TECHNO INDIA UNIVERSITY

Techno India University, West Bengal

2ND -SEMESTER

Course Code	Course Title	Contact Hrs. / Week			Credit
		L	T	P	
Theory					
TIU-PEN-S102	CAREER ADVANCEMENT & SKILL DEVELOPMENT(Database Administration Concepts)	1	1	1	2
TIU-PMG-T118	Professional Ethics and Human Values	2	0	0	2
TIU-PCA-T122	OOP in Java	3	1	0	4
TIU-PCA-T124	Cloud Computing	2	1	0	3
TIU-PCA-T126	Networking and Mobile Communications	2	1	0	3
TIU-PCA-T128	Internet of Things & Applications	2	1	0	3
TIU-PCA-T130	AI and Machine Learning Applications in Python	2	1	0	3
Practical					
TIU-PCA-L124	Web Technologies Lab(Using Dot Net)	0	2	3	2
TIU-PCA-L122	OOP in Java Lab	0	0	3	2
TIU-PCA-L130	Machine Learning Lab	0	0	3	2
TIU-PCA-L128	IOT Lab	0	0	3	2
Sessional					
TIU-PES-S198	Entrepreneurship Skill Development	0	0	3	2
Total Credits					**30**

DETAILED SYLLABUS

Approved by:

External Expert-1 (Prof. Subhadip Basu, J.U.)
External Expert-2 (Prof. Amlan Chakraborty, C.U.)
HOD - (Prof. A.B. Chaudhuri)

Career Advancement and Skill Development

TIU-PEN-T100

L-T-P: 1-0-1   **Credit: 2**

Course Objectives
1. Acquire knowledge of soft skill
2. Making and acquiring knowledge on basic communication skill

COURSE OUTCOME:

After completion of this course the student should be able to:

After completion of this course the student should be able to:

CO1: Participate effectively in critical conversations and demonstrate the ability to prepare, organize, and deliver their work to the public.

CO2: Read critically and interpret texts with attention to form and genre, ambiguity and complexity, considering how aesthetic experiences fostered by works of literature are central to their meaning and ethical force.

CO3: Practice a deliberate writing process with emphasis on inquiry, audience, research, and revision.

CO4: Differentiate between genres of writing, understand the formal elements of language use in those genres, and write in appropriate genres and modes for a variety of purposes and audiences, in print and/or digital contexts.

CO5: Read works of criticism and theory, situating their own readings of primary and secondary texts in relation to larger critical debates.

#Interview Skill Management	Types of Interview & Dress Code	1
	Aptitude Interview Grooming	
	Technical Interview Questions	
	Advanced English	1
Total		**2**

Professional Ethics and Human Values
TIU-PMG-T108

L-T-P: 2-0-0   **Credit: 2**

Course Educational Objectives (CEO):

Acquiring knowledge of Ethics related to Engineering and updated Ethical decision making approaches.

Responsibilities and Rights in the Society.

Understanding the scope and complexity of Corporate Social responsibility in the global and Indian context.

COURSE OUTCOME:

After completion of this course the student should be able to:

CO1: Identify the importance of human values and skills for sustained happiness.

CO2: Strike a balance between profession and personal happiness/ goals.

CO3: Explain the significance of trust, mutually satisfying human behavior and enriching interaction with nature.

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CO4: Develop appropriate technologies and management patterns to create harmony in professional and personal life

Detailed syllabus

UNIT I : ROLE OF ETHICS IN LEADERSHIP

Values needed for Managers in Productivity improvement, Work Culture and Leadership in India, Ethics in Visioning & Modelling by Leaders, Impact of Ethics in Emotional Intelligence, Stress, Conflict Management and ultimately Leadership, Role of CEO in inducing Ethics in Business Culture.

UNIT II : ENGINEERING ETHICS :

Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Models of professional roles - Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories

UNIT III : ENGINEERING AS SOCIAL EXPERIMENTATION :

Engineering as Experimentation – Engineers as responsible Experimenters – Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk - Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination

UNIT IV : GLOBAL ISSUES IN ETHICS:

Introduction, Current Scenarios, Business Ethics, Environmental Ethics, Computer Ethics, Media Ethics, Bioethics, Research Ethics, Intellectual Property Rights, Professionals & Ethics.

UNIT V : Ethical Codes:

Need for Ethical Codes, Sample codes, Codes from Other Professions, Corporate Codes, Implementation of codes, Limitations of codes.

UNIT VI : Understanding Corporate Social Responsibility (CSR):

Introduction, Understanding CSR, History of CSR in India. Theories of corporate Governance, Importance of CSR in Corporate Governance, The Social Impact. Introduction, Role of Government, Role of NGOS & Not-for-profit Organizations, Role of Educational Institutions, Role of the Media. 10

UNIT VII : Framework for rating CSR & Global CSR:

Understanding CSR ratings, available Accepted Rating Frameworks, Structure of BITC CR Index, Rating Criteria and basic structure of the rating process. Study of Sample Rating Framework for Corporate. Multinational companies, challenges of multinationals, country specific CSR Initiatives.

UNIT VIII : Cyber Law :

Indian Legal Position in E Commerce, IT Act 2000, Copy right in IT, Copy right vs Patent, Legal Issues in Internet, Software Copyright and Multimedia, Remedies in Cyber Crime ,Fraud Hacking.

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Recommended Books:

1. Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw Hill, New Delhi, 2003.

2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

3. Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey, 2004.

4. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics –

Concepts and Cases", Cengage Learning, 2009

5. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi,

2003

6. Edmund G Seebauer and Robert L Barry, "Fundametals of Ethics for Scientists and

Engineers", Oxford University Press, Oxford, 2001

7. Laura P. Hartman and Joe Desjardins, "Business Ethics: Decision Making for Personal

Integrity and Social Responsibility" Mc Graw Hill education, India Pvt. Ltd.,New Delhi 2013.

8. World Community Service Centre, " Value Education", Vethathiri publications, Erode,

2011

Web sources:

1. www.onlineethics.org 2, www.nspe.org 3, www.globalethics.org4, www.ethics.org

expert witnesses and advisors -moral leadership-

Books for Main Reading:
1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw-Hill, New York 1996.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

Books for Supplementary Reading:
1. Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, 2004 (Indian Reprint now available).
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Wadsworth Thompson Leatning, United States, 2000 (Indian Reprint now available)
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.
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OOP in Java
TIU-PCA-T102

L-T-P: 3-1-0   **Credit: 4**

COURSE Objective

1. Use an integrated development environment to write, compile, run, and test simple object-oriented **Java programs**.
2. Read and make elementary modifications to **Java programs** that solve real-world problems. Validate input in a **Java program**.

COURSE OUTCOME

After completion of this course the student should be able to:

CO1: Implement the concept of Object Oriented Programming & Java Programming Constructs.

CO2: Impliment the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords.

CO3: Implement the concept of exception handling and Input /Output operations.

CO4: Design the applications of Java & Java applet.

CO5: Design the concept of Event Handling and Abstract Window Toolkit.

CO6: Analyze the concept of Event Handling and Abstract Window Toolkit.

Detailed syllabus

Unit I

Introduction to Java Programming Language, Data Types and Operations, Structured Programming, Selection Statements, Loops, Methods, Method Abstraction and Stepwise Refinement, Arrays, Object-Oriented Programming: Classes and Objects, Constructors, Implementing & Designing Classes, Use of Keywords: static, final, this, Class Abstraction and Encapsulation, Strings and Text I/O, Inheritance and Polymorphism, use of super keyword, Overriding vs. Overloading, Object: The Cosmic Super class, Abstract Classes and Interfaces, Packages, Object-Oriented Design and Patterns.

Unit II

GUI Programming: GUI Basics, Graphics, Event-Driven Programming, Creating User Interfaces, Applets and Multimedia, Exception Handling, Binary I/O, Files & Streams, Recursion, Dynamic Binding, Generics & Generic Programming, Java Collections Framework, Algorithm Efficiency, Searching & Sorting.

Unit III

Multithreading, Networking, JDBC, Internationalization, AWT, Advanced GUI Programming: MVC, JavaBeans and Bean Events, Containers, Layout Managers, and Borders, Menus, Toolbars, Dialogs and Swing Models, JTable and JTree, New Features of Java.

Recommended Books:
Main Reading:
1. Y. Daniel Liang, "Introduction to Java Programming: Comprehensive Version", 7th Edition, 2009, Pearson Education Inc., New Delhi.
2. Herbert Schildt "Java The Complete Reference", 8th Edition, 2011, McGraw Hill Education (India) Private Limited.

Supplementary Reading:

1. Richard A. Johnson, "An Introduction to Java Programming and Object Oriented Application Development", First Edition, 2007, CENGAGE Learning India Pvt. Ltd., New Delhi.

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2. E. Balagurusamy, "Programming with Java: A Primer"

3. Cay S. Horstmann, "Big Java", 3rd Edition, Wiley India Pvt. Ltd., New Delhi.

Cloud computing
TIU-PCA-T104

L-T-P: 2-1-0   **Credit: 3**

COURSE Objective

1. To learn how to use Cloud Services.
2. 6. Broadly educate to know the impact of engineering on legal and societal issues involved

COURSE OUTCOME

After completion of this course the student should be able to:

CO1: Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures.

CO2: Design different workflows according to requirements.

CO3: Apply map reduce programming model.

CO4: Apply suitable Virtualization concept, Cloud Resource Management and design scheduling algorithms.

CO5: Develop combinatorial auctions for cloud resources and design scheduling algorithms for computing clouds.

CO6: Analyze cloud Storage systems and Cloud security, the risks involved, its impact and develop cloud application.

Detailed syllabus

Unit-1: Distributed System Models and Enabling Technologies

Scalable Computing Service over the Internet: The Age of Internet Computing, scalable computing Trends and New Paradigms, Internet of Things and Cyber-Physical Systems. System Models for distributed and Cloud Computing: Clusters of Cooperative Computers, Grid Computing Infrastructures, Peer-to-Peer Network Families, Cloud Computing over the Internet. Software Environments for Distributed Systems and Clouds: Service-Oriented Architecture (SOA), Trends towards Distributed Operating Systems, Parallel and Distributed Programming Models. Performance, Security, and Energy-Efficiency: Performance Metrics and Scalability Analysis, Fault-Tolerance and System Availability, Network Threats and Data Integrity, Energy-Efficiency in Distributed Computing.

Unit-2: Computer Clusters for scalable parallel computing

Clustering for massive parallelism: Cluster Development Trends, Design Objective of Computer Clusters, Fundamental Cluster Design issues. Virtual machines and Virtualization of clusters and Data centers: Implementation levels of virtualization: levels of virtualization Implementation, VMM Design requirements and providers, Virtualization support at the OS level, Middleware Support for Virtualization.

Unit-3: Cloud Platform Architecture over Virtualized Data Centers

Cloud computing and Service Models: Public, Private, and Hybrid Clouds, Cloud Ecosystem and Enabling Technologies, Infrastructure-as- a- Service (IaaS), Platform- and Software-as-a-Service (Paas, SaaS). Architectural

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Design of Compute and Storage Clouds: A Generic Cloud architecture Design, Layered Cloud Architectural development, Virtualization Support and Disaster Recovery, Architectural Design Challenges.

Unit-4: Public Cloud Platforms

GAE, AWS, and Azure: Smart Cloud, Public Clouds and Service Offerings, Google App Engine (GAE), Amazon Web Service (AWS), Microsoft Windows Azure. Inter-cloud Resource Management: Extended Cloud Computing Services, Resource Provisioning and Platform Deployment, Virtual Machine Creation and Management. Cloud Security and Trust management: Cloud Security Defense Strategies, Distributed Intrusion/Anomaly Detection, Data and Software Protection Techniques.

Unit-5: Cloud Programming and Software Environments

Features of Cloud and Grid Platforms: Cloud Capabilities and Platform Features,Traditional Features Common to Grids and Clouds, Data Features and Databases, Programming and Runtime Support. Parallel and Distributed Programming Paradigms: Parallel Computing and Programming Paradigms, MapReduce, Twister and IterativeMapReduce, Hadoop Library from Apache.

Unit-6: Programming Support of App Engine

Programming the Google App Engine, Google File System (GFS), Bigtable, Google'sNOSQL system, Chubby, Google's Distributed Lock service. Programming on AmazonAWS and Microsoft Azure: Programming on Amazon EC2, Amazon Simple Storage ServiceS3, Amazon Elastic Block Store EBS and SimpleDB, Microsoft Azure programming support. Emerging Cloud Software Environments: Open Source Eucalyptus and Nimbus, Open Nebula, Sector/Sphere, and Open Stack, Manjrasoft Aneka Cloud and Appliances.

Unit-7 : Ubiquitous Clouds and the Internet of Things

Performance of Distributed Systems and the Cloud Data-intensive Scalable Computing(DISC), Quality of Service in Cloud computing, Benchmarking MPI, Azure, EC2,MapReduce, and Hadoop. Online social and Professional Networking: Online SocialNetwork Characteristics, Graph-Theoretic Analysis of social networks, communities and applications of social networks, Facebook: The World's Largest Content-Sharing Network, Twitter for Micro blogging, News and Alert Services.

Books for Main Reading:
1. Buyya, Selvi ," Mastering Cloud Computing ",TMH Pub
2. Kumar Saurabh, "Cloud Computing" , Wiley Pub
3. Krutz , Vines, "Cloud Security " , Wiley Pub
4. Velte, "Cloud Computing- A Practical Approach" ,TMH Pub
5. Sosinsky, " Cloud Computing" , Wiley Pub

Books for Supplementary Reading:
1. Gautam Shroff, Enterprise Cloud Computing Technology Architecture App
lications [ISBN: 978-0521137355]
2. Dimitris N. Chorafas, Cloud Computing Strategies, [ISBN: 1439834539]

Networking & Mobile Communications

Approved by:

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HOD - (Prof. A.B. Chaudhuri)

TIU-PCA-T114

L-T-P: 2-1-0   **Credit: 3**

COURSE OBJECTIVE

1. To impart fundamental concepts in the area of mobile computing,
2. to provide a computer systems perspective on the converging areas of wireless networking, embedded systems, and software, and to introduce selected topics of current research interest in the field.

COURSE OUTCOME

After completion of this course the student should be able to:

CO1: Explain the concepts and features of mobile computing technologies and applications.

CO2: Analyze how the underlying wireless and mobile communication networks work, their technical features, and what kinds of applications they can support.

CO3: Identify the important issues of developing mobile computing systems and applications.

CO4: Organize the functionalities and components of mobile computing systems into different layers and apply various techniques for realizing the functionalities.

CO5: Develop mobile computing applications by analyzing their characteristics and requirements, selecting the appropriate computing models and software architectures, and applying standard programming languages and tools.

Detailed syllabus

Overview of Computer Networks:

Overview of OSI Model: Significance of Layered Model, PDUs, SDUs, IDUs, Higher Layer Protocols Network Classification, Switching and Components.

2. Multiple Access Technologies for Wireless Communication:

FDMA, TDMA: Fixed TOM, Pure ALOHA and Slotted ALOHA CDMA: Spread Spectrum Techniques.

3. Mobile Data Communication:

Cellular Telephony, Radio propagation: Small Scale Fading and Multipath Fading, Speech Coding, Error Coding and Error Correction. Mobility Management, Hand off Management: Soft Hand off and Hard Hand off, Handoff architecture, Switching and authentication, MTSO Interconnections. Circuit Switched Data Services on Cellular Networks, Packet Switched Data Services on Cellular Networks.

4. Personal Wireless Communication Systems:

Personal Communication Systems (PCS) Architecture, Cordless Telephony (CT2), Digital Enhanced Cordless Telecommunications (DECT), Personal Access Communication System (PACS), Personal Handy Phone System (PHS).

5. 3G and 4G Wireless Standards:

GPRS Architecture, GPRS Network, WCDMA, LTE, Wi-MAX.

Recommended Books:

Main Reading:

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       HOD -   (Prof. A.B. Chaudhuri)

1. Raj Pandya, "Mobile and Personal Communication Systems & Services"
2. Yi- Bing Lin and Imrich Chlamtac, "Wireless and Mobile Network Architectures"
3. Rajesh & Balasubramanian "Computer Networks : Fundamentals and Application"

Supplementary Reading:

1. Jochen Schiller, "Mobile Communication"

2.C.Y. William Lee, "Mobile Cellular Telecommunications : Analog & Digital Systems"

3.Gilbert Held, "Building A Wireless Network"

4.Theodore S. Rappaport, "Wireless Communications: Principles and Practice"

Internet Of Things & Applications
TIU-PCA-T116

L-T-P: 2-1-0   **Credit: 3**

COURSE Objective

1. To assess the vision and introduction of IoT.

2. To Understand IoT Market perspective.

3. To Implement Data and Knowledge Management and use of Devices in IoT Technology.

4. To Understand State of the Art - IoT Architecture.

COURSE OUTCOME

After completion of this course the student should be able to:

CO1: Interpret the vision of IoT from a global context.

CO2: Determine the Market perspective of IoT.

CO3: Compare and Contrast the use of Devices, Gateways and Data Management in IoT.

CO4: Implement state of the art architecture in IoT.

CO5: Illustrate the application of IoT in Industrial Automation and identify Real World Design
Constraints.

Detailed syllabus

IoT & Web Technology: The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization.

M2M to IoT – A Basic Perspective: Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

IoT Architecture -State of the Art: Introduction, State of the art, Architecture Reference Model- Introduction, Reference Model and architecture, IoT reference Model, IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

IoT Applications for Value Creations: Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and Gas Industry, Opinions on IoT Application and Value for Industry, Home Management, eHealth.

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Internet of Things Privacy, Security and Governance: Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security

- **IOT application with python**.: Fundamental of python programming, Classes in Python, Data Structures in Python
- Exception Handling, Modules, Reading from and writing to Files, and Standard Python libraries,statistical application, networking using sockets, APIs for twitter and emails. Data science modules for IoT such as numpy, scipy, pandas, matplotlib. Multi-threading and Exception handling.

Books for Main Reading:

1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1 st Edition, VPT, 2014

2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1 st Edition, Apress Publications, 2013.

Book for Supplementary reading:

1. Cuno Pfister, Getting Started with the Internet of Things, O"Reilly Media, 2011, ISBN: 978-1-4493- 9357-1

AI and Machine Learning Applications in Python
TIU-PCA-T118

L-T-P: 2-0-1   **Credit: 3**

COURSE OBJECTIVE

Course Objective: 1. To provide a strong foundation of fundamental concepts in **Artificial Intelligence**.

2. To provide a basic exposition to the **goals** and methods

COURSE OUTCOME:

CO1: Describe the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.
CO2: Analyze the strengths and weaknesses of many popular machine learning approaches.

Detailed syllabus

1. **Introduction:**

   Definition of learning systems. Goals and applications of machine learning. Aspects of developing a learning system: training data, concept representation, function approximation.

- **Inductive Classification:**

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The concept learning task. Concept learning as search through a hypothesis space. General-to-specific ordering of hypotheses. Finding maximally specific hypotheses. Version spaces and the candidate elimination algorithm. Learning conjunctive concepts. The importance of inductive bias.

- **Decision Tree Learning:**

  Representing concepts as decision trees. Recursive induction of decision trees. Picking the best splitting attribute: entropy and information gain. Searching for simple trees and computational complexity. Occam's razor. Over fitting, noisy data, and pruning.

- **Ensemble Learning:**

  Using committees of multiple hypotheses. Bagging, boosting, and DECORATE. Active learning with ensembles.

- **Experimental Evaluation of Learning Algorithms:**

  Measuring the accuracy of learned hypotheses.
  Comparing learning algorithms: cross-validation, learning curves, and statistical hypothesis testing.

- **Computational Learning Theory:**

  Models of learnability: learning in the limit; probably approximately correct (PAC) learning. Sample complexity: quantifying the number of examples needed to PAC learn. Computational complexity of training. Sample complexity for finite hypothesis spaces. PAC results for learning conjunctions, kDNF, and kCNF. Sample complexity for infinite hypothesis spaces, Vapnik-Chervonenkis dimension.

- **Rule Learning: Propositional and First-Order:**

  Translating decision trees into rules. Heuristic rule induction using separate and conquer and information gain. First-order Horn-clause induction (Inductive Logic Programming) and Foil. Learning recursive rules. Inverse resolution, Golem, and Progol.

- **Artificial Neural Networks:**

  Neurons and biological motivation. Linear threshold units. Perceptrons: representational limitation and gradient descent training. Multilayer networks and backpropagation. Hidden layers and constructing intermediate, distributed representations. Over fitting, learning network structure, recurrent networks.

- **Support Vector Machines:**

  Maximum margin linear separators. Quadratic programming solution to finding maximum margin separators. Kernels for learning non-linear functions.

- **Bayesian Learning:**

  Probability theory and Bayes rule. Naive Bayes learning algorithm. Parameter smoothing. Generative vs. discriminative training. Logisitic regression. Bayes nets and Markov nets for representing dependencies.

- **Instance-Based Learning:**

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Constructing explicit generalizations versus comparing to past specific examples. k-Nearest-neighbor algorithm. Case-based learning.

- **Text Classification:**

Bag of words representation. Vector space model and cosine similarity. Relevance feedback and Rocchio algorithm. Versions of nearest neighbor and Naive Bayes for text.

- **Clustering and Unsupervised Learning:**

Learning from unclassified data. Clustering. Hierarchical Aglomerative Clustering. k-means partitional clustering. Expectation maximization (EM) for soft clustering. Semi-supervised learning with EM using labeled and unlabled data.

- **Language Learning :**

Classification problems in language: word-sense disambiguation, sequence labeling. Hidden Markov models (HMM's). Veterbi algorithm for determining most-probable state sequences. Forward-backward EM algorithm for training the parameters of HMM's. Use of HMM's for speech recognition, part-of-speech tagging, and information extraction. Conditional random fields (CRF's). Probabilistic context-free grammars (PCFG). Parsing and learning with PCFGs. Lexicalized PCFGs.

Book for main reading:

1. Machine Learning, Tom Mitchell, McGraw Hill, 1997.

2. Bishop, C. (2006). Pattern Recognition and Machine Learning. Berlin: Springer-Verlag.

Book for Supplementary reading:

1. Machine Learning: A Probabilistic Perspective, By Kevin P. Murphy, MIT press.

2. Research Paper: Ensemble Learning : Thomas G. Dietterich Department of Computer Science Oregon State University Corvallis, Oregon 97331-3202 USA tgd s.orst.edu September 4, 2002

Management Fundamentals & information Systems
TIU-PCA-T112

L-T-P: 2-0-0   **Credit: 2**

As directed by the faculty member.

Web Technologies Lab(Using Dot Net)

TIU-PCA-L120

L-T-P: 0-0-3   **Credit: 2**

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        HOD -   **(Prof. A.B. Chaudhuri)**

As directed by the faculty.

OOP in Java Lab

TIU-PCA-L102

L-T-P: 0-0-3   **Credit: 2**

Unit I Introduction to Java

1. Program on creation of classes and using different types of function.
2. Program using constructor/function overloading
3. Program on passing Object as parameter to a function
4. Program using static and final variable and methods

Unit II Program based on Array, Inheritance and Wrapper Class

1. Program to perform different operations on Array and String
2. Program using Interface and Inheritances covering domain like educational institute, banking etc.
3. Program using Wrapper class to cover auto boxing and unboxing

Unit III Program on packages and exception Handling

1. Program using packages to demonstrate the scope of access specifier
2. Program to On Exception Handling Mechanism covering

(Try, Catch, Throw, Throws, Finally)

3. Program to create your own exception class

Unit IV Program on Applet and multithreading

1. Program on dynamic applet creation using image/media etc
2. Program on Multithreading
3. Program to create multiply threads doing different task.
4. Program based on thread priority and thread synchronization

Unit V Program on File Handling and JDBC

1. Program using IO streams
2. Program using object serialization and object De-serialization
3. JDBC: All data base operation using Access /oracle/MySQL as backend

Unit VI Program to create rich User interface using various swing component

Unit VII JSP

1. Sample program to demonstrate JSP syntax and semantics
2. Program based on directive and error object
3. Program based on cookies and Sessions

Unit VIII Servlets

1. A Simple Servlet Generating Plain text/ HTML
2. Program based on cross page posting and post back posting (client request and server response)

Unit IX EJB (Enterprise Java Beans)

1. Program on session, message and entity bean

Unit X Introduction to Framework: 1. Struts

2. Basic Configuration for struts
3. Program based on Action validation and control in struts
4. Program based on integration of JSP and Servlets with struts

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        HOD -   **(Prof. A.B. Chaudhuri)**

Unit XI Mini Project in Java

Machine Learning Lab
TIU-PCA-L118

L-T-P: 0-0-3   **Credit: 2**

As directed by the faculty.

IOT Lab
TIU-PCA-L116

L-T-P: 0-0-3   **Credit: 2**

As directed by the faculty.

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