

ACADEMIC YEAR (2021-2022)



J.K.K.MUNIRAJAH COLLEGE OF TECHNOLOGY
T.N.Palayam(po),Gobi(tk)-638506, Erode(dt).

Metric No 1.3.2

S.No	Name of the course	course code	programme offering	Experiential learning			Number of students
				project work	field work	inplant training	
(2021-2022) Regulation-2017							
1	Advanced Software Engineering	CP5154	MASTER OF COMPUTER SCIENCE AND ENGINEERING	✓			1
2	Machine Learning Techniques	CP5191	MASTER OF COMPUTER SCIENCE AND ENGINEERING	✓			1
3	Network Design and Technologies	CP5201	MASTER OF COMPUTER SCIENCE AND ENGINEERING	✓			1
4	Security Practices	CP5291	MASTER OF COMPUTER SCIENCE AND ENGINEERING	✓			1

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OBJECTIVES:

- To understand Software Engineering Lifecycle Models
- To do project management and cost estimation
- To gain knowledge of the System Analysis and Design concepts.
- To understand software testing approaches
- To be familiar with DevOps practices

UNIT I INTRODUCTION 9

Software engineering concepts – Development activities – Software lifecycle models - Classical waterfall - Iterative waterfall – Prototyping – Evolutionary - Spiral – Software project management – Project planning – Estimation – Scheduling – Risk management – Software configuration management.

UNIT II SOFTWARE REQUIREMENT SPECIFICATION 9

Requirement analysis and specification – Requirements gathering and analysis – Software Requirement Specification – Formal system specification – Finite State Machines – Petrinets – Object modelling using UML – Use case Model – Class diagrams – Interaction diagrams – Activity diagrams – State chart diagrams – Functional modelling – Data Flow Diagram.

UNIT III ARCHITECTURE AND DESIGN 9

Software design – Design process – Design concepts – Coupling – Cohesion – Functional independence – Design patterns – Model-view-controller – Publish-subscribe – Adapter – Command – Strategy – Observer – Proxy – Facade – Architectural styles – Layered - Client-server - Tiered - Pipe and filter.- User interface design

UNIT IV TESTING 9


Testing – Unit testing – Black box testing– White box testing – Integration and System testing– Regression testing – Debugging - Program analysis – Symbolic execution – Model Checking

UNIT V DEVOPS 9

DevOps:Motivation-Cloud as a platform-Operations- Deployment Pipeline:Overall Architecture-Building and Testing-Deployment- Case study: Migrating to Microservices.

TOTAL: 45 PERIODS**OUTCOMES:**

At the end of this course, the students will be able to:


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- Understand the advantages of various Software Development Lifecycle Models
- Gain knowledge on project management approaches as well as cost and schedule estimation strategies
- Perform formal analysis on specifications
- Use UML diagrams for analysis and design
- Architect and design using architectural styles and design patterns
- Understand software testing approaches
- Understand the advantages of DevOps practices

REFERENCES:

1. Bernd Bruegge, Alan H Dutoit, Object-Oriented Software Engineering, 2nd edition, Pearson Education, 2004.
2. Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, Fundamentals of Software Engineering, 2nd edition, PHI Learning Pvt. Ltd., 2010.
3. Craig Larman, Applying UML and Patterns, 3rd ed, Pearson Education, 2005.
4. Len Bass, Ingo Weber and Liming Zhu, —DevOps: A Software Architect's Perspective, Pearson Education, 2016
5. Rajib Mall, Fundamentals of Software Engineering, 3rd edition, PHI Learning Pvt. Ltd., 2009.
6. Stephen Schach, Software Engineering 7th ed, McGraw-Hill, 2007.



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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 learning techniques
- To understand graphical models of machine learning algorithms

UNIT I INTRODUCTION 9

Learning – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search – Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm – Linear Discriminants – Perceptron – Linear Separability – Linear Regression.

UNIT II LINEAR MODELS 9

Multi-layer Perceptron – Going Forwards – Going Backwards: Back Propagation Error – Multi-layer MLP – Overview – Deriving Back-Propagation – Radial Basis Functions and Splines – Concepts – RBF Network – Curse of Dimensionality – Interpolations and Basis Functions – Support Vector Machines.

UNIT III TREE AND PROBABILISTIC MODELS 9

Learning with Trees – Decision Trees – Constructing Decision Trees – Classification and Regression Trees – Ensemble Learning – Boosting – Bagging – Different ways to Combine Classifiers – Probability and Learning – Data into Probabilities – Basic Statistics – Gaussian Mixture Models – Nearest Neighbor Methods – Unsupervised Learning – K means Algorithms – Vector Quantization – Self Organizing Feature Map

UNIT IV DIMENSIONALITY REDUCTION AND EVOLUTIONARY MODELS 9

Dimensionality Reduction – Linear Discriminant Analysis – Principal Component Analysis – Factor Analysis – Independent Component Analysis – Locally Linear Embedding – Isomap – Least Squares Optimization – Evolutionary Learning – Genetic algorithms – Genetic Offspring: - Genetic Operators – Using Genetic Algorithms – Reinforcement Learning – Overview – Getting Lost Example – Markov Decision Process

UNIT V GRAPHICAL MODELS 9**PRINCIPAL**

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Markov Chain Monte Carlo Methods – Sampling – Proposal Distribution – Markov Chain Monte Carlo – Graphical Models – Bayesian Networks – Markov Random Fields – Hidden Markov Models – Tracking Methods

TOTAL: 45 PERIODS

OUTCOMES:

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

- Distinguish between, supervised, unsupervised and semi-supervised learning
- Apply the appropriate machine learning strategy for any given problem
- Suggest supervised, unsupervised or semi-supervised learning algorithms for any given problem
- Design systems that uses the appropriate graph models of machine learning
- Modify existing machine learning algorithms to improve classification efficiency

REFERENCES:

1. Ethem Alpaydin, —Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series)l, Third Edition, MIT Press, 2014
2. Jason Bell, —Machine learning – Hands on for Developers and Technical Professionalsl, First Edition, Wiley, 2014
3. Peter Flach, —Machine Learning: The Art and Science of Algorithms that Make Sense of Datal, First Edition, Cambridge University Press, 2012.
4. Stephen Marsland, —Machine Learning – An Algorithmic Perspectivel, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.
5. Tom M Mitchell, —Machine Learningl, First Edition, McGraw Hill Education, 2013.



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OBJECTIVES:

- To understand the principles required for network design
- To explore various technologies in the wireless domain
- To study about 3G and 4G cellular networks
- To understand the paradigm of Software defined networks

UNIT I NETWORK DESIGN 10

Advanced multiplexing – Code Division Multiplexing, DWDM and OFDM – Shared media networks – Switched networks – End to end semantics – Connectionless, Connection oriented, Wireless Scenarios – Applications, Quality of Service – End to end level and network level solutions. LAN cabling topologies – Ethernet Switches, Routers, Firewalls and L3 switches – Remote Access Technologies and Devices – Modems and DSLs – SLIP and PPP – Core networks, and distribution networks.

UNIT II WIRELESS NETWORKS 9

IEEE802.16 and WiMAX – Security – Advanced 802.16 Functionalities – Mobile WiMAX - 802.16e – Network Infrastructure – WLAN – Configuration – Management Operation – Security – IEEE 802.11e and WMM – QoS – Comparison of WLAN and UMTS – Bluetooth – Protocol Stack – Security – Profiles

UNIT III CELLULAR NETWORKS 9

GSM – Mobility Management and call control – GPRS – Network Elements – Radio Resource Management – Mobility Management and Session Management – Small Screen Web Browsing over GPRS and EDGE – MMS over GPRS – UMTS – Channel Structure on the Air Interface – UTRAN – Core and Radio Network Mobility Management – UMTS Security

UNIT IV 4G NETWORKS 9

LTE – Network Architecture and Interfaces – FDD Air Interface and Radio Networks – Scheduling – Mobility Management and Power Optimization – LTE Security Architecture – Interconnection with UMTS and GSM – LTE Advanced (3GPP Release 10) - 4G Networks and Composite Radio Environment – Protocol Boosters – Hybrid 4G Wireless Networks Protocols – Green Wireless Networks – Physical Layer and Multiple Access – Channel Modelling for 4G – Introduction to 5G

UNIT V SOFTWARE DEFINED NETWORKS 9**PRINCIPAL**

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Introduction – Centralized and Distributed Control and Data Planes – Open Flow – SDN
Controllers – General Concepts – VLANs – NVGRE – Open Flow – Network Overlays – Types –
Virtualization – Data Plane – I/O – Design of SDN Framework

TOTAL : 45 PERIODS


OUTCOMES:

Upon completion of this course, the students should be able to

- Identify the components required for designing a network
- Design a network at a high-level using different networking technologies
- Analyze the various protocols of wireless and cellular networks
- Discuss the features of 4G and 5G networks
- Experiment with software defined networks

REFERENCES:

1. Erik Dahlman, Stefan Parkvall, Johan Skold, —4G: LTE/LTE-Advanced for Mobile Broadband, Academic Press, 2013.
2. Jonathan Rodriguez, —Fundamentals of 5G Mobile Networks, Wiley, 2015.
3. Larry Peterson and Bruce Davie, —Computer Networks: A Systems Approach, 5th edition, Morgan Kauffman, 2011
4. Martin Sauter, "From GSM to LTE, An Introduction to Mobile Networks and Mobile Broadband", Wiley, 2014.
5. Martin Sauter, —Beyond 3G - Bringing Networks, Terminals and the Web Together: LTE, WiMAX, IMS, 4G Devices and the Mobile Web 2.0, Wiley, 2009.
6. Naveen Chilamkurti, Sherali Zeadally, Hakima Chaouchi, —Next-Generation Wireless Technologies, Springer, 2013.
7. Paul Goransson, Chuck Black, —Software Defined Networks: A Comprehensive Approach, Morgan Kauffman, 2014.
8. Savo G Glisic, —Advanced Wireless Networks – 4G Technologies, John Wiley & Sons, 2007.
9. Thomas D.Nadeau and Ken Gray, —SDN – Software Defined Networks, O'Reilly Publishers, 2013.
10. Ying Dar Lin, Ren-Hung Hwang and Fred Baker, —Computer Networks: An Open Source Approach, McGraw Hill, 2011


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OBJECTIVES:

- To learn the core fundamentals of system and web security concepts
- To have through understanding in the security concepts related to networks
- To deploy the security essentials in IT Sector
- To be exposed to the concepts of Cyber Security and encryption Concepts
- To perform a detailed study of Privacy and Storage security and related Issues.

UNIT I SYSTEM SECURITY 9

Building a secure organization- A Cryptography primer- detecting system Intrusion- Preventing system Intrusion- Fault tolerance and Resilience in cloud computing environments- Security web applications, services and servers.

UNIT II NETWORK SECURITY 9

Internet Security - Botnet Problem- Intranet security- Local Area Network Security - Wireless Network Security - Wireless Sensor Network Security- Cellular Network Security- Optical Network Security- Optical wireless Security.

UNIT III SECURITY MANAGEMENT 9

Information security essentials for IT Managers- Security Management System - Policy Driven System Management- IT Security - Online Identity and User Management System - Intrusion and Detection and Prevention System.

UNIT IV CYBER SECURITY AND CRYPTOGRAPHY 9

Cyber Forensics- Cyber Forensics and Incidence Response - Security e-Discovery - Network Forensics - Data Encryption- Satellite Encryption - Password based authenticated Key establishment Protocols.

UNIT V PRIVACY AND STORAGE SECURITY 9

Privacy on the Internet - Privacy Enhancing Technologies - Personal privacy Policies - Detection of Conflicts in security policies- privacy and security in environment monitoring systems. Storage Area Network Security - Storage Area Network Security Devices - Risk management - Physical Security Essentials.

TOTAL : 45 PERIODS


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OUTCOMES:

Upon completion of this course the students should be able to

- Understand the core fundamentals of system security
- Apply the security concepts related to networks in wired and wireless scenario
- Implement and Manage the security essentials in IT Sector
- Able to explain the concepts of Cyber Security and encryption Concepts
- Able to attain a through knowledge in the area of Privacy and Storage security and related Issues.

REFERENCES:

1. John R.Vacca, Computer and Information Security Handbook, Second Edition, Elsevier 2013.
2. Michael E. Whitman, Herbert J. Mattord, Principal of Information Security, Fourth Edition, Cengage Learning, 2012.
3. Richard E.Smith, Elementary Information Security, Second Edition, Jones and Bartlett Learning, 2016


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