DEPARTMENT OF

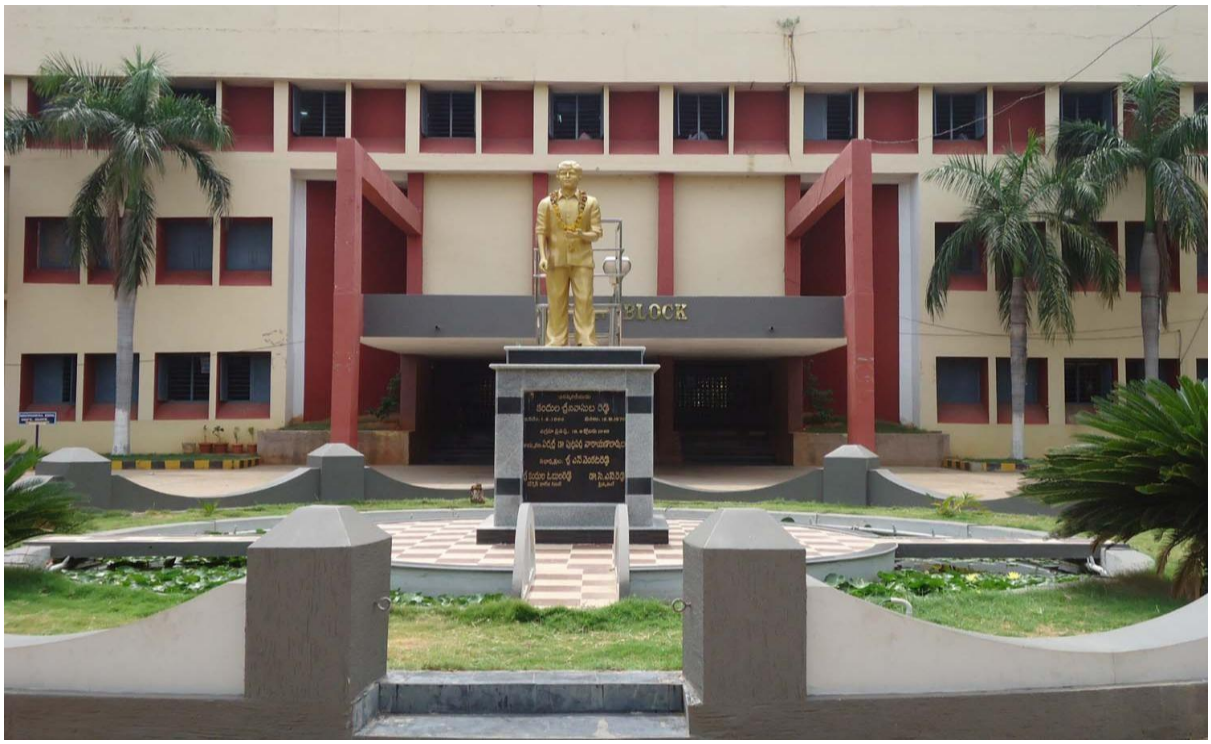
COMPUTER SCIENCE AND ENGINEERING

COURSE STRUCTURE AND SYLLABUS

FOR

B.Tech CSE (VII Sem - VIII Sem) (R18 Regulations)

(Effective from 2018-19 for Regular students and from 2019-20 for Later Entry students)



KANDULA SREENIVASA REDDY MEMORIAL COLLEGE OF ENGINEERING(AUTONOMOUS)

KADAPA - 516005, AP

(Approved by AICTE, Affiliated to JNTUA, Ananthapuramu, Accredited by NAAC)
(An ISO 9001-2008 Certified Institution)

COMPUTER SCIENCE AND ENGINEERING

VII SEMESTER

Subject Code	Subject Category	Course Name	L	T	P	IM	EM	CR
1805701	PCC	Machine Learning	3	0	0	30	70	3
1805702	PCC	Big Data Technologies	3	0	0	30	70	3
1805703 1805704 1805705	PEC	**Professional Elective-3** 1. Computer Graphics 2. Design Patterns 3. Cloud Computing	3	0	0	30	70	3
18OE503 18OE504	OEC	**Open Elective-2** 1. Python Programming 2. Computer Networks	3	0	0	30	70	3
18OE505 18OE506	OEC	**Open Elective-3** 1. Web Technologies 2. Operating Systems	3	0	0	30	70	3
1805710	PCC	Big Data Technologies Lab	0	0	2	50	50	1
1805711	PCC	Machine Learning Lab	0	0	2	50	50	1
1805712	Project	Technical Seminar	0	0	2	100	--	1
1805713	Project	Project-I	0	0	8	100	--	4
		TOTAL	**15**	**0**	**14**	**450**	**450**	**22**

VIII SEMESTER

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1805801 1805802 1805803	PEC	**Professional Elective-4** 1. Cyber Security 2. Object Oriented Analysis & Design 3. Deep Learning	3	0	0	30	70	3
18OE507 18OE508	OEC	**Open Elective-4** 1. Software Engineering 2. Cloud Computing	3	0	0	30	70	3
1805806	Project	Project-II	0	0	12	50	50	6
		TOTAL	**6**	**0**	**12**	**110**	**190**	**12**

R18-CSE- VII Semester

Course Title	MACHINE LEARNING				B.Tech VII Sem (R18) CSE		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1805701	PCC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs		

Course Objectives:

- To introduce students to the basic concepts and techniques of Machine Learning.
- To have a thorough understanding of the Supervised and Unsupervised learning techniques.
- To study the various probability-based and generalized learning techniques.
- To understand ensemble models of machine learning algorithms.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand the machine learning concepts that are suitable for developing real time applications
CO 2	Understand the concept of decision tree classifier and develop a model for a given problem.
CO 3	Apply instant based learning to solve a real time problem.
CO 4	Understand the concepts of probability and Bayes's machine learning algorithms.
CO 5	Evaluate different clustering algorithms.

UNIT – I

Introduction: Introduction to Machine Learning: Introduction, Different types of learning, Applications of Machine Learning, Parametric and Nonparametric Machine Learning Algorithms, Training and test sets, cross validation. Linear Regression: Introduction, Linear Models for Regression.

UNIT – II

Decision Tree Learning: Introduction, Decision tree representation, appropriate problems for decision tree learning, the basic decision tree algorithm, hypothesis spacesearch in decision tree learning, inductive bias in decision tree learning, issues indecision tree learning, Avoiding Over fitting the Data.

UNIT – III

Instance Based Learning: K nearest neighbor, the Curse of Dimensionality, Over fitting and Under fitting, Feature Selection: forward search, backward search, univariate, multivariate feature selection approach, Dimensionality Reduction, Linear Discriminant Analysis, Principal Component Analysis.

UNIT – IV

Probability and Bayes Learning: Brute-Force Bayes Concept Learning, Maximum Likelihood Hypothesis, Naïve Bayes Classifier, Logistic Regression, Support Vector Machine:Introduction, the Dual formulation, Maximum margin with noise, nonlinear SVM and Kernelfunction, Beyond Binary Classification.

UNIT – V

Evaluating Machine Learning algorithms and Model Selection, Ensemble Learning: Introduction, Bagging and boosting, Random forest. Clustering: Introduction, K-mean clustering, K-medoids clustering, Hierarchical clustering - Agglomerative clustering –Divisive clustering-Choosing the number of clusters.

Text Books:

1. Machine Learning, Tom M.Mitchell, McGraw-Hill
2. Machine Learning: A Probabilistic Perspective,KevinMurphy,MITPress,2012
3. Pattern Recognition and Machine Learning, Christopher Bishop,Springer,2007.
4. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor &Francis

Reference Books:

1. Machine Learning: The Art and Science of Algorithms That Make Sense of Data, Peter Flash, Cambridge, University Press
2. The Elements of Statistical Learning, Trevor Hastie, Robert Tibshi rani, Jerome Friedman, Springer, 2009.
3. Machine Learning: Pocket Reference, Matt Harrison, O'Reilly Media.
4. Introduction Machine Learning, Ethem Alpaydin, 3rd Edition, The MIT Press.

Course Title	BIG DATA TECHNOLOGIES				B.Tech VII Sem (R18) CSE		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1805702	PCC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hrs					End Exam Duration: 3Hrs		

Course Objectives:

- To study the big data characteristics and its history
- To provide students with knowledge in HDFS concepts and interfaces
- To acquire conceptual understanding of MapReduce Framework and its classes
- To make learners aware about MapReduce job runs
- To provide overview of Hadoop Database applications

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Analyze the Bigdata characteristics.
CO 2	Make use of HDFS interfaces to read and write files.
CO 3	Analyze the data with MapReduce classes.
CO 4	Build the development environment of Hadoop to run the job on local job runner and on a cluster.
CO 5	Summarize the database applications of Hadoop and Pig.

UNIT - I

Introduction to Big Data, Why is Big Data, Why Big Data is important, Meet Hadoop, Data, Data Storage and Analysis, Comparison with other systems, Grid Computing, A briefhistory of Hadoop, Apache Hadoop and the Hadoop EchoSystem, Linux refresher; VMWare Installation of Hadoop.

UNIT - II

The Design of HDFS, HDFS Concepts, Command Line interface to HDFS, Hadoop File Systems, Interfaces, Java Interface to Hadoop, Anatomy of a file read, Anatomy of a file write, Replica placement and Coherency Model, Parallel copying with distcp, Keeping an HDFS cluster balanced.

UNIT - III

Introduction, Analyzing data with unix tools, Analyzing data with Hadoop, Java MapReduce classes(new API), Data flow, combiner functions, Running a distributed MapReduce job, Configuration API, Setting up the developing environment, Managing configuration, Writing a unit test with MRUnit, Running ajob in local job runner, Running on a cluster, Launching a job, The MapReduce WebUI.

UNIT - IV

Classic MapReduce, Job submission, Job initialization, Task Assignment, Taskexecution, Progress and status updates, Job Completion, Shuffle and sort on Map and Reducer side, Configuration tuning, Map Reduce types, Input formats, Sorting, Map side and Reduce side joins.

UNIT - V

Hive: The Hive Shell, Hive services, Hive clients, The meta store, comparison withtraditional databases, Hive QI, Hbasics, Concepts, implementation, Java and Map reduce clients, Loading Data, Web queries.

Pig: Introduction to Pig, Pig Latin.

Text Books:

1. Tom White, Hadoop, "The Definitive Guide" , 3rd Edition, O'Reilly Publications,2012.
2. Dirk deRoos, Chris Eaton, George Lapis, Paul Zikopoulos, Tom Deutsch, "Undetstanding Big Data Analytics for Enterprise class Hadoop and StreamingData", 1st Edition, TMH, 2012.
3. Bart Baesens, Analytics in a Big Data World: The Essential Guide to DataScience and its Applications, Wiley Publications, 2014.
4. Big Data Technologies and Applications, Borko Furht, Flavio Villanustre, Springer.

Reference Books:

1. Hand Book of Big Data Technologies, Albert Y. Zomaya, Sherif Sakr, Springer.
2. Big Data Analytics: Tools and Technology for Effective Planning, Arun K. Somani, Ganesh Chandra Deka, CRC Press.
3. Big Data, Big Analytics, Michael Minelli, Michele Chambers, Ambiga Dhiraj, John Wiley and Sons.

Course Title	COMPUTER GRAPHICS (Professional Elective-3)				B.Tech VII Sem (R18) CSE		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1805703	PEC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs		

Course Objectives:

- To apply the rules and algorithms in generating graphical outputs.
- To develop multi-dimensional objects using suitable transformations.
- To Develop real-time rendering graphics.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Classify CRT, Color CRT, DVST, Flat Panel display devices and Graphical Input Devices.
CO 2	Understand DDA, Bresenhams line drawing algorithms and Midpoint circle generating algorithms, clipping of polygons.
CO 3	Exemplify 2D & 3Dtranslation, rotation, reflection, scaling and shearing.
CO 4	Compare RGB, CMY,YIQ, CMYK Color models.
CO 5	Summarize types of animation, Animation sequence and morphing technique.

UNIT - I

Introduction: Usage of Graphics and their applications, Presentation Graphics- Computer Aided Design- Computer Art- Entertainment- Education and Training- Visualization- Image Processing Graphical User Interfaces.

Overview of Graphics systems: Video Display Devices- Raster Scan systems-random scan systems Graphics monitors and workstations-Input devices-hard copy devices- Graphics software.

UNIT - II

Scan Converting Lines – Basic Incremental algorithm, Midpoint algorithm and additional issues; Scan converting Circles, Scan Converting Ellipses, Solid Filling, Pattern Filling, Thick Primitives, Cohen – Sutherland line clipping algorithm, Parametric line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm, Generating characters.

UNIT - III

Geometrical transformations – 2D transformations, Homogeneous coordinates, Matrix representation of 2D transformations, Composition of 2D transformations, Window to view- port transformation, Matrix representation of 3D transformations, Composition of 3Dtransformations.

Representing Curves and Surfaces – Polygon meshes, Parametric cubic curves, Parametric bicubic surfaces and Quadratic surfaces.

UNIT - IV

Viewing in 3D – Projections, Specifying an arbitrary 3D view.

Solid Modeling – Representing Solids, Regularized Boolean set operations, Primitive instancing, Sweep Representation, Boundary Representations, Spatial-Partitioning Representations.

Achromatic and Colored Light – Achromatic light, Chromatic color, Color models for raster graphics, Reproducing color, Using color in computer graphics.

UNIT - V

Illumination Models – Ambient light, Diffuse reflection, Atmospheric attenuation.

Shading Models – Constant shading, Interpolated shading, Polygon mesh shading, Gouraudshading, Phong shading.

Animation – Conventional and Computer–Assisted animation, Animation languages,Methods of controlling animation, Basic rules of animation, Problems peculiar to animation.

Text Books:

1. Foley, Van Dam, Feiner and Hughes, Computer Graphics – Principles and Practice, 2nd Edition in C, Pearson Education, 2004
2. Donald Hearn and M. Pauline Baker, Computer graphics, C version, Prentice – Hall.
3. William M. Newman, Robert F. Sproull, Principles of interactive computer graphics, 12thEdition, McGraw – Hill, 1986.
4. David F. Rogers, Rae A. Earnshaw, Computer Graphics Techniques : Theory and Practice,Springer-Verlag, 1990.

Reference Books:

1. Computer Graphics using Open GL by Franscis S Hill Jr Pearson Education, 2004.
2. Fundamentals of Computer Graphics, Steve Marschner, Peter Shirley, 4th Edition, CRC Press.
3. Introduction to Computer Graphics:A Practical Learning Approach, Fabio Ganovelli, Massimiliano Corsini, Sumanta Pattanaik, Marco Di Benedetto, CRC Press.
4. Computer Gaphics, Amarendra N. Sinha, Arun D Uadi, Tata McGraw Hill.

Course Title	DESIGN PATTERNS (Professional Elective-3)				B.Tech VII Sem (R18) CSE		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1805704	PEC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs		

Course Objectives:

- To understand design patterns and their underlying object oriented concepts
- To understand implementation of design patterns and providing solutions to realworld software design problems.
- To understand patterns with each other and understanding the consequences ofcombining patterns on the overall quality of a system

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Know the underlying object oriented principles of design patterns.
CO 2	Understand the context in which the pattern can be applied.
CO 3	Understand how the application of a pattern affects the system quality and its tradeoffs.

UNIT - I

Introduction to Design Patterns: Design Pattern Definition, Design Patterns in Small Talk MVC, Describing Design Patterns, Catalog of Design Patterns, Organizing the Catalog, Solving of Design Problems using Design Patterns, Selection of a Design Pattern, Use of Design Patterns.

UNIT - II

Designing A Document Editor: A Case Study: Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look and Feel Standards, Supporting Multiple Window Systems, User Operations, Spelling Checking and Hyphenation. Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

UNIT - III

Structural Patterns-1: Adapter, Bridge, Composite. Structural Patterns-2: Decorator, Façade, Flyweight, Proxy, Discuss of Structural Patterns.

UNIT - IV

Behavioral Patterns-1: Chain of Responsibility, Command, Interpreter, Iterator. Behavioral Patterns-2: Mediator, Memento, Observer.

UNIT - V

Behavioral Patterns-2(cont'd): State, Strategy, Template Method, Visitor, and Discussion of Behavioral Patterns. What to Expect from Design Patterns, A Brief History, The Pattern Community, An Invitation, A Parting Thought.

Text Books:

1. Design Patterns by Erich Gamma, Pearson Education.
2. Pattern's in JAVA Vol-I By Mark Grand, Wiley DreamTech.
3. Pattern's in JAVA Vol-II By Mark Grand, Wiley DreamTech.
4. JAVA Enterprise Design Patterns Vol-III By Mark Grand, Wiley DreamTech

Reference Books:

1. Head First Design Patterns By Eric Freeman-Oreilly-spd
2. Design Patterns Explained By Alan Shalloway, Pearson Education.
3. Pattern Oriented Software Architecture, F.Buschmann &others, John Wiley & Sons.

Course Title	CLOUD COMPUTING (Professional Elective-3)				B.Tech VII Sem (R18) CSE		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1805705	PEC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs		

Course Objectives:

- To explain the cloud paradigms.
- To introduce the various levels of services that can be achieved by cloud.
- To know about service providers of cloud.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Recall different computing paradigms.
CO 2	Understand the evolution of cloud computing paradigm and its architecture.
CO 3	Explain and characterize different cloud deployment models and service models.
CO 4	Understand programming models and API's in Cloud Computing.
CO 5	Identify the Data Center environment and service providers in cloud computing.

UNIT - I

Computing Paradigms:

High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Bio computing, Mobile Computing, Quantum Computing, Optical Computing, Nano computing, Network Computing.

Cloud Computing Fundamentals:

Motivation for Cloud Computing: The Need for Cloud Computing. Defining Cloud Computing: NIST Definition of Cloud Computing, Computing Is a Service, Cloud Computing Is a Platform. Principles of Cloud computing: Five Essential Characteristics, Four Cloud Deployment Models, Three Service Offering Models, Cloud Ecosystem, Requirements for Cloud Services, Cloud Application, Benefits and Drawbacks.

UNIT - II

Cloud Computing Architecture and Management: Cloud Architecture, Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications on the Cloud, Managing the Cloud, Migrating Application to Cloud.

UNIT - III

Cloud Deployment Models: Private Cloud, Public Cloud, Community Cloud, Hybrid Cloud.

Cloud Service Models: Infrastructure as a Service, Platform as a Service, Software as a Service, Other Cloud Service Models.

Virtualization: introduction, Virtualization opportunities, Approaches to virtualization, Hypervisors, From virtualization to cloud computing.

UNIT - IV

Programming Models in Cloud: Cloud Application Development Platforms: Windows Azure, Google App Engine, Force.com, Manjrasoft Aneka.

Software Development in Cloud : Introduction, Different perspectives on SaaS development, New challenges, Cloud aware software development using PaaS technology.

UNIT - V

Networking for Cloud Computing: Introduction, Overview of Data Center Environment, Networking Issues in Data Centers.

Cloud Service Providers: Introduction, EMC, Google, Amazon Web Services, Microsoft, IBM, Salesforce, Rackspace.

Text Books:

1. K. Chandrasekaran, Essentials of Cloud Computing, CRC Press, 2015.
2. Barrie Sosinsky, Cloud Computing Bible, Wiley-India, 2010.
3. RajkumarBuyya, James Broberg, Andrzej M. Goscinski, Cloud Computing:Principles and Paradigms, Wiley, 2011.
4. Nikos Antonopoulos, Lee Gillam, Cloud Computing: Principles, Systems andApplications, Springer, 2012.

Reference Books:

1. Cloud Computing: A Practical Approach, Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, Tata McGraw Hill.
2. Cloud Computing Theory and Practice: Dan C. Marinescu, Elsevier.
3. Cloud Computing Bible, Barrie Sosinsky, Wiley Publishing.
4. Cloud Computing and Virutualization, Dac-Nhuong Le, Raghavendra Kumar, Gia Nhu Nguyen, Jyir Moy Chatterjee, Wiley.

Course Title	BIG DATA TECHNOLOGIES LAB				B.Tech VII Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805710	PCC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		0	0	2	1	50	50	100
					End Exam Duration: 3Hrs			

Course Objectives:

- Optimize business decisions and create competitive advantage with Bigdata analytics.
- Practice java concepts required for developing mapreduce programs.
- Impart the architectural concepts of Hadoop and introducing mapreduce paradigm.
- Practice programming tools PIG and HIVE in Hadoop ecosystem.
- Implement best practices for Hadoop development.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand the installation of VMW are and PIG.
CO 2	Understand and apply the setting up and Installing Hadoop in its three operating modes.
CO 3	Implement the file management tasks in Hadoop.
CO 4	Understand MapReduce Paradigm.
CO 5	Understand Pig Latin scripts sort, group, join, project, and filter your data.

LIST OF EXPERIMENTS

1. Installation of VMW is to setup the Hadoop environment and its ecosystems.

2. **A**. Perform setting up and Installing Hadoop in its three operating modes.
   I. Standalone.
   II. Pseudo distributed.
   III. Fully distributed.
   B. Use web based tools to monitor your Hadoop setup.

3. Implementing the basic commands of LINUX Operating System File/Directory creation, deletion, and update operations.

4. Implement the following file management tasks in Hadoop:
   I. Adding files and directories
   II. Retrieving files
   III. Deleting files
   Hint: A typical Hadoop work flow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilities.

5. Run a basic word count MapReduce program to understand MapReduce Paradigm.

6. Write a Map Reduce program that mines weather data. Hint: Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented.

7. Implement matrix multiplication with Hadoop MapReduce.

8. Installation of PIG.

9. Write Pig Latin scripts sort, group, join, project, and filter your data.

10. A. Run the Pig Latin Scripts to find Word Count.
    B. Run the Pig Latin Scripts to find a max temp for each and every year.

Text Books:

1. Tom White, Hadoop, "The Definitive Guide" , 3rd Edition, O'Reilly Publications,2012.
2. Dirk deRoos, Chris Eaton, George Lapis, Paul Zikopoulos, Tom Deutsch, "Undetstanding Big Data Analytics for Enterprise class Hadoop and StreamingData", 1st Edition, TMH, 2012.
3. Bart Baesens, Analytics in a Big Data World: The Essential Guide to DataScience and its Applications, Wiley Publications, 2014.
4. Big Data Technologies and Applications, Borko Furht, Flavio Villanustre, Springer.

Reference Books:

1. Hand Book of Big Data Technologies, Albert Y. Zomaya, Sherif Sakr, Springer.
2. Big Data Analytics: Tools and Technology for Effective Planning, Arun K. Somani, Ganesh Chandra Deka, CRC Press.
3. Big Data, Big Analytics, Michael Minelli, Michele Chambers, Ambiga Dhiraj, John Wiley and Sons.

Course Title	MACHINE LEARNING LAB				B.Tech VII Sem (R18) CSE		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1805711	PCC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		0	0	2	1	50	50	100
					End Exam Duration: 3Hrs		

Course Objectives:

- To get an overview of the various machine learning techniques and able to demonstrate them using python.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand complexity of Machine Learning algorithms and their limitations.
CO 2	Understand modern notions in data analysis-oriented computing.
CO 3	Be capable of confidently applying common Machine Learning algorithms in practice and implementing their own.
CO 4	Be capable of performing experiments in Machine Learning using real-world data.

LIST OF EXPERIMENTS

1. Download, Install Anaconda on Windows and understand environment.
2. Data Pre-processing
    a. Importing the Data set
    b. Missing Data
    c. Splitting the dataset into the Training set and Test set
    d. Feature Scaling
3. Implement Simple Linear Regression using python.
4. Implement decision tree algorithm using python.
5. Implement k-nearest neighbor's classification using python.
6. Implement Principal Component Analysis (PCA) using python.
7. Implement Naive Bayes using python.
8. Implement Support Vector Machine (SVM) using python.
9. Implement K-Means Clustering using Python.
10. Implement Hierarchical Clustering using Python.

Text Books:

1. Machine Learning, Tom M.Mitchell, McGraw-Hill
2. Machine Learning: A Probabilistic Perspective,KevinMurphy,MITPress,2012
3. Pattern Recognition and Machine Learning, Christopher Bishop,Springer,2007.
4. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor &Francis

Reference Books:

1. Machine Learning: The Art and Science of Algorithms That Make Sense of Data, Peter Flash, Cambridge, University Press
2. The Elements of Statistical Learning, Trevor Hastie, Robert Tibshi rani, Jerome Friedman, Springer, 2009.
3. Machine Learning: Pocket Reference, Matt Harrison, O'Reilly Media.
4. Introduction Machine Learning, Ethem Alpaydin, 3rd Edition, The MIT Press.

Course Title	TECHNICAL SEMINAR				B.Tech VII Sem (R18) CSE		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1805712	PROJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		0	0	2	1	100	--	100
Internal Assessment								

Course Objectives:

- Identify and compare technical and practical issues related to the area of course specialization.
- Outline annotated bibliography of research demonstrating scholarly skills.
- Prepare a well-organized report employing elements of technical writing and critical thinking.
- Demonstrate the ability to describe, interpret and analyze technical issues and develop competence in presenting

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Establish motivation for any topic of interest and develop a thought process for technical presentation.
CO 2	Organize a detailed literature survey and build a document with respect to technical publications.
CO 3	Analysis and comprehension of proof-of-concept and related data.
CO 4	Effective presentation and improve soft skills.
CO 5	Make use of new and recent technology for creating technical reports.

GUIDELINES FOR TECHNICAL SEMINAR

Seminar is an important component of learning in an Engineering College, where the student getsacquainted with preparing a report & presentation on a topic.

PARAMETERS OF EVALUATION:

1. The seminar shall have topic approved by the faculty.
2. The seminar is evaluated for 100 marks for internal.
3. The students shall be required to submit the rough drafts of the seminar.
4. Faculty shall make suggestions for modification in the rough draft. The final draft shall be presented by the student.
5. Presentation schedules will be prepared by Department in line with the academic calendar.

The Seminars shall be evaluated as follows:

Rough Draft:

In this stage, the student should collect the information from various sources on the topic and collate themin a systematic manner. He/ She may take the help of the concerned faculty.
The report should be typed in "MS-Word" file with "Times New Roman" font, with font size of 16 for main heading, 14 for sub-headings and 12 for the body text. The seminar report contains relevant diagrams,pictures and illustrations. It should normally contain 10 to 15 pages.

1.	Topic, name of the student & faculty	1 Page
2.	List of contents	1 Page
3.	Introduction	1 Page
4.	Descriptions of the topic (point-wise)	5 – 10 Pages
5.	Conclusion	1 Page
6.	References/Bibliography	1 Page

The soft copy of the rough draft of the seminar presentation in MS Power Point format along with the draftreport should be submitted to the concerned faculty, within stipulated time.

The evaluation of the technical seminar report shall generally be based upon the following:
Within one week of the submission of the rough draft, the students are to submit the final draftincorporating the suggestions made by the faculty.

Presentation:

After finalization of the final draft, the students shall be allotted dates for presentation (in the designatedseminar classes) and they shall then present it in presence of students, Faculty & Technical Seminar In- charge.

The student shall submit 3 copies of the Report neatly bound. The students shall also distribute the title andabstract of the seminar in hard copy to the Technical Seminar In-charge. The final presentation has to be delivered with 18-25 slides. The time duration for presentation is 15 to 20 minutes.

The evaluation of the Presentation shall generally be based upon the following.

1.	Punctuality in submission of Seminar Report	20 Marks
2.	Reports and Contents of Presentation	20 Marks
3.	Depth of the students' knowledge in the subject	20 Marks
4.	Relevance and interest the topic creates	15 Marks
5.	Ability to involve the spectators	15 Marks
6.	Question answer session	10 Marks
	Total	**100 Marks**

WHO WILL EVALUATE?

The presentation of the seminar topics shall be made before an internal evaluation committee comprising the Head of the Department or his/her nominee, seminar in-charge and a senior faculty of the department.

Course Title	PROJECT-I				B.Tech VII Sem (R18) CSE		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1805713	PROJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		0	0	8	4	100	--	100
Internal Assessment								

Course Objectives:

- Acquire and apply new knowledge as needed, using appropriate learning strategies.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Demonstrate a technical knowledge of their selected project topic.
CO 2	Understand problem identification, formulation and solution.
CO 3	Design engineering solutions to complex problems utilizing a systems approach.
CO 4	Communicate with engineers and the community at large in written an oral form.
CO 5	Demonstrate the knowledge, skills and attitudes of a professional engineer.

GUIDELINES FOR PROJECT

The prime objective of the project work is to imbibe students with technical, analytical and innovative ideas. The students will able to learn theoretical and practical approaches pertaining to software applications development. A team of 4-5 students formed as a group and work under the supervision of a departmental faculty. Associating the students to solve real world problems identified within the department. The project work normally includes:

1. Literature survey on existing problem/ topic from viable sources.
2. Eliciting the problem-solving approach/methodologies and making the feasibility study.
3. The team should perform an extensive software requirements analysis.
4. Preparing an abstract on the selected topic and present before Departmental Review Committee (DRC).
5. Preparing a roadmap to design, analyze, implement, evaluate/test considering functional, non-functional aspects and finally, deploy the application/product/software service.
6. Detailed Analysis/Design /Simulation as needed.
7. Final development of product/process conducting testing and specifying the results, conclusions and future scope.
8. Preparing a project report in the standard format for being evaluated by the Department Review Committee (DRC).
9. Final Project presentation / execution before Departmental Review Committee (DRC)

Semester 7: (Open Elective-2 & 3)

S.No	Subject Code	Subjects	L	T	P	C R
1	18OE503 18OE504	**Open Elective-2:** 1. Python Programming 2. Computer Networks	3	0	0	3
2	18OE505 18OE506	**Open Elective-2:** 1. Web Technologies 2. Operating Systems	3	0	0	3
	Total		**6**	**0**	**0**	**6**

Course Title	PYTHON PROGRAMMING (Open Elective-2)				B.Tech VII Sem (R18)		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
18OE503	OEC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2Hrs					End Exam Duration: 3Hrs		

Course Objectives:

- Understand programming skills using basics of Python language
- To introduce the object-oriented programming concepts.
- Acquire basics of how to translate problem into object-oriented form
- To understand object-oriented programming concepts, and apply them in solving problems.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Demonstrate and acquire knowledge on usage of Data types, operators, input and output statements in python programming.
CO 2	Analyze the given problem and develop python program to solve the problem.
CO 3	Able to use proper iterative statements in problem solving.
CO 4	Entity the right sequence to solve the real-world problems.
CO 5	Apply object-oriented features to solve real time applications.

UNIT - I

Features of python, Execution of a python program, comments, identifiers and variables, classification of data types, keywords, constants, Naming conventions in python, Operators and expressions, operator precedence and associativity, input and output statements.

UNIT - II

Control statements: simple if, if..else, nested if, if..elif..else statement. **Loops:** while loop, for loop, nested loops, break , continue , pass and assert statements, Arrays in python, Strings and their operations.

UNIT - III

Functions: define and calling a function, return statement, formal and actual arguments, local and global variables, passing arguments to function, anonymous functions, example programs on functions, recursion.

UNIT - IV

Sequences: Lists, Tuples, Sets, Dictionaries, Operations and methods on Tuples, Lists, Dictionaries. **Files:** Types of files, opening file, closing a file, write data into a file, read data from a file.

UNIT - V

Introduction to Oops:, Introduction to class and objects, self-variable in python, constructor,types of variables and methods, Inheritance and polymorphism, abstract class.

Text Books:

1. Core python programming by Wesley J Chun, Prentice Hall, Second edition.
2. Introduction to Computation and Programming using Python, by John Guttag, PHI Publisher.
3. Learning python, Mark Lutz, O'Reilly publications, 5th edition, 2013.
4. Core python programming by Dr. R. Nageswara Rao, Dreamtech press, second edition, 2018

Reference Books:

1. Python: The complete reference by Martin C Brown, McGraw-Hill Publication, 2018.
2. Programming Python, Mark Lutz,4th Edition, O'Reilly publications.
3. Dive into Python, Mark Pilgrim, APress Media, LLC.

Course Title	COMPUTER NETWORKS (Open Elective-2)				B.Tech VII Sem (R18)		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
18OE504	OEC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs		

Course Objectives:

- Study the evolution of computer networks and future direction.
- Study the concepts of computer networks from layered.
- Perspective study the issues open for research in computer networks.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand the terminology and concepts of the OSI reference model and TCP-IP.
CO 2	Describe the functions of Data link layer and its protocols.
CO 3	Classifying the different routing algorithms and IP addressing with network layer
CO 4	Understand connection establishment and services provides by TCP and UDP.
CO 5	Explain the working of DNS and World Wide Web

UNIT - I

Introduction: Uses of Computer Networks, Network Hardware, Reference Models: OSI, TCP/IP, Comparison of OSI & TCP/IP reference models.

Introduction to physical layer: Data and Signals, Transmission impairment.

Transmission media: Introduction, Guided Media, Unguided Media

UNIT - II

The Data Link Layer: Data Link Layer design issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols.

The Medium Access Control sublayer : Multiple Access protocols, Ethernet.

UNIT - III

The Network Layer: Network layer design issues, Routing algorithms : The Optimality Principle, Shortest Path Algorithm, Flooding, Distance Vector Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing. Quality of service, IP Addresses, IPv4,IPv6,Tunneling, Fragmentation.

UNIT - IV

The Transport Layer: The Transport Service, Elements of Transport Protocols, Congestion Control, The internet transport protocols: UDP, TCP: Introduction to TCP,Introduction to UDP.

UNIT - V

The Application layer: Domain Name System (DNS), World Wide Web (WWW), E-mail.

Text Books:

1. "Computer Networks", Andrew S. Tanenbaum, David J.Wetherall, Pearson, 5th edition, 2010.
2. "Data communications and networking", Behrouz A. Forouzan, TMH, 5th edition, 2012.
3. "Internetworking with TCP/IP – Principles, protocols, and architecture- Volume 1,Douglas E. Comer, 5 th edition, PHI
4. "Computer Networks", 5E, Peterson, Davie, Elsevier.

Reference Books:

1. "Introduction to Computer Networks and Cyber Security", Chawan- Hwa Wu, Irwin, CRC Publications.
2. "Computer Networks and Internets with Internet Applications", Comer.
3. Computer Networks, A Top-Down Approach, James F. Kurose, Keith W. Ross, 3rd Edition, Pearson.
4. Computer Networks, A Top-Down Approach, Behrouz A. Forouzan, Firoz Mosharraf, Special Indian Edition, McGraw Hill.

Course Title	WEB TECHNOLOGIES (Open Elective-3)				B.Tech VII Sem (R18)			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
180E505	OEC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
MidExamDuration:2Hrs					EndExamDuration:3Hrs			

Course Objectives:

- To learn the basic concepts of HTML.
- To introduce client side scripting with Java Script.
- To introduce the concepts of Java Applets, AWT and Swings.
- To introduce server side programming with Servlets and Database connectivity

Course Outcomes: On successful completion of this course, the students will be able to

CO1	Understand the basic concepts of HTML scripting language.
CO2	Understand the CSS, java Script and create static web pages.
CO3	Understand the concepts of AWT and Swings.
CO4	Define web server and installation of web server.
CO5	Develop server side programs using JSP and accessing database through JSP.

UNIT - I

HTML Common tags- Introduction, HTML Basics: Text, Colors, Links, Images, Forms: Text Area, Check Box, Radio Button, Button, Menus, Frames, List, Tables

UNIT - II

Java Script: Introduction , Basics of Java Script, Control Structures, Pop up Boxes, Functions, Arrays Events, Objects, Dynamic HTML: Introduction, Cascading Style Sheets (CSS).

UNIT - III

Review of Applets, Class, Event Handling, AWT Programming, Introduction to Swings: JApplet Handling Swing Controls like icons, Labels, Buttons, Text Boxes, Combo Boxes

UNIT - IV

Web Servers and Servlets: Tomcat Server Installation &Testing, Introduction to Servlets, Deployment of servlet, Life cycle of a servelet, HTTP-GET and POST Requests, Session Tracking, Cookies.

UNIT - V

JDBC: Database Access, JDBC Architecture, Introduction to JSP: Introduction, Advantages of JSP, The problem with servlet, The anatomy of JSP page, JSP Processing.

Text Books:

1. HTML & CSS: The Complete Reference, Thomas A. Powell, 5the Edition, McGraw Hill.
2. Web Technologies: A Computer Science Perspective, Jeffrey C. Jackson, Pearson Education.
3. Java The Complete Reference, Herbert Schildt, TMH.
4. Web Technologies, A.S. Puntambekar, Technical Publications.

Reference Books:

1. Web Programming, building internet applications, Chris Bates 3rd edition, WILEYDreamtech
2. Web Technology, N.P. Gopalan, J. Akilandeswari, PHI.
3. Foundations of Web Technlogy, Ramesh R Sarukkai, Springer.

Course Title	OPERATING SYSTEMS (Open Elective-3)				B.Tech VII Sem (R18)		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
180E506	**OEC**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Mid ExamDuration:2Hours					**EndExamDuration:3Hrs**			

Course Objectives:

- Have an overview of functions of operating systems.
- Have a thorough knowledge of process management and memory management.
- To have a thorough knowledge of how handle to deadlocks.
- Learn the concepts of files, protection and security.

Course Outcomes: On successful completion of this course, the students will be able to

CO1	Understand the basic concepts related to the operating systems.
CO2	Analyze the various process scheduling algorithms and process synchronization mechanisms.
CO3	Analyze the various memory management schemes.
CO4	Understand the ways to deal the deadlocks and the basic concepts related to files inthe system.
CO5	Analyze the protection and security mechanisms

UNIT - I

Operating Systems Basics: Operating systems functions, Overview of computer operating systems, distributed systems, operating system services and systems calls, system programs, operating system structure.

UNIT - II

Process Management: Process concepts, scheduling-criteria, algorithms, their evaluation.

Concurrency: Process synchronization, the critical-section problem, Peterson‘s Solution, semaphores, monitors.

UNIT-III

Memory Management: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page-replacement algorithms.

UNIT-IV

Deadlocks: system model, deadlock characterization, deadlock prevention, detection andavoidance, recovery form deadlock.

Files: The concept of a file, Access Methods, Directory structure, File system mounting.

UNIT-V

Protection: Protection, Goals of Protection, Principles of Protection, Domain of protection Access Matrix, Implementation of Access Matrix.

Text Books:

1. Abraham Silberchatz, Peter B. Galvin, Greg Gagne, "Operating System Concepts", Eighth edition, John Wiley.
2. Andrew S Tanenbaum, "Modern Operating Systems", Fourth Edition, Pearson Education
3. William Stallings, "Operating Systems: Internals and Design Principles", SixthEdition2009, Pearson Education.
4. D.M.Dhamdhere, "Operating Systems, A Concept based Approach", Third Edition, TMH

Reference Books:

1. A.S.Godbole, "Operating Systems", Second Edition, TMH.
2. Operating Systems: A Spiral Approach – Elmasri, Carrick, Levine, TMH Edition
3. Operating Systems – H.M. Deitel, P. J. Deitel, D. R. Choffnes, 3rd Edition, Pearson
4. Operating Systems: A Practical Approach, Rajiv Chopra, 4th Edition, S Chand Publishers

R18-CSE- VIII Semester

Course Title	CYBER SECURITY (Professional Elective-4)				B.Tech VIII Sem (R18) CSE		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1805801	PEC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs		

Course Objectives:

- To learn about cybercrimes and how they are planned
- To learn the vulnerabilities of mobile and wireless devices
- The learner will gain knowledge about securing both clean and corrupted systems, protect personal data, and secure computer networks.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understanding the basic cyber security concepts.
CO 2	Classifying the international laws and cyber forensics.
CO 3	Remembering to cyber-crime.
CO 4	Recognizing cybercrime and cyber terrorism.
CO 5	Understanding the privacy issues.

UNIT - I

Introduction to Cyber Security: Basic Cyber Security Concepts, layers of security, Vulnerability, threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIA Triad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Spectrum of attacks, Taxonomy of various attacks, IP spoofing, Methods of defense, Security Models, risk management, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, etc., Comprehensive Cyber Security Policy.

UNIT - II

Cyberspace and the Law & Cyber Forensics: Introduction, Cyber Security Regulations, Roles of International Law. The INDIAN Cyberspace, National Cyber Security Policy. Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Forensics Investigation, Challenges in Computer Forensics, Special Techniques for Forensics Auditing.

UNIT - III

Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

UNIT- IV

Cyber Security: Organizational Implications: Introduction, cost of cybercrimes and IPR issues, web threats for organizations, security and privacy implications, social media marketing: security risks and perils for organizations, social computing and the associated challenges for organizations.

Cybercrime and Cyber terrorism: Introduction, intellectual property in the cyberspace, the ethical dimension of cybercrimes the psychology, mindset and skills of hackers and other cyber criminals.

UNIT - V

Privacy Issues: Basic Data Privacy Concepts: Fundamental Concepts, Data Privacy Attacks, Data linking and profiling, privacy policies and their specifications, privacy policy languages, privacy in different domains- medical, financial, etc.

Text Books:

1. Nina Godbole and Sunit Belpure, Cyber Security Understanding Cyber Crimes, ComputerForensics and Legal Perspectives, Wiley
2. B. B. Gupta, D. P. Agrawal, Haoxiang Wang, Computer and Cyber Security: Principles,Algorithm, Applications, and Perspectives, CRC Press, ISBN 9780815371335, 2018.
3. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRCPress.
4. Introduction to Cyber Security, Chwan-Hwa(john) Wu,J. David Irwin, CRC PressT&F Group.

Reference Books:

1. Cyber Security Engineering: A Practical Approach for Systems and Software Assurance, Nancy R. Meade, Carol C. Woody, Addison Wesley.
2. The Cyber Security: Self help Guide, Arun Soni, CRC Press.
3. Cyber Security: Analytics, Technology & Automation, Martti Lehto, Pekka Neittaanmaki, Springer.
4. Cyber Security: Essentials, Charles J. Brooks, Christopher Grow, Philip Craig, Donald Short, SYBEX.

Course Title	OBJECT ORIENTED ANALYSIS & DESIGN (Professional Elective-4)				B.Tech VIII Sem (R18) CSE		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**	
1805802	**PEC**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Mid Exam Duration: 2 Hours					**End Exam Duration: 3Hrs**		

Course Objectives:

- To understand the Object-oriented life cycle.
- To know how to identify objects, relationships, Services and attributes through UML.
- To understand different UML diagrams.
- To know object-oriented design process, software quality and usability.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Design software applications and document them using UML class diagrams
CO 2	Analyze, design, document the requirements through use case driven approach.
CO 3	Identify analyses, and model structural and behavioral concepts of the system.
CO 4	Apply the concepts of architectural design for deploying the code for software.
CO 5	Develop; explore the conceptual model into various scenarios and applications.

UNIT - I

Introduction to UML: Importance of Modeling, Principles of Modeling, Object OrientedModeling, Conceptual Model of the UML, Architecture.

UNIT - II

Basic Structural Modeling : Classes, Relationships, Common Mechanisms, andDiagrams Interfaces, Types and Roles, Packages.

Class and Object Diagrams : Terms, Concepts, Modeling Techniques for Class andObject Diagrams.

UNIT - III

Basic Behavioral Modeling-I : Interactions, Interaction Diagrams.

Basic Behavioral Modeling-II : Use Cases, Use Case Diagrams, Activity Diagrams.

UNIT - IV

Advanced Behavioral Modeling : Events and Signals, State Machines, Processes andThreads, Time and Space, State Chart Diagrams.

UNIT - V

Architectural Modeling: Component, Deployment, Component Diagrams and Deployment Diagrams, Systems and Models.

Case Stud : The Unified Library Application.

Text Books:

1. The Unified Modeling Language User Guide, Grady Booch, James Rumbaugh,Ivar Jacobson, Pearson Education.
2. UML 2 Toolkit, Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, WILEY-Dreamtech India Pvt. Ltd.
3. Fundamentals of Object Oriented Design in UML, Meilir Page- Jones, Pearson Education.
4. Modeling Software Systems Using UML2, Pascal Roques, Wiley- Dreamtech India Pvt.Ltd.

Reference Books:

1. Object Oriented Analysis and Design, Atul Kahate, The McGraw- Hill Companies.
2. Object-Oriented Analysis and Design with the Unified Process, John W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.
3. Learning UML 2.0, Russ Miles and Kim Hamilton, O'Reilly, SPD.
4. Appling UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
5. UML and C++, R.C.Lee and W.M.Tepfenhart, PHI.
6. Object Oriented Analysis, Design and Implementation, B.Dathan and S.Ramnath, Universities Press.
7. OO Design with UML and Java, K.Barclay, J.Savage, Elsevier.
8. Mark Priestley: Practical Object-Oriented Design with UML, TMH.

Course Title	DEEP LEARNING (Professional Elective-4)				B.Tech VIII Sem (R18) CSE		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
1805803	PEC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs		

Course Objectives:

- Study the neural networks and convolutions networks and their architecture.
- Gain knowledge about recurrent neural networks and deep supervised learning methods.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand the neural networks to solve the real time problems.
CO 2	Understand convolutional neural networks and their architectures.
CO 3	Understand recurrent neural networks and recursive NNs.
CO 4	Understand Deep supervised learning methods.
CO 5	Implement the Deep Learning models in various Applications.

UNIT - I

Introduction: Feed forward Neural networks, Gradient descent and the back propagation algorithm, Unit saturation, vanishing gradient problem, ways to mitigate it. RelU Heuristics for avoiding bad local minima, Heuristics for faster training, Nestors accelerated gradient descent, Regularization, Dropout.

UNIT - II

Convolutional Neural Networks : Architectures, convolution / pooling layers

UNIT - III

Recurrent Neural Networks: LSTM, GRU, Encoder Decoder architectures Recursive neural network (RNN).

UNIT - IV

Deep Unsupervised Learning: Auto encoders (standard, sparse, denoising, contractive, etc), Variational Auto encoders, Adversarial Generative Networks, Autoencoder and DBM Attention and memory models, Dynamic memory networks.

UNIT - V

Applications of Deep Learning to NLP/Computer Vision: Introduction to NLP and Vector Space Model of Semantics, Word Vector representations: Continuous Skip-Gram Model, Continuous Bag-of-Words model (CBOW), Named Entity Recognition, Opinion Mining using Recurrent Neural Networks, Sentence Classification using Convolutional Neural Networks. Image segmentation, object detection, automatic image captioning, Image generation with Generative adversarial networks, Video to text with LSTM models. Attention models for computer vision tasks.

Text Books:

1. Bengio, Yoshua, Ian J. Goodfellow, and Aaron Courville. "Deep learning." An MIT Press book. (2015).
2. Josh Patterson, Adam Gibson, Deep Learning: A Practitioner's Approach, OReilly, 2017.
3. Jeff Heaton, Deep Learning and Neural Networks, Heaton Research Inc, 2015.
4. Mindy L Hall, Deep Learning, VDM Verlag, 2011.

Reference Books:

1. Introduction to Deep Learning, Eugene Charniak, The MIT Press.
2. Deep Learning, D. Kelleher, The MIT Press.
3. Dive into Deep Learning, Joanne Quinn, Joanne McEachen, Michael Fullan, Mag Gardner, Max Drummy, Corwin.

Course Title	PROJECT-II				B.Tech VIII Sem (R18) CSE		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805806	PROJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		0	0	12	6	50	50	100
Internal Assessment:50					External Assessment:50			

Course Objectives:

- Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- Acquire and apply new knowledge as needed, using appropriate learning strategies.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Demonstrate a sound technical knowledge of their selected project topic.
CO 2	Understand problem identification, formulation and solution
CO 3	Design engineering solutions to complex problems utilizing a systems approach.
CO 4	Communicate with engineers and the community at large in written an oral form
CO 5	Demonstrate the knowledge, skills and attitudes of a professional engineer

GUIDELINES FOR PROJECT

The prime objective of the project work is to imbibe students with technical, analytical and innovative ideas. The students will able to learn theoretical and practical approaches pertaining to software applications development. A team of 4-5 students formed as a group and work under the supervision of a departmental faculty. Associating the students to solve real world problems identified within the department. The project work normally includes:

1. Literature survey on existing problem/ topic from viable sources.
2. Eliciting the problem-solving approach/methodologies and making the feasibility study.
3. The team should perform an extensive software requirements analysis.
4. Preparing an abstract on the selected topic and present before Departmental ReviewCommittee (DRC).
5. Preparing a roadmap to design, analyze, implement, evaluate/test considering functional, non- functional aspects and finally, deploy the application/product/software service.
6. Detailed Analysis/Design /Simulation as needed.
7. Final development of product/process conducting testing and specifying the results, conclusions and future scope.
8. Preparing a project report in the standard format for being evaluated by the Department Review Committee (DRC).
9. Final Project presentation / execution before Departmental Review Committee (DRC)

Semester 8: (Open Elective-4)

S.No	Subject Code	Subjects	L	T	P	C R
1	18OE507 18OE508	**Open Elective-4:** 1. Software Engineering 2. Cloud Computing	3	0	0	3
		Total	**3**	**0**	**0**	**3**

Course Title	SOFTWARE ENGINEERING (Open Elective-4)				B.Tech VIII Sem (R18)		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
18OE507	**OEC**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Mid Exam Duration: 2 Hours					**End Exam Duration: 3Hrs**			

Course Objectives:

- Knowledge of basic Software engineering methods and practices, and their appropriate application also the software engineering layered technology and Process frame work.
- A general understanding of software process models such as the waterfall and evolutionary models.
- Understanding of the role of project management including planning, scheduling, risk management, etc.
- Understanding of data models, object models, context models and behavioural models also different software architectural styles.
- Understanding of software testing approaches such as unit testing and integration testing other testing strategies and Risk management.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Ability to apply software engineering principles and techniques.
CO 2	Ability to develop, maintain and evaluate large-scale software systems.
CO 3	To produce efficient, reliable, robust and cost-effective software solutions.
CO 4	To gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in a software project.

UNIT –I

Software and Software Engineering: The Nature of Software, Software Engineering, Software Process Software Myths. Process Models: A Generic Process Model, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models.

UNIT - II

Understanding Requirements: Requirements Engineering, Establishing the Groundwork, Eliciting Requirements, Building the Requirements Model, Negotiating Requirements, Validating Requirements.

Requirements Modeling: Requirements Analysis, Scenario-Based Modeling, Data Modeling Concepts, Class-Based Modeling.

UNIT – III

Design Concepts: Design within the Context of Software Engineering, Design Process, Design Concepts, The Design Model.

Architectural Design: Software Architecture, Architectural Genres, Architectural Styles, Architectural Design.

UNIT - IV

User Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation.

Coding and Testing: Testing, Testing in the Large versus Testing in the Small, Unit Testing, Integration Testing, Black-Box Testing, White-Box Testing, Debugging, System Testing.

UNIT - V

Software Project Management: Project Planning, Metrics for Project Size Estimation, Project Estimation Techniques, Empirical Estimation Techniques, COCOMO-A Heuristic Estimation Technique, Halstead's Software Science-An Analytical Technique, Risk Management.

Text Books:

1. Software Engineering: A practitioner's Approach, Roger S. Pressman, Seventh Edition, 2010, McGrawHill International Edition.
2. Fundamentals of Software Engineering, Rajib Mall, 4th Edition, 2014, PHI.
3. Software Engineering, Ian Sommerville, Ninth edition, Pearson education.
4. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008

Reference Books:

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.
2. Software Engineering, Principles and Practices, Deepak Jain, Oxford UniversityPress.
3. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.
4. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition , 2006.
5. Software Engineering Foundations, Yingxu Wang, Auerbach Publications,2008.

Course Title	CLOUD COMPUTING (Open Elective-4)					B.Tech VIII Sem (R18)		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
18OE508	**OEC**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Mid Exam Duration: 2 Hours					**End Exam Duration: 3Hrs**			

Course Objectives:

- To explain the cloud paradigms.
- To introduce the various levels of services that can be achieved by cloud.
- To know about service providers of cloud.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Recall different computing paradigms
CO 2	Understand the evolution of cloud computing paradigm and its architecture, and Characterizing different cloud deployment models.
CO 3	Explain service models and Virtualization.
CO 4	Understand programming models and Software Development in Cloud Computing.
CO 5	Identify the Data Center environment and service providers in cloud computing.

UNIT - I

Computing Paradigms:

High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Biocomputing, Mobile Computing, Quantum Computing, Optical Computing, Nano computing, Network Computing.

Cloud Computing Fundamentals:

Motivation for Cloud Computing: The Need for Cloud Computing. Defining Cloud Computing: NIST Definition of Cloud Computing, Computing Is a Service, Cloud Computing Is a Platform. Principles of Cloud computing: Five Essential Characteristics, Four Cloud Deployment Models, Three Service Offering Models, Cloud Ecosystem, Requirements for Cloud Services, Cloud Application, Benefits and Drawbacks.

UNIT - II

Cloud Computing Architecture and Management: Cloud Architecture, Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications on the Cloud, Managing the Cloud, Migrating Application to Cloud.

Cloud Deployment Models: Private Cloud, Public Cloud, Community Cloud, Hybrid Cloud.

UNIT - III

Cloud Service Models: Infrastructure as a Service, Platform as a Service, Software as a Service, Other Cloud Service Models.

Virtualization: introduction, Virtualization opportunities, Approaches to virtualization, Hypervisors, From virtualization to cloud computing,

UNIT - IV

Programming Models in Cloud: Cloud Application Development Platforms: Windows Azure, Google App Engine, Force.com, Manjrasoft Aneka.

Software Development in Cloud: Introduction, Different perspectives on SaaS development, New challenges, Cloud aware software development using PaaS technology

UNIT - V

Networking for Cloud Computing: Introduction, Overview of Data Center Environment, Networking Issues in Data Centers.

Cloud Service Providers: Introduction, EMC, Google, Amazon Web Services, Microsoft, IBM, Salesforce, Rackspace

Text Books:

1. Barrie Sosinsky, Cloud Computing Bible, Wiley-India, 2010.
2. Nikos Antonopoulos, Lee Gillam, Cloud Computing: Principles, Systems and Applications, Springer, 2012.
3. K. Chandrasekaran, Essentials of Cloud Computing, CRC Press, 2015.
4. RajkumarBuyya, James Broberg, Andrzej M. Goscinski, Cloud Computing:Principles and Paradigms, Wiley, 2011

Reference Books:

1. Cloud Computing: A Practical Approach, Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, Tata McGraw Hill.
2. Cloud Computing Theory and Practice: Dan C. Marinescu, Elsevier.
3. Cloud Computing Bible, Barrie Sosinsky, Wiley Publishing.
4. Cloud Computing and Virutualization, Dac-Nhuong Le, Raghavendra Kumar, Gia Nhu Nguyen, Jyir Moy Chatterjee, Wiley.