of utility theory, Utility functions, Sequential decision problems, Value iteration and Policy iteration Robotics: Robotic hardware, Perception, Planning and control, Application domains	06

TEXT BOOKS

1. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 3rd ed.New Delhi: Prentice Hall Series in AI, 2010

REFERENCE BOOKS :

2. Elaine Rich, Kevin Knight, Shivashankar B Nair, “ Artificial Intelligence” third edition, McGraw Hill
3. Introduction to Knowledge Systems,San Francisco: Morgan Kaufman, 1995.
4. Winston,Patrick Henry, Artificial Intelligence, 3rded. California: Addison Wesley, 1995.
5. Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems, 2nded.New Delhi, Prentice Hall of India, 1997

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VIII

PCC-IT804 – PROJECT MANAGEMENT

TEACHING SCHEME	EXAMINATION SCHEME
Theory: -3 Hr/week	Term work: -25
Tutorial:- 1 Hr/week	Theory:- ESE 70 Marks CIE 30 Marks
Practical: -	Credits:- 4

Prerequisite: 1. Fundamentals of Economics and Management
2. Software Engineering
3. Software Testing and Quality Assurance

Course Objectives:

1. Understand the fundamental concepts of project management
2. Understand the nine project management knowledge areas
3. Understand the processes in the knowledge areas and inter dependencies between them
4. Understand the documents required for actual projects
5. Understand the commonly used tools and techniques for project management

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. Understand the selection and initiation of individual projects and of portfolios of projects in the enterprise.
2. Conduct project planning activities that accurately forecast project costs, timelines, and quality. Implement processes for successful resource, communication, and risk and change management.
3. Demonstrate effective project execution and control techniques that result in successful projects.
4. Conduct project closure activities and obtain formal project acceptance.
5. Demonstrate a strong working knowledge of ethics and professional responsibility and effective organizational leadership and change skills for managing projects, project teams, and stakeholders.

Unit no.	Course Contents	No. of lectures required
1	Introduction to Project Management Project, project management(PM), role of project manager, project management profession, system view of PM, organization, stakeholders, project phases and lifecycle, context of IT projects, process groups, mapping process groups to knowledge areas.	06

2	Project Integration and Scope Management Strategic planning and project selection, preliminary scope statements, project management plans, project execution, monitoring and controlling project work, integrated change control, closing project, software assistance scope planning and scope management plan, scope definition and project scope statement, creating the work breakdown structure,	08
3	Project Time and Cost Management Importance of project schedules, activity - definition, sequencing, resource estimating, duration estimating; schedule development and control, software assistance Importance, basic principles, cost estimating, budgeting and control, software assistance	06
4	Project Quality and Human Resource Management Importance, quality – planning, assurance and control, tools and techniques, modern quality management and improving IT project quality, software assistance Importance, keys to managing people, human resource planning, acquiring, developing and managing project team, software assistance	08
5	Project Communication and Risk Management Importance, communication planning, information distribution, performance reporting, managing stakeholders, suggestions for improving project communication, software assistance Importance, risk management planning, sources of risk, risk identification, qualitative and quantitative risk analysis, risk response planning, risk monitoring and control, software assistance	08
6	Project Procurement Management Importance, planning purchases and acquisitions, planning contracting, requesting seller responses, selecting sellers, administering the contract, closing the contract, software assistance	04

TEXT BOOKS :

1. Information Technology Project Management (4th Edition) – Kathy Schwalbe, (Cengage Learning – India Edition)

REFERENCE BOOKS :

1. Project Management Core Textbook – Mantel Jr., Meredith, Shafer, Sutton with Gopalan
2. (Wiley India Edition)
3. 2. A Guide to the Project Management Body of Knowledge (Third Edition)- Newtown Square, PA, Project Management Institute, 2005
5. 3. Effective Project Management: Traditional, Agile, Extreme – Robert K Wyosaki (Seventh Edition) Wiley India

TERMWORK :

Tutorial work to be considered for awarding of term work marks

Guidelines for tutorials

Divide the batches into groups as per BE Project batches and ask them to complete tutorials based on your final year project using any of the open source project management tool or Microsoft Project Management 2010 or above trial version available. 8-10 tutorials from the sample list below should be allocated to the project groups. Faculty will evaluate the performance of the students in the tutorials and assign the term work marks

1. Survey of common project management tools and techniques by knowledge area and write a report on same.
2. Develop the project charter for project
3. Collect requirement using different techniques and develop scope of selected project
4. Creating WBS structure of selected project using different approaches
5. Develop project schedule network diagram for project
6. Develop entire schedule of project by estimating activity resources and duration
7. Problems on network diagram and critical path methods
8. Prepare the cost estimate by using any of the cost estimate types
9. Develop the project quality document
10. List and analysis different types of tools and techniques for quality control
11. Application of motivational theories to the group of students to study psychology of students
12. Develop communication management plan for selected project
13. Identify risk involved in project and prepare risk document
14. Develop the SOW (Statement of work) for the procurement of selected project.

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VIII

PCC-IT805 – Advance Web Technology

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 3Hr/week	Term work: -50
Tutorial:-	Practical:- 50
Practical: - 4Hr/Week	Credits:- 5

Prerequisite:

1. HTML/CSS
2. JavaScript
3. Web Technology - I

Course Objectives:

1. Develop modern, complex, responsive and scalable web applications with Angular Motivate.
2. Use their gained, deep understanding of the Angular fundamentals to quickly establish themselves as frontend developers.
3. Fully understand the architecture behind an Angular application and how to use it.

Course Outcomes:

On completion of the course, student will be able to-

1. Explain the concepts of advanced web development.
2. Design Front end using Angular technology
3. Develop a web application using back end technologies.

Unit no.	Course Contents	No. of lectures required
1	AngularJS Introduction , AngularJS Expressions, AngularJS Modules, AngularJS Directives, AngularJS ng-model Directive, AngularJS Data Binding, AngularJS Controllers, AngularJS Scope, AngularJS Filters, Form Validations, AJAX, Views, Services, Dependency Injection, Custom Directive	07
2.	Angular Introduction, Difference AngularJs and Angular, Angular Versions, Angular - Web Application architecture, MVC and MVVM design pattern, Angular architecture, Angular building blocks, Forms implementation, Filters, Services, Consuming, REST Web Services, Modules: Built-in and custom, Directives: Built-in and custom, Routing and Navigation, Animations, Testing Angular application	07

3.	Bootstrap: Bootstrap - Overview Environment Setup, Grid System ,Typography ,Code , Tables ,Forms, Buttons , Badges and Labels , Progress Bars , List Groups , Panels , Dropdowns ,Images , Helper Classes , Responsive utilities, navigation, modals, image carousels	04
4	Node Node , Difference between Angular Js and Node Js, NodeJs architecture ,Modules: Built-in and custom, Event loop, Asynchronous application , Testing node application	05
5	Express Introduction to ExpressJs, Routing, Template engines, Middleware, Web Application, components, Error handling, Testing application Express application	06
6.	MongoDB Relational vs NoSQL DB, MongoDB fundamentals, Data modeling, Aggregation pipeline, Grid FS, Performance optimization	05

TEXT BOOKS :

1. MEAN Web Development author Amos Q. Haviv published by PACKT PUBLISHING LTD
2. Pro MEAN Stack Development author Elrom, Elad published by Apress
3. Bootstrap: Responsive Web Development author Jake Spurlock published by O'REILLY

REFERENCE BOOKS :

1. Bootstrap in 24 hours, Sams Teach Yourself author Jennifer Kyrnin published by By Jennifer Kyrnin
2. Web Development withNode and Express author Ethan Brown Published by O'Reilly Media
3. Getting MEAN with Mongo, Express, Angular, and Node(Manning) author Simon Holmes, Clive Harber published by Simon Holmes
4. AngularJS in Action author Lukas Ruebbelke published by Martin Gontovnikas
5. Practical Node.JS author Azat Mardan published by Apress.

TERMWORK :

- Minimum of 15 Experiments to be performed from the list given below.
- 25 marks for performance in practical and experiments as part of continuous evaluation
- 25 marks for Practical Test and oral to be conducted.

Experiment List:

1. Create simple Testing Angular application.
2. Display the current value of the query model by adding a `{{Ctrl.query}}` binding into the phone-list.template.html template and see how it changes, when you type in the input box.
3. Angello: Creating controllers to manage views
4. AngularJS: Declaring properties and methods in a controller
5. Binding to properties and expressions in an AngularJS template, creating views and controllers and how to test them
6. Using \$http to communicate with remote servers
7. Directives uses in Angello
8. Write a program demonstrating NodeJs application.
9. Error handling in NodeJs.
10. Express.js Installation
11. Develop Website : Saving Time with Express
12. Quality Assurance: Page Testing
13. Building a web server with Express
14. running NPM with -g and \$ express -V
15. Proper Installation of MongoDB
16. simple MongoDB script with a native driver
17. Persistence With MongoDB and Mongoskin

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VIII

PCC-IT806 – Project-II

TEACHING SCHEME	EXAMINATION SCHEME
Theory: -	Term work: -25
Tutorial:-	Practical:- 50
Practical: - 4 Hr./week	Credits:- 2

Prerequisite: Project - I.

Course Objectives:

1. Students should learn to design and develop usable User Interface.
2. Students should learn to analyze and apply emerging technologies in development of a project.
3. Students should learn to test the modules in project.
4. Students should learn to demonstrate working of project.

Course Outcomes:

On completion of the course, student will be able to-

1. Design and develop usable User Interface
2. Analyze and apply emerging technologies in development of a project
3. Test the modules in Project
4. Demonstrate working of project

Course Contents

The group will continue to work on the project selected during the semester VII and submit the completed project work to the department at the end of semester VIII as mentioned below.

1. The workable project.
2. The project report in the bound journal complete in all respect with the following : -
 - i. Problem specifications
 - ii. System definition – requirement analysis.
 - iii. System design – dataflow diagrams, database design
 - iv. System implementation – algorithm, code documentation
 - v. Test results and test report.
 - vi. In case of object oriented approach – appropriate process be followed.

Term work will be jointly assessed by a panel of teachers appointed by head of the institution. Oral examination will be conducted by internal and external examiners as appointed by the University.

Note:

1. Project work should be continually evaluated based on the contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.
2. Two mid-term evaluations should be done, which includes presentations and demos of the work done.
- 3. Care should be taken to avoid copying and outsourcing of the project work.**

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem-VIII

WI-IT 807 –Winter Internship

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - Null	Term work: - 50
Tutorial:- Null	Theory:- Null
Practical: - Null	Credits:- 0

Prerequisite: Interested professional language, Winter Internship semester VII

Course Objectives:

- 1) Identify the ethical standard of behavior for professional and interns within the industry
- 2) Understand the observation; documentation and assessment are used in industry
- 3) Develop applied professional skills and technique to get place in MNC Company

Course Outcomes:

1. Demonstrate understanding of therapeutic models of helping.
2. Understand the stages of helping, including exploration, insight, and action
3. Develop applied helping skills to facilitate change in individuals, families, and group

Course Content

Internship / Industrial training is a very vital part of professional engineering education. All B. Tech. students are required to undergo internship / training during summer / winter vacation for the period of four to eight weeks. Training and Placement Department take various initiatives and interacts with industries.

To get the maximum benefits from these rare opportunities, industrial internship/training is very carefully planned. The training program has following components.

1) Allotment of internship/Training organizations

2) Orientation Lecture: During Orientation Lecture students are taught techniques of learning what to learn, how to learn, etc.

3) Internship / Industrial Training Schedule: B. Tech. = 04 Weeks in the month of December.

4) Daily Diary: Daily Diary prepared for student. Students undergoing training are required to maintain daily diary regularly in systematic manner.

5) Evaluation: Evaluation of training performance is done in sem VIII.