



### **III YEAR V SEMESTER BSc MPCs SYLLABUS**

**SRI RAMAKRISHNA DEGREE COLLEGE (AUTONOMOUS)**

**NANDYAL**

**BACHELOR OF COMPUTER APPLICATIONS**  
**Semester –V**  
**CYBER SECURITY AND MALWARE ANALYSIS**  
(Skill Enhancement Course, 3 credits)

**COURSE OBJECTIVES:**

The main objective of the course is to impart conceptual understanding on Cyber security and protection of electronic systems and information from malware attacks.

**COURSE OUTCOMES:**

**Upon successful completion of this course, students should have the knowledge and skills to**

1. Understand the computer networks, networking tools and cyber security
2. Learn about NIST Cyber Security Framework
3. Understand the OWASP Vulnerabilities
4. Implement various Malware analysis tools
5. Understand about Information Technology act 2000

**UNIT-I: Introduction to Networks & cyber security**

Computer Network Basics, Computer network types, OSI Reference model, TCP/IP Protocol suite, Difference between OSI and TCP/IP, What is cyber, cyber-crime and cyber-security, All Layer wise attacks, Networking devices: router, bridge, switch, server, firewall, How to configure: router, How to create LAN, Network tools, IP scanner, port scanner, vulnerability scanner, command tools-- netstack, traceroute, nslookup, tcpview.

**UNIT-II: NIST Cyber security framework**

Introduction to the components of the framework, Cyber security Framework Tiers, What is NIST Cyber security framework, Features of NIST Cyber security framework, Functions of NIST Cyber security framework, Turn the NIST Cyber security Framework into Reality/ implementing the framework

**UNIT-III: OWASP**

What is OWASP?, OWASP Top 10 Vulnerabilities: Injection, Broken Authentication, Sensitive Data Exposure, XML External Entities (XXE), Broken Access Control, Security Mis-configuration, Cross-Site Scripting (XSS), Insecure De-serialization, Using Components with Known Vulnerabilities, Insufficient Logging and Monitoring. OWASP Juice Shop, Web application firewall

**UNIT-IV: MALWARE ANALYSIS**

What is malware, Types of malware: Keyloggers, Trojans, Ransome ware, Rootkits. Antivirus, Firewalls, Malware analysis: VM ware, How to use sandbox, How to create virtual machine, Process explorer, Process monitor, SYS-internal Suite. SOC-security operations controls - Solar

winds (study the tools), Network intrusion detection: Wireshark, IDS, IPS, Snort.

**UNIT-V: CYBER SECURITY: Legal Perspectives:** Cybercrime and the legal landscape around the world, Indian IT ACT 2000 --Cybercrime and Punishments, Weak areas of IT ACT 2000, Challenges to Indian law and cybercrime scenario in India, Amendments of the Indian IT Act.

**Text books:**

1. Computer Networks | Fifth Edition | By Pearson (6th Edition) | Tanenbaum, Feamster & Wetherall
2. Computer Networking | A Top-Down Approach | Sixth Edition | By Pearson | Kurose James F. Ross Keith W.
3. Cyber Security by Sunit Belapure, Nina Godbole | Wiley Publications
4. TCP/IP Protocol Suite | McGraw-hill | Forouzan | Fourth Edition

# BACHELOR OF COMPUTER APPLICATIONS

Semester –V

DIGITAL IMAGING

(Skill Enhancement Course, 3 credits)

Total Hrs: 60

Max Marks: 100

## Course Objective:

Learn about different types of images and how to use basic and advanced features of GIMP Software for creating and image editing tools.

## Course Learning Outcomes:

Upon successful completion of the course, a student will be able to:

1. Gain knowledge about Types of Graphics, Types of Objects, Types of video editing tools
2. Show their skills in editing and altering photographs for through abasic understanding of the tool box.
3. Gain knowledge in using the layers.
4. Gain knowledge in using the selection tools, repair tools.
5. Gain knowledge in using selection tools , applying filters and can show their skills.

## UNIT-I

Types of Graphics: Raster vs Vector Graphics , Types of Objects: Audio formats, Video formats, Image formats, Text document formats, Types of video editing, Different color modes, Image Scanner, Types of Image Scanners

## UNIT-II

What is GIMP? GIMP tool box window , layers Dialog.Tool Options Dialog, Image window, Image window menus

## UNIT-III

**Improving Digital Photos:** Opening files, rescaling saving files, Cropping, Brightening & Darkening, Rotating, Sharpening, Fixing Red Eye

**Introduction to layers:** What is layer?, Using layer to add text, Using move tool, Changing colors Simple effects on layers, Linking layers together, Performing operations on layers, Using layers to copy and paste, Tour of layers dialog

## UNIT-IV

**Drawing:** Drawing lines and curves, Changing colors and brushes, Erasing, Drawing rectangles, Circles, other shapes, Outlining and filling regions, Filling with patterns and gradients, Importing brushes or gradients or making your own.

**Selection:** Working with selections, Select by color and fuzzy, Select Bezier paths, Intelligent scissors tool, Modifying selections with selection modes

## UNIT-V

**Erasing and Touching Up:** Dodge and burn tool, Smudging tool, Clone tool, Sharpening using convolve

tool, Blurring with Gaussian Blur, Correcting Color Balance, Hue, Saturation, Color balance using curves ,and levels.

**Filters:** Filters, Blur, Enhance, Distort, Noise Filters

**Text Book:** Beginning GIMP From Novice to professional by Akkana Peck, Second Edition, Apress

# **BACHELOR OF COMPUTER APPLICATIONS**

**Semester – V**

## ***INTERNET OF THINGS***

**(Skill Enhancement Course- 3 credits)**

**Total Hrs: 60**

**Max Marks: 100**

### **Course description and objectives:**

Students will be explored to the interconnection and integration of the physical world and the cyber space. They are also able to design & develop communication system among heterogeneous components i.e. IOT Devices.

### **Course Outcomes: ·**

1. Able to understand various applications of IOT in real world and industry domain·
2. Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks·
3. Able to understand building blocks of Internet of Things and characteristics.
4. Able to design and develop IOT devices.

### **UNIT-1**

IOT, Explain Characteristics and component of IOT, Advantages and disadvantages of IOT, various application areas of IoT, Time for Convergence for IoT, reasons to converge the technologies and shift to IOT, smart parking IOT application using figure, smart home IOT application using figure, smart health using IoT, Smart City application of IoT.

### **UNIT-2**

M2M Value Chains, IoT architecture outline with diagram, IOT Value Chains using figure, shifting from M2M to IoT, design principles and needed capabilities of IOT, I-GVC using figure, Global Value Chain, M2M Value Chains, IoT-Architecture.

### **UNIT 3:**

ETSI M2M high-level architecture, IOT reference model, IOT function view, IOT reference architecture's deployment and operational view, reference architecture of IOT using figure, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views of IOT reference architecture, Architecture Reference Model of IOT using figure, IoT Domain Model, Open Geospatial Consortium Architecture with a diagram.

### **UNIT 4**

Shopping basket can tell: IoT for retailing industry?, future factory concepts, four aspects in your business to master IoT, Needs of IoT for Oil and Gas Industry, creation from big data and serialization, challenges faced by industry related IoT Applications, four Aspects in one's business to master IoT, eHealth IOT applications, security concerns for industry, shopping basket can tell: IoT for retailing industry, future factory concepts, IoT for Oil and Gas Industry, Smart factory.

## **UNIT 5**

GAMBAS adaptive middleware, smartie approach for IoT, security, privacy and trust in IoT-Data-Platforms for smart cities, Data aggregation for the IoT in smart cities security, contributions from FP7Projects, smartie approach, properties and characteristics, privacy-preserving sharing of IoT Data, activity chain - governance, privacy and security issues.

**BACHELOR OF COMPUTER APPLICATIONS**  
**Semester –V**  
**MACHINE LEARNING USING PYTHON**  
**(Skill Enhancement Course, 3 credits)**

**Total Hrs: 60**

**Max Marks: 100**

**Course Educational Objective:** The objective of the course provides the basic concepts and techniques of Machine Learning and helps to use recent machine learning software for solving practical problems. It enables students to gain experience by doing independent study and research.

**Course Outcomes:** At the end of this course, the student will be able to

1. Identify the characteristics of machine learning. (Understand- L2)
2. Summarize the Model building and evaluation approaches (Understand- L2)
3. Apply Bayesian learning and regression algorithms for real-world Problems. (Apply-L3)
4. Apply supervised learning algorithms to solve the real-world Problems. (Apply- L3)
5. Apply unsupervised learning algorithms for the real world data. (Apply- L3)

**UNIT-I: Introduction to Machine Learning and Preparing to Model**

**Introduction to Machine Learning-** Introduction, What is Human Learning? Types of Human Learning, What is Machine Learning? Types of Machine Learning, Problems Not To Be Solved Using Machine Learning, Applications of Machine Learning.

**Preparing to Model-**Introduction, Machine Learning Activities, Basic Types of Data in Machine Learning, Exploring Structure of Data, Data Quality and Remediation, Data Pre- Processing

**UNIT-2: Modeling & Evaluation, Basics of Feature Engineering**

**Modeling & Evaluation-**Introduction, Selecting a Model, Training a Model (for Supervised Learning), Model Representation and Interpretability, Evaluating Performance of a Model.

**Basics of Feature Engineering-**Introduction, Feature Transformation, Feature Subset Selection

**UNIT-3: Bayesian Concept Learning and Regression**

**Bayesian Concept Learning** - Introduction, Why Bayesian Methods are Important?, Bayes' Theorem, Bayes' Theorem and Concept Learning, Bayesian Belief Network.

**Regression:** Introduction, Regression Algorithms - Simple linear regression, Multiple linear regression, Polynomial Regression Model, Logistic Regression, Maximum Likelihood Estimation.

**UNIT-4: Supervised Learning: Classification, Ensemble Learning**

**Classification-**Introduction, Example of Supervised Learning, Classification Model, Classification Learning Steps, Common Classification Algorithms - k-Nearest Neighbour (kNN), Decision tree, Random forest model, Support vector machines.

**Ensemble Learning-** Boosting, Bagging



## **UNIT-5: Unsupervised learning**

**Unsupervised Learning-** Introduction, Unsupervised vs Supervised Learning, Application of Unsupervised Learning, Clustering –Clustering as a Machine Learning task, Different types of clustering techniques, Partitioning methods, Hierarchical clustering, Density-based methods: DBSCAN.

**Finding Pattern using Association Rule** - Definition of common terms, Association rule, Apriori algorithm.

### **Text Books:**

1. Subramanian Chandramouli, SaikatDutt, Amit Kumar Das, “Machine Learning”, PearsonEducationIndia ,1<sup>st</sup> edition.
2. Tom M. Mitchell, “Machine Learning’, MGH, 1997.

### **Reference Books:**

1. Shai Shalev-Shwartz, ShaiBen David, “Understanding Machine Learning: From Theory toAlgorithms”, Cambridge.
2. Peter Harington, “Machine Learning in Action” , Cengage, 1<sup>st</sup> edition, 2012.
3. Peter Flach, “Machine Learning: The art and science of algorithms that make sense of data”,Cambridge university press,2012.
4. Jason Brownlee, “Machine Learning Mastery with Python Understand Your Data, CreateAccurate Models and Work Projects End-To-End”,Edition: v1.4, 2011.

**BACHELOR OF COMPUTER APPLICATIONS**  
**Semester –V**  
**MOBILE APPLICATION DEVELOPMENT**  
**(Skill Enhancement Course , 3 credits)**

**Total Hrs: 60**

**Max Marks: 100**

**Course objectives:**

1. Interpret the features of Android operating systems
2. Configure Android Environment and Development tools
3. Develop user interfaces by using layouts and controls
4. Develop rich user interface in the given view
5. Understand the security services and able to publish android application

**Learning Outcomes:**

Upon successful completion of the course, a student will be able to:

1. Identify basic terms ,tools and software related to android systems
2. Describe components of IDE, understand features of android development tools
3. Describe the layouts and controls
4. Explain the significance of displays using the given view
5. Explain the features of services and able to publish android Application
6. Developing interesting Android applications using MIT App Inventor

**UNIT-1**

Introduction to Android ,open headset alliance, Android Ecosystem, Need of Android, Features of Android, Tools and software required for developing an Application, Android architecture.

**UNIT-2**

operating system, java JDK, Android SDK, Android development tools, Android virtual devices, steps to install and configure Android studio and sdk.

**UNIT-3**

control flow, directory structure, components of a screen, fundamental UI design, linear layout, absolute layout , table layout, relative layout, text view, edit text, button, image button, radio button, toggle button, radio group, check box, and progress bar, list view , grid view, image view , scroll view, time and date picker.

**UNIT-4**

android platform services, Android system Architecture, Android Security model, Applications development: creating small application.

## UNIT-5

Introduction of MIT App Inventor, Application Coding, Programming Basics & Dialog, More Programming Basics, Alarm Clock Application, Audio & Video, Drawing Application, File, Game, Device Location, Web Browsing

### Text Books:

1. Erik Hellman, "Android Programming – Pushing the Limits", 1st Edition, Wiley India PvtLtd, 2014.
2. App Inventor : create your own Android apps by Wolber, David (David Wayne)

### Reference Books:

1. Dawn Griffiths and David Griffiths, "Head First Android Development", 1st Edition, O'Reilly SPDPublishers, 2015.
2. J F DiMarzio, "Beginning Android Programming with Android Studio", 4th Edition, Wiley India PvtLtd, 2016. ISBN-13: 978-8126565580
3. Anubhav Pradhan, Anil V Deshpande, " Composing Mobile Apps" using Android, Wiley 2014,ISBN: 978-81-265-4660-2
4. Android Online Developers Guide
5. <http://developer.android.com/reference/> Udacity: Developing Android Apps-Fundamentals
6. <https://www.udacity.com/course/developing-android-appsfundamentals--ud853-nd>
7. <http://www.appinventor.mit.edu/>

# **BACHELOR OF COMPUTER APPLICATIONS**

## **Semester –V**

### **PC HARDWARE AND NETWORKING**

**(Skill Enhancement Course (Elective), 5 credits)**

**Total Hrs: 60**

**Max Marks: 100**

#### **Course objectives:**

Upon successful completion of the course, a student will be able to:

- 1 Understand the basic structure of computer.
- 2 Learn the Computer hardware
- 3 Learn the Computer Networking

#### **Learning Outcomes:**

1. Identify the computer peripherals, software and hardware devices.
2. Describe the basics of networks and networking tools.
3. Describe the Network Addressing and sub-netting.
4. Explains the Networks protocols and management..
5. Identifies Basic Network administrator roles.

#### **UNIT-1 Introduction to computer hardware**

Computer Hardware: Introduction to Hardware components of computer, Components and its parts, Identifying the Important Hardware Components of PC.- CPU, Motherboard, RAM, HDD, ODD, SMPS, K/B, Mouse, Monitor (CRT,LCD,LED) etc, SMPS: About SMPS, Types of SMPS, Power stored in UPS, Components and Circuits inside the SMPS Unit, UPS (Uninterrupted Power Supply): Types of UPS (Offline/Line Interactive & Online), Working Principle of each type of UPS. Connecting, Maintenance and Troubleshooting.

#### **UNIT-2 Computer management and servicing**

Assembling and disassembling PCs, Introduction to BIOS / CMOS Setup, POST (Power On SelfTest), Introduction to BIOS/CMOS Setup, Demonstration of BIOS/CMOS Configuration (Date, Time, Enable/Disable Devices), Dual BIOS Feature, BIOS/CMOS Setup, Booting Sequence/Boot Order. Introduction to Operating System: Definition, Process of Booting the Operating System, Windows XP/Win7 Activation and Automatic Updating procedures, Computer Management, Computer Management, Disk Management, Defragmentation, Services and Applications, local Users and Groups, Advanced System Settings, Device Manager, Task Manager, Windows Registry, Partitioning, Partitioning of Hard Drive - Primary, Extended, Logical partitions using PartitionTools.

#### **UNIT-3 Overview of Networking**

Overview of Networking: Classification of Networks–LAN, MAN, WAN, Hardware and Software Components, Wi-Fi, Bluetooth, Network Communication Standards. NETWORKING MODEL -OSI Reference Model, TCP/IP Reference Model, LAN Cables, Connectors, wireless network adapter, Wireless network adapter, Functions of LAN Tools, Anti-Magnetic mat, Anti-Magnetic Gloves, Crimping Tool, Cable

Tester, Cutter, Loop back plug, Toner probe, Punch down tool, Protocol analyzer, Multi meter, Network Topologies: Bus, Ring, Star, Mesh, Hybrid Topologies.

#### **UNIT- 4 Network Addressing and sub-netting**

Network Addressing, TCP/IP Addressing Scheme, Components of IP Address and classes, Sub-netting, Internet Protocol Addressing - IPv4 ,IPv6, Class full addressing and classless addressing

#### **UNIT-5 Networks protocols and management**

Protocols in computer networks, Hyper Text Transfer Protocol(HTTP), File Transfer Protocol(FTP), Simple Mail Transfer Protocol(SMTP) , address Resolution Protocol(ARP), Reverse Address Resolution Protocol(RARP), Telnet, ICMP, Simple Network Management Protocol(SNMP), DHCP, DNS, Network Management, Network Monitoring and Troubleshooting, Remote Monitoring (RMON).

#### **Text Book:**

1. "Introduction to Data Communications and Networking", B. Forouzan,TataMcGrawHill.
2. "Computer Networks", Tanenbaum, PHI.
3. PC AND CLONES Hardware, Troubleshooting and Maintenance B. Govinda rajalu,Tata Mc-graw-HillPublication

#### **Reference Books:**

1. PC Troubleshooting and Repair Stephen J. Bigelow Dream tech Press, New Delhi
2. "Data and Computer Communications", Stallings, PHI,
3. "DataCommunication", William Schewber, McGrawHill,1987
4. IT essential V7 companion guide – Cisco Networking Academy 2020
5. Upgrading and repairing PCs(22nd edition) – Scott Mueller – 2015 Que