



Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
B.Tech(CSE with Specialization in Information and Cyber Security)
Choice Based Credit System (CBCS)-2021-25
SEMESTER-VII

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING & EVALUATION SCHEME | | | | | L | T | P | CREDITS |
|----------------|-------------|---------------------------------------------|------------------------------|---------------|----------------------|-------------------------|----------------------|----------|----------|----------|----------|
| | | | THEORY | | | PRACTICAL | | | | | |
| | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* | | | | |
| BBAI501 | AECC | Human Values and Professional Ethics | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

The objective of the course is to disseminate the theory and practice of moral code of conduct and familiarize the students with the concepts of “right” and “good” in individual, social and professional context

Course Outcomes (COs):

1. Help the learners to determine what action or life is best to do or live.
2. Right conduct and good life.
3. To equip students with understanding of the ethical philosophies, principles, models that directly and indirectly affect business.

COURSE CONTENT

Unit I: Human Value

1. Definition, Essence, Features and Sources
2. Sources and Classification
3. Hierarchy of Values
4. Values Across Culture

Unit II: Morality

1. Definition, Moral Behaviour and Systems
2. Characteristics of Moral Standards
3. Values Vs Ethics Vs Morality
4. Impression Formation and Management

Unit III: Leadership in Indian Ethical Perspective.

1. Leadership, Characteristics
2. Leadership in Business (Styles), Types of Leadership (Scriptural, Political, Business and Charismatic)
3. Leadership Behaviour, Leadership Transformation in terms of Shastras (Upanihads, Smritis and Manu-smriti).

Unit IV: Human Behavior – Indian Thoughts

1. Business Ethics its meaning and definition
2. Types, Objectives, Sources, Relevance in Business organisations.
3. Theories of Ethics, Codes of Ethics

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Unit V: Globalization and Ethics

1. Sources of Indian Ethos & its impact on human behavior
2. Corporate Citizenship and Social Responsibility – Concept (in Business),
3. Work Ethics and factors affecting work Ethics.

Suggested Readings

1. Beteille, Andre (1991). *Society and Politics in India*. AthlonePress:New Jersey.
2. Chakraborty, S. K. (1999). *Values and Ethics for Organizations*. oxford university press
3. Fernando, A.C. (2009). *Business Ethics - An Indian Perspective*. India: Pearson Education: India
4. Fleddermann, Charles D. (2012). *Engineering Ethics*. New Jersey: Pearson Education / Prentice Hall.
5. Boatright, John R (2012). *Ethics and the Conduct of Business*. Pearson. Education: New Delhi.
6. Crane, Andrew and Matten, Dirk (2015). *Business Ethics*. Oxford University Press Inc:New York.
7. Murthy, C.S.V. (2016). *Business Ethics – Text and Cases*. Himalaya Publishing House Pvt. Ltd:Mumbai
8. Naagrajan, R.R (2016). *Professional Ethics and Human Values*. New Age International Publications:New Delhi.

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| BTCS702N | DCC | Big Data and Hadoop | 60 | 20 | 20 | 30 | 20 | 3 | 0 | 2 | 4 |

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

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Course Educational Objectives (CEOs):

The objectives of this course are to make the students to:

1. Introduce students to Big Data Analysis using hadoop
2. Introduce to Hadoop Eco System, HDFS, commands, management and map reduce.
3. Understating machine learning concept and Introduce JAQL, pig and HIVE
4. Data stream, partitioning, debugging and toolkits

Course Outcomes (COs):

At the end of the course, students shall be able to:

1. Install Hadoop, configure HDFS, Install Zookeeper , Pig Installation, Sqoop Installation, Hbase Installation run commands
2. Use Zookeeper , Sqoop, Hbase, JAQL, PIG & HIVE
3. Use BigInsite, data streams, partitioning and other toolkits
4. appreciate the influence of big data for business decisions and approach

Syllabus:

UNIT I

Introduction about big data ,Describe details Big data: definition and taxonomy , explain Big data value for the enterprise , Setting up the demo environment ,Describe Hadoop Architecture , Hadoop Distributed File System, MapReduce& HDFS , First steps with the Hadoop , Deep to understand the fundamental of MapReduce

UNIT II

Hadoop ecosystem, Installing Hadoop Eco System and Integrate With Hive Installation , PigInstallation ,Hadoop , Zookeeper Installation , Hbase Installation , , Sqoop Installation, Installing Mahout Introduction to Hadoop , Hadoop components: MapReduce/Pig/Hive/HBase, Loading data into Hadoop, Getting data from Hadoop.

UNIT III

Using Hadoop to store data, Learn NoSQL Data Management, Querying big data with Hive, Introduction to the SQL Language , From SQL to HiveQL , Querying big data with Hive,

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Introduction to HIVE e HIVEQL, Using Hive to query Hadoop files. Moving the Data from RDBMS to Hadoop , Moving the Data from RDBMS to Hbase , Moving the Data from RDBMS to Hive

UNIT IV

Machine Learning Libraries for big data analysis, Machine Learning Model Deployment, Machine learning tools , Spark & SparkML , H2O , Azure ML.

UNIT V

Monitoring The HadoopCluster , Monitoring Hadoop Cluster, Monitoring Hadoop Cluster with Nagios , Monitoring Hadoop Cluster, Real Time Example in Hadoop , Apache Log viewer Analysis , Market Basket Algorithms Big Data Analysis in Practice , Case Study , Preparation of Case Study Report and Presentation , Case Study Presentation

Text Books:

1. Tom White, "Hadoop: The Definitive Guide Paperback – 2015" Shroff Publishers & Distributers Private Limited - Mumbai; Fourth edition (2015).
2. V. K. Jain (Author), "Big Data and Hadoop" Khanna Publishers; 1 edition (1 June 2015)
3. Jason Bell (Author) "Machine Learning for Big Data: Hands-On for Developers and Technical Professionals" Wiley (2014)
4. Big Data Analytics & Hadoop by IBM ICE Publications

References:

1. Big data. Architettura, tecnologie e metodi per l'utilizzo di grandibasi di dati, A. Rezzani, Apogeo Education, 2013
2. Hadoop For Dummies, Dirk deRoos, For Dummies, 2014
3. Cohen et al. "MAD Skills: New Analysis Practices for Big Data", 2009
4. Ullman, Rajaraman, Mining of Massive Datasets, Chapter 2
5. Stonebraker et al., "MapReduce and Parallel DBMS's: Friends or Foes?", Communications of the ACM, January 2010.
6. Dean and Ghemawat, "MapReduce: A Flexible Data Processing Tool", Communications of the ACM, January 2010.

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List of Practicals:

1. Installing Hadoop, configure HDFS, Install Zookeeper , Pig Installation, Sqoop Installation, Hbase Installation
2. Configuring Hadoop
3. Running jobs on Hadoop
4. Working on HDFS
5. Hadoop streaming
6. Creating Mapper function using python.
7. Creating Reducer function using python
8. Python iterator and generators
9. Twitter data sentimental analysis using Flume and Hive
10. Business insights of User usage records of data cards
11. Wiki page ranking with hadoop
12. Health care Data Management using Apache Hadoop ecosystem

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| BTCS603N | DCC | Introduction to Cloud Computing | 60 | 20 | 20 | 30 | 20 | 3 | 0 | 2 | 4 |

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COURSE OBJECTIVES

The student will have ability to:

1. Analyze the SAAS, PAAS IAAS services of Cloud Computing to represent how engineering agility in an organization can be created.
2. Assess the exploitation of web services from cloud computing.
3. Configure essential infrastructural components used for implementing Cloud.
4. Significantly study case studies to derive the most excellent practice model to be appropriate when deploying cloud-based applications.

COURSE OUTCOMES

Upon completion of the course, students will be able to:

1. Investigate the trade-offs among deploying applications in the cloud and over the Local infrastructure.
2. Compute real-world problems security, privacy issues using cloud computing through group collaboration.
3. Development and Deployment applications over commercial cloud computing infrastructures.
4. Analyze and investigation of application & hardware performance, scalability, and availability of the underlying cloud technologies and software.

SYLLABUS

UNIT-I:

10 Hours

Overview of Cloud Computing

Introduction- Evolution, Shift from distributed computing to cloud computing; principles and characteristics of cloud computing- IaaS, PaaS, SaaS; service-oriented computing and cloud environment, Advantages, Service & Deployment Models, Infrastructure, and Consumer View, Functioning of Cloud Computing, Cloud Architecture, Cloud Storage, Cloud Services, Industrial Applications.

UNIT-II:

8 Hours

Cloud Computing Technology

Client systems, Networks, server systems and security from services perspectives, security, and privacy issues; accessing the cloud with platforms and applications; Cloud storage.

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UNIT-III:

9 Hours

Working with Cloud

Infrastructure as a Service – conceptual model and working, Platform as a Service – conceptual model and functionalities. Software as a Service –conceptual model and working. Trends in Service provisioning with clouds. Working on Microsoft Azure & IBM SmartCloud.

UNIT-IV:

9 Hours

Using Cloud Services

Cloud collaborative applications and services – case studies with calendars, schedulers, and event management; cloud applications in project management. Amazon Web Services & applications, AWS EC2, S3, Cloud Analytics, Cloud Open Stack.

UNIT-V:

8 Hours

Case studies- Microsoft Azure, Google App Engine, IBM Smart Cloud and Open source clouds, - Open-Nebula, Sales force and Eucalyptus, Cloud Simulation

TEXT BOOKS:

1. Cloud Computing: A Practical Approach by Anthony T. Velte Toby J. Velte,RobertElsenpeter, 2010 by TheMcGraw-Hill.

REFERENCES:

1. Kumar Saurabh, “Cloud Computing”, WileyPub,2012.
2. Krutz , Vines, “Cloud Security , WileyPub,2013.
3. Sosinsky, “Cloud Computing”, WileyPub,2012.
4. Murray Woodside; John Chinneck; Marin Litiou on “Adaptive Cloud Deployment UsingPersistence Strategies and Application Awareness”IEEEExplore, Year: 2017, Page(s):277 – 290.

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5. Buyya, Selvi ,Mastering Cloud Computing, TMHPub.

6. Michael Miller, Cloud computing – Web based Applications, Pearson Publishing, 2011.

LIST OF PRACTICALS:

1. Service deployment & Usage over cloud using VirtualBox.
2. Performance evaluation of services over cloud using VMwaretool.
3. Working of Goggle Drive to make spreadsheet.
4. Working on Heroku for Cloud application deployment.
5. Working on Aneka sevicees for Cloud application.
6. Working on services of Google AppEngine.
7. Working on Application deployment & services of Microsoft Azure.
8. Working on Application deployment & services of IBM SmartCloud.
9. Working and configuration of Euceliptus.
10. Deployment & Services of Amazon WebServices.

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| BTCS707N | SEC | Technical presentation skill | 0 | 0 | 0 | 0 | 50 | 0 | 0 | 2 | 1 |

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Course Educational Objectives (CEOs):

The student will have ability to:

1. To encourage the students to study advanced engineering developments.
2. To prepare and present technical reports.
3. To prepare technical material using audiovisual materials.
4. To encourage the students to use various teaching aids such as over head projectors, PowerPoint presentation and demonstrative models.

Course Outcomes (COs):

Upon completion of the subject, students will be able to:

1. Ability to review, prepare and present technological developments.
2. Ability to face the placement interviews.
3. Ability to effectively communicate technical material in print.
4. Ability to present technical material orally with confidence and poise.
5. Ability to present technical material using audiovisual materials.
6. Ability to communicate technical material to a variety of audiences, from members of the building and engineering trades and medical fields to government representatives and the general public.
7. Ability to work well in teams.

GUIDELINES:

During the Presentation Session each student is expected to prepare and present a topic on engineering/technology, for duration of about 15-20 minutes. Each student is expected to present at least twice during the semester and the student is evaluated based on that. At the end of the semester, he / she can submit a report on his / her topic of presentation and marks are given based on the report.

TEXT BOOKS:

1. The Chicago Manual of Style, 13th Edition, Prentice Hall of India 1989.
2. Gowers Ernest, "The Complete Plan in Words" Penguin, 1973.
3. Menzel D.H., Jones H.M, Boyd, LG., "Writing a Technical Paper". McGraw Hill, 1961.
4. Strunk, W., & White E.B., "The Elements of Style", 3rd Edition , McMillan, 1979.

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| BTCS707N | SEC | Technical presentation skill | 0 | 0 | 0 | 0 | 50 | 0 | 0 | 2 | 1 |

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REFERENCES:

1. Turbrian K.L., "A Manual for Writers of Term Papers, Thesis and dissertations" Univ of Chicago Press, 1973.
2. IEEE Transactions on "Written and Oral Communication" has many papers.

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| BTCS705N | SEC | Industrial Training | 0 | 0 | 0 | 0 | 50 | 0 | 0 | 2 | 1 |

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| BTCS706N | SEC | Project | 0 | 0 | 0 | 120 | 80 | 0 | 0 | 8 | 4 |

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Guideline and instruction for Project:-

| S.No | Particular |
|------|---------------------------------------------------------------------------------------------------------------------|
| 1. | Group formation and Submission of Project Topic (At least three(03)) |
| 2. | Guide allotment and Topic Finalization |
| 3. | Presentation – I Contents: 1. Problem Domain 2. Literature Survey 3. Feasibility Study 4. References |
| 4. | Synopsis Submission |
| 5. | Presentation – II Contents: 1. SRS / URD 2. Conceptual Design |
| 6. | Presentation – III Contents: 1. Detail Design 2. Implementation & Test Plan |
| 7. | Project Report Submission |

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SEMESTER-VII

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING & EVALUATION SCHEME | | | | | L | T | P | CREDITS |
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| | | | THEORY | | | PRACTICAL | | | | | |
| | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* | | | | |
| BTDSE711N | DSE | Soft Computing | 60 | 20 | 20 | 30 | 20 | 3 | 0 | 2 | 4 |

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
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Course Educational Objectives (CEOs):

The student will have ability to:

1. Apply soft computing techniques to real word problems
2. Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic control and other machine intelligence applications of fuzzy logic.
3. Understand the fundamental theory and concepts of neural networks, neuro-modeling, several neural network paradigms and its applications.
4. Understand the basics of an evolutionary computing paradigm known as genetic algorithms and its application to engineering optimization problems.
5. Apply hybrid techniques to improve efficiency of the algorithms.

Course Outcomes (COs):

Upon completion of the subject, students will be able to:

1. Design asystems using approaches of soft computing for solving various real-world problems.
2. Applythe rules of fuzzy logic forfuzzy control and Competent with issues related fuzzy systems.
3. Learn training, verification and validation of neural network models.
4. Design Engineering applications that can be optimized using genetic algorithms.
5. Design a robust and low-cost intelligent machines with knowledge of tolerance of imprecision and uncertainty.

SYLLABUS

UNIT-I

Introduction to Soft Computing, Historical Development, Definitions, advantages and disadvantages, solution of complex real life problems, Soft Computing and its Techniques, Soft Computing verses Hard Computing. Applications of Soft Computing in the Current industry.

UNIT-II

Introduction to Fuzzy Logic, Crisp Sets, Fuzzy Sets, Fuzzy Relations, Membership Functions and features, Fuzzification, Methods of Membership Value Assignments, Defuzzification and

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methods, Lambda cuts. Fuzzy Measure, Fuzzy Reasoning, Fuzzy Inference System.

UNIT-III

Neural Network (NN), Biological foundation of Neural Network, Neural Model and Network Architectures, Perceptron Learning, Supervised Hebbian Learning, Back-propagation, Associative Learning, Competitive Networks, Hopfield Network, Computing with Neural Nets and applications of Neural Network

UNIT-IV

Genetic Algorithm, Fundamentals, basic concepts, working principle, encoding, fitness function, reproduction, Genetic modeling: Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator, Generational Cycle, Convergence of GA, Applications & advances in GA, Differences & similarities between GA & other traditional methods.

UNIT-V

Neuro-Fuzzy and Soft Computing, Adaptive Neuro-Fuzzy Inference System Architecture, Hybrid Learning Algorithm, Learning Methods that Cross-fertilize ANFIS and RBFN. Coactive Neuro Fuzzy Modeling, Framework Neuron Functions for Adaptive Networks, Neuro Fuzzy Spectrum. Hybridization of other techniques

TEXT BOOKS:

1. S.N. Deepa and S.N. Sivanandam, Principles of Soft Computing, 2ed., Wiley, 2011
2. Vojislav Kecman, Learning and Soft Computing - Support Vector Machines, Neural Networks, and Fuzzy Logic Models, 1ed., The MIT Press, 2001.
3. D. K. Pratihari, Soft Computing, 1ed., Alpha Science, 2007.
4. Timothy J. Ross, Fuzzy logic with Engineering Applications, 3ed., John Wiley and Sons, 2010.
5. S. Rajasekaran and G.A.V. Pai, Neural Networks, Fuzzy Logic and Genetic Algorithms, 2ed. PHI
6. David E. Goldberg, Genetic Algorithms in search, Optimization & Machine Learning, 1ed., Addison-Wesley Publishing Company, 1989

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***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

1. Jang, Sun and Mizutani, Neuro-Fuzzy and Soft Computing: A Computational Approach to Learning and Machine Intelligence, 1ed., Pearson, 1997.
2. George J. Klir and Bo Yuan, Fuzzy Sets and Fuzzy Logic: Theory and Applications, 1ed., Prentice Hall, 1995
3. Simon Haykin, Neural Networks: A Comprehensive Foundation, 2ed. Prentice Hall, 1998
4. Samir Roy and Udit Chakraborty, A Beginners Approach to Soft Computing, 1ed., Pearson, 2013.

List of Practicals:

1. Implementation of Fuzzy Operations.
2. Implementation of Fuzzy Relations (Max-min Composition)
3. Implementation of Fuzzy Controller (Washing Machine)
4. Implementation of Simple Neural Network (McCulloch-Pitts model)
5. Implementation of Perceptron Learning Algorithm
6. Implementation of Unsupervised Learning Algorithm
7. Implementation of Simple Genetic Application
8. Study of ANFIS Architecture
9. Study of Derivative-free Optimization
10. Study of research paper on Soft Computing.

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| BTDSE715N | DSE | Quantum Computing | 60 | 20 | 20 | 30 | 20 | 3 | 0 | 2 | 4 |

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Course Educational Objectives (CEOs):

The objective of this course is to impart necessary knowledge to the learner so that he/she can develop and implement algorithm and write programs using these algorithm.

Course Outcomes (COs):

Upon completion of the subject, students will be able to:

1. Explain the working of a Quantum Computing program, its architecture and programmodel
2. Develop quantum logic gate circuits
3. Develop quantum algorithm
4. Program quantum algorithm on major toolkits

SYLLABUS

UNIT-I

Introduction to Quantum Computing: Motivation for studying Quantum Computing, Major players in the industry (IBM, Microsoft, Rigetti, D-Wave etc.), Origin of Quantum Computing, Overview of major concepts in Quantum Computing: Qubits and multi-qubits states, Bra-ket notation, Bloch Sphere presentation, Quantum Superposition, Quantum Entanglement.

UNIT-II

Math Foundation for Quantum Computing: Matrix Algebra: basis vectors and orthogonality, innerproduct and Hilbert spaces, matrices and tensors, unitary operators and projectors, Dirac notation, Eigen values and Eigen vectors.

UNIT-III

Building Blocks for Quantum Program: Architecture of a Quantum Computing platform, Details of q-bit system of information representation: Bloch Sphere, Multi-qubits States, Quantum superposition of qubits (valid and invalid superposition), Quantum Entanglement, Useful states from quantum algorithmic perspective e.g. Bell State, Operation on qubits: Measuring and transforming using gates, Quantum Logic gates and Circuit: Pauli, Hadamard, phase shift, controlled gates, Ising, Deutsch, swap etc, Programming model for a Quantum Computing Program: Steps performed on classical computer, Steps performed on Quantum Computer, Moving data between bits and qubits.

UNIT-IV

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Quantum Algorithms: Basic techniques exploited by quantum algorithms, Amplitude amplification, Quantum Fourier Transform, Phase Kick-back, Quantum Phase estimation, Quantum Walks, Major Algorithms: Shor’s Algorithm, Grover’s Algorithm, Deutsch’s Algorithm, Deutsch -Jozsa Algorithm,

UNIT–V

OSS Toolkits for implementing Quantum program: IBM quantum experience, Microsoft Q, RigettiPyQuil (QPU/QVM)

TEXT BOOKS And REFERENCES:

1. Michael A. Nielsen, “Quantum Computation and Quantum Information”, Cambridge University Press.
2. David McMahon, “Quantum Computing Explained”, Wiley.
3. IBM Experience:
<https://quantumexperience.ng.bluemix.net>
4. Microsoft Quantum Development Kit
<https://www.microsoft.com/en-us/quantum/development-kit>
5. Forest SDK PyQuil:
<https://pyquil.readthedocs.io/en/stable/>.

List of Practicals:

1. Implementation of Qubits.
2. Visualization of Bloch Sphere.
3. Implementation of Shor’s Algorithm.
4. Implementation of Grover’s Algorithm.
5. Implementation of Deutsch’s Algorithm.
6. Implementation of Deutsch -Jozsa Algorithm.

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| BTDSE716N | DSE | Virtual Reality | 60 | 20 | 20 | 30 | 20 | 3 | 0 | 2 | 4 |

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Course Educational Objectives (CEOs):

The objective of this course is to provide a detailed understanding of the concepts of Virtual Reality and its applications.

Course Outcomes (COs):

Upon completion of the subject, students will be able to:

1. Understand geometric modelling and Virtual environment.
2. Study about Virtual Hardware and Software
3. Develop Virtual Reality applications.

SYLLABUS

UNIT-I

Introduction to Virtual Reality: Virtual Reality and Virtual Environment: Introduction, Computergraphics, Real time computergraphics, Flight Simulation, Virtual environment requirement, benefits of virtual reality, Historical development of VR, Scientific Landmark.

3D Computer Graphics: Introduction, The Virtual world space, positioning the virtual observer, the perspective projection, human vision, stereo perspective projection, 3D clipping, Colour theory, Simple 3D modelling, Illumination models, Reflection models, Shading algorithms, Radiosity, Hidden Surface Removal, Realism-Stereographic image.

UNIT-II

Geometric Modelling: Geometric Modelling: Introduction, From 2D to 3D, 3D space curves, 3D boundary representation.

Geometrical Transformations: Introduction, Frames of reference, Modelling transformations, Instances, Picking, Flying, Scaling the VE, Collision detection.

Generic VR system: Introduction, Virtual environment, Computer environment, VR technology, Model of interaction, VR Systems.

UNIT-III

Virtual Environment: Animating the Virtual Environment: Introduction, The dynamics of numbers, Linear and Nonlinear interpolation, the animation of objects, linear and non-linear translation, shape & object in between, free from deformation, particle system.

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Physical Simulation: Introduction, Objects falling in a gravitational field, Rotating wheels, Elastic collisions, projectiles, simple pendulum, springs, Flight dynamics of an aircraft.

UNIT-IV

VR Hardware and Software: Human factors: Introduction, the eye, the ear, the somatic senses.
 VR Hardware: Introduction, sensor hardware, Head-coupled displays, Acoustic hardware, Integrated VR systems.
 VR Software: Introduction, Modelling virtual world, Physical simulation, VR toolkits, Introduction to VRML

UNIT-V

VR Applications: Introduction, Engineering, Entertainment, Science, Training.
 The Future: Virtual environment, modes of interaction

TEXT BOOKS And REFERENCES:

1. John Vince, “Virtual Reality Systems “, Pearson Education Asia, 2007.
2. Anand R., “Augmented and Virtual Reality”, Khanna Publishing House, Delhi.
3. Adams, “Visualizations of Virtual Reality”, Tata McGraw Hill, 2000.
4. Grigore C. Burdea, Philippe Coiffet , “Virtual Reality Technology”, Wiley Inter Science, 2nd Edition, 2006.
5. William R. Sherman, Alan B. Craig, “Understanding Virtual Reality: Interface, Application and Design”, Morgan Kaufmann, 2008.
6. www.vresources.org
7. www.vrac.iastate.edu
8. www.w3.org/MarkUp/VRM.

List of Practicals:

1. Study of tools like Unity, Maya, 3DS MAX, AR toolkit, Vuforia and Blender.
2. Use the primitive objects and apply various projection types by handling camera.
3. Download objects from asset store and apply various lighting and shading effects.
4. Model three dimensional objects using various modelling techniques and apply textures over them.
5. Create three dimensional realistic scenes and develop simple virtual reality enabled mobile applications which have limited interactivity.
6. Add audio and text special effects to the developed application.

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7. Develop VR enabled applications using motion trackers and sensors incorporating fullhaptic interactivity.
8. Develop AR enabled applications with interactivity like E learning environment, Virtualwalkthroughs and visualization of historic places.
9. Develop AR enabled simple applications like human anatomy visualization, DNA/RNAstructure visualization and surgery simulation.
10. Develop simple MR enabled gaming applications.

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| BTICS701 | DSE | Mobile and Cloud Security | 60 | 20 | 20 | 30 | 20 | 3 | 0 | 2 | 4 |

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Course Objectives:

The student will have ability:

1. To understand modern trend of cloud and mobile computing security.
2. to acquire knowledge about the methodology followed in developing secure computing applications

Course Outcomes:

Upon completion of the subject, students will be able to:

- 1 Research in the field of mobile and cloud security and privacy.
- 2 Generalize the Data Centre operations, encryption methods and deployment details.
- 3 Provide recommendations for using and managing the customer's identity and choose the type of virtualization to be used.
- 4 Understand the Mobile platform security models and Mobile Commerce Security.
- 5 Design secured cloud and mobile networks that optimize accessibility whilst minimizing vulnerability to security risks.

Syllabus:

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| BTICS701 | DSE | Mobile and Cloud Security | 60 | 20 | 20 | 30 | 20 | 3 | 0 | 2 | 4 |

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
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UNIT I - Cloud Computing Security Architectural Framework:

Cloud Benefits, Business scenarios, Cloud Computing Evolution, cloud vocabulary, Essential Characteristics of Cloud Computing, Cloud deployment models, Cloud Service Models, Multi-Tenancy, Approaches to create a barrier between the Tenants, cloud computing vendors, Cloud Computing threats, Cloud Reference Model, The Cloud Cube Model, Security for Cloud Computing, How Security Gets Integrated.

UNIT II - Mobile Security Framework:

Mobile system architectures, Overview of mobile cellular systems, GSM and UMTS Security architecture & Attacks, Vulnerabilities in Cellular Services, Cellular Jamming, Attacks & Mitigation, Security in Cellular VoIP Services, Mobile application security.

UNIT III - Mobile platform security models and Mobile Commerce Security:

Android, iOS Mobile platform security models, Detecting Android malware in Android markets, Reputation and Trust, Intrusion Detection, Vulnerabilities, Analysis of Mobile commerce platform, secure authentication for mobile users, Mobile commerce security, payment methods, Mobile Coalition key evolving Digital Signature scheme for wireless mobile Networks.

UNIT IV -Data Center Operations and security challenges:

Data Center Operations, Security challenge, Implement Five Principal Characteristics of Cloud Computing, Data center Security Recommendations. Encryption and Key Management: Encryption for Confidentiality and Integrity, Encrypting data at rest, Key Management Lifecycle, Cloud Encryption Standards, Recommendations.

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UNIT V - Computing Paradigms:

Virtualization Vulnerabilities, Hypervisor Security-Related Issues, Side Channel Attacks, Data Segregation, ubiquitous, grid, cloud, pervasive, green, ad hoc (mobile, vehicular, flying) networks.

TEXT BOOKS:

1. Tim Mather, Subra Kumaraswamy, Shahed Latif, —Cloud Security and Privacy, An Enterprise Perspective on Risks and Compliance, Oreilly Media 2009.
2. S. Kami Makki, Peter Reiher, Kia Makki, Niki Pissinou, Shamila Makki, “Mobile and Wireless Network Security and Privacy”, Springer, ISBN 978-0-387-71057-0, 09-Aug2007.
3. Anurag Kumar, D. Manjunath, Joy Kuri “Wireless Networking” Morgan Kaufmann Publishers, First edition, 2009.

REFERENCE BOOKS:

1. Vic (J.R.) Winkler, —Securing the Cloud, Cloud Computer Security Techniques and Tactics, Syngress, April 2011.
2. C. Siva Ram Murthy, B.S. Manoj, “Adhoc Wireless Networks Architectures and Protocols”, Prentice Hall, ISBN 9788131706885, 2007
3. Nouredine Boudriga, “Security of Mobile Communications”, ISBN 9780849379413, 2010.
4. Kitsos, Paris; Zhang, Yan, “RFID Security Techniques, Protocols and System-On-Chip Design”, ISBN 978-0-387-76481-8, 2008.

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5. Johny Cache, Joshua Wright and Vincent Liu,” Hacking Wireless Exposed: Wireless Security Secrets & Solutions “, second edition, McGraw Hill, ISBN: 978-0-07-166662-6,2010.

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Course Objectives:

The student will have ability:

1. To understand the Cyber Crime Investigation, digital evidence and cyber trails.
2. Understand key terms and concepts in cyber law, intellectual property and cyber crimes, trademarks and domain theft.
3. Determine computer technologies, digital evidence collection, and evidentiary reporting in forensic acquisition.
4. Secure both clean and corrupted systems, protecting personal data, securing simple computer networks, and safe Internet usage.

Course Outcomes:

Upon completion of the subject, students will be able to:

1. Analyze the Digital evidence in real time applications.
2. Analyze the nature and effect of cybercrime in society.
3. Interpret the basic concepts how to Handling the digital crime scene, digital evidence examination guidelines.
4. Analyze Computer Crime and Criminals and Liturgical Procedures.
5. Apply the laws and regulations to the applications
6. Analyse the email tracking cyber applications

Syllabus:

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UNIT I - Forensics Overview:

Computer Forensics Fundamentals, Benefits of Computer Forensics, Computer Crimes, Computer Forensics Evidence and the Courts, Legal Concerns and Privacy Issues

UNIT II - Introduction to Digital Forensics:

Introduction to Digital Forensics, Forensic Software and Hardware, Analysis and Advanced Tools, Forensic Technology and Practices, Forensic Ballistics and Photography, Face, Iris and Fingerprint Recognition, Audio Video Analysis, Windows System Forensics, Linux System Forensics, Network Forensics, Biometric Security.

UNIT III - Forensics Process:

Forensics Investigation Process, Securing the Evidence and Crime Scene, Chain of Custody, Law Enforcement Methodologies, Forensics Evidence, Evidence Sources. Evidence Duplication, Preservation, Handling, and Security, Forensics Soundness, Order of Volatility of Evidence, Collection of Evidence on a Live System, Court Admissibility of Volatile Evidence

UNIT IV - Acquisition and Duplication:

Sterilizing Evidence Media, Acquiring Forensics Images, Acquiring Live Volatile Data, Data Analysis, Metadata Extraction, File System Analysis, Performing Searches, Recovering Deleted, Encrypted, and Hidden files, Internet Forensics, Reconstructing Past Internet Activities and Events, E-mail Analysis, Messenger Analysis: Yahoo, MSN, Gmail Chats.

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UNIT V - Mobile Device Forensics:

Evidence in Cell Phone, PDA, Blackberry, iPhone, iPod, and MP3. Evidence in CD, DVD, Tape Drive, USB, Flash Memory, Digital Camera, Court Testimony, Testifying in Court, Expert Witness Testimony, Evidence Admissibility

Text Books:

1. Jason Luttgens, Matthew Pepe, Kevin Mandia, Incident Response & Computer Forensics, McGraw-Hill Osborne Media, 3rd edition , 2014.
2. Keith J. Jones, Richard Bejtlich, Curtis W. Rose, Real Digital Forensics: Computer Security and Incident Response, Paperback – Import, 2005.

References:

1. John Sammons, The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics Paperback, February 24, 2012.
2. Hacking Exposed: Network Security Secrets & Solutions, Stuart McClure, Joel Scambray and George Kurtz, McGraw-Hill, 2005.

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