Skill Enhancement Courses (SECs) for Semester -V,

From 2022-23(Syllabus-Curriculum)

Structure of SECs for Semester–V

(To choose One pair from the Four alternate pairs of SECs)

S. No.	Paper Code	Subject	Hours per week	Credits	Max. Marks Internal	Max. Marks External (University Exams)	Total Marks
1	SEC-1	Machine Learning Using Python	4	4	25	75	100
	SEC-1P(Lab)	Python Lab	2	1	--	50	50
2	SEC-2	Digital Imaging	4	4	25	75	100
	SEC-2P(Lab)	Digital Imaging Lab	2	1	--	50	50
3	SEC-3	Cyber Security and Malware Analysis	4	4	25	75	100
	SEC-3P(Lab)	Cyber Security and Malware Analysis Lab	2	1	--	50	50
4	SEC-4	Internet of Things	4	4	25	75	100
	SEC-4P(Lab)	Internet of Things Lab	2	1	--	50	50
5	SEC-5	Mobile Application Development	4	4	25	75	100
	SEC-5P(Lab)	Mobile Application Development Lab	2	1	--	50	50
6	SEC-6	PC Hardware And Networking	4	4	25	75	100
	SEC-6P(Lab)	Computer Networking and PC trouble shooting Labs	2	1	--	50	50
	TOTAL		36	30	150	750	900

Note: *Course type code: T: Theory, L: Lab, P: Problem solving

Note: FIRST and SECOND PHASES (2 spells) of APPRENTICESHIP between 1st and 2nd year and between 2nd and 3rd year (two summer vacations)

***Note**: THIRD PHASE of APPRENTICESHIP Entire 5th / 6th Semester

Note-1:The Number of hours per week and credits are assigned to each course as per the course structure which was already approved at the time of finalizing the first FOUR semesters of BCA programme under CBCS by the concerned committee.

Note-2: *One of the main objectives of Skill Enhancement Courses (SEC) is to inculcate practical skills related to the domain subject in students. The syllabus of SEC will be skill oriented and hence, teachers shall impart practical training to students on the skills embedded in syllabus citing related real field situations.*

Note-3: *Since, the proposed SECs are connected to Computer Programming/Software Tools and Skill enhancement, the students need to get exposure on the syllabus content by practicing on the computer. Faculty are advised to engage students in practical based assignments so as to ensure better understanding of the practical usage of the particular skill based subject in real application*   *domain.*

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BCA	Semester – V (Skill Enhancement Course- Elective)	Credits:4
Course: 6A	Machine Learning Using Python	Hrs/Wk:4

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

CO1: Identify the characteristics of machine learning.(**Understand- L2**)

CO2: Summarize the Model building and evaluation approaches(**Understand- L2**)

CO3: Apply Bayesian learning and regression algorithms for real-world Problems.(**Apply- L3**)

CO4: Apply supervised learning algorithms to solve the real-world Problems. (**Apply- L3**)

CO5: 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",Pearson Education India ,1stedition.
2. Tom M. Mitchell, "Machine Learning', MGH, 1997.

Reference Books:
1. Shai Shalev-Shwartz, ShaiBen David, "Understanding Machine Learning: From Theory to Algorithms", Cambridge.
2. Peter Harington, "Machine Learning in Action" , Cengage, 1st 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, Create Accurate Models and Work Projects End-To-End",Edition: v1.4, 2011.

B.C.A	Semester – V (Skill Enhancement Course-Elective)	Credits:1
Course: 6A	**Machine Learning Using Python Lab**	Hrs/Wk:2

1. EDA Analysis
2. Exploring Feature Selection Algorithms
   - Ranking
   - Wrapper methods
3. Dimensionality Reduction-PCA
4. Exploring Model Evolution Parameters.
5. Probabilistic Classification Algorithm
6. Regression Techniques: Linear, Logistic
7. Classification Techniques – Tree Based
8. Classification Techniques- Neural Network.
9. Ensemble Learning
10. Clustering &Apriori Algorithm.

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BCA	Semester – V (Skill Enhancement Course- Elective)	Credits:4
Course: 7A	Digital Imaging	Hrs/Wk:4

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 a
basic 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   **12 HRS**

    1.Types of Graphics
        1.1 Raster vs Vector Graphics
    2.Types of Objects
        2.1 Audio formats
        2.2 Video formats
        2.3 Image formats
        2.4 Text document formats
    3. Types of video editing
    4. Different color modes.
    5. Image Scanner
        5.1 Types of Image Scanners

UNIT-II   **12 HRS**

    1.What is GIMP
    2.GIMP tool box window
    3.layers Dialog
    4.Tool Options Dialog
    5.Image window
    6.Image window menus

UNIT-III   **12 HRS**

Improving Digital Photos

    1.1 Opening files
        1.1.1 rescaling saving files
    1.2.Cropping
    1.3. Brightening & Darkening
    1.4. Rotating
    1.5. Sharpening
    1.6. Fixing Red Eye

Introduction to layers

2. What is layer

2.1. Using layer to add text

2.2. Using move tool

2.3. Changing colors

2.4. Simple effects on layers

2.5 Linking layers together

2.6 Performing operations on layers

2.7 Using layers to copy and paste

2.8 Tour of layers dialog

UNIT-IV Drawing: **12 HRS**

1.1 Drawing lines and curves

1.2 Changing colors and brushes

1.3 Erasing

1.4 Drawing rectangles

1.5 Circles, other shapes

1.6 Outlining and filling regions

1.7 Filling with patterns and gradients

1.8 Importing brushes or gradients or making your own.

Selection:

2.1 Working with selections

2.2 Select by color and fuzzy

2.3 Select Bezier paths

2.4 Intelligent scissors tool

2.5 Modifying selections with selection modes Dodge and burn tool

UNIT-V Erasing and Touching Up: **12 HRS**

1.1

1.2 Smudging tool

1.3 Clone tool

1.4 Sharpening using convolve tool

1.5 Blurring with Gaussian Blur

1.6 Correcting Color Balance

1.7 Hue

1.8 Saturation

1.9 Color balance using curves and levels.

Filters:

2.1 Filters

2.1.1 Blur

2.1.2 Enhance

2.1.3 Distort

2.1.4 Noise Filters

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

Recommended Co-Curricular Activities (participation: total 15 weeks):

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A. **Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)

2. Student seminars (on topics of the syllabus and related aspects (individual activity))

3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))

4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

B. **General**

1. Group Discussion
2. Others

Recommended Continuous Assessment Methods:

Some of the following suggested assessment methodologies could be adopted;

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Programming exercises,
4. Observation of practical skills,
5. Efficient delivery using seminar presentations,
6. Viva voce interviews.
7. Computerized adaptive testing, literature surveys and evaluations,
8. Peers and self-assessment, outputs form individual and collaborative work

B.C.A	Semester – V (Skill Enhancement Course-Elective)	Credits:1
Course: 7A	Digital Imaging Lab	Hrs/Wk:2

1. Designing a Visiting card
2. Design Cover page of a book
3. Paper add for calling tenders
4. Passport photo design
5. Design a Pamphlet
6. Brochure designing
7. Titles designing
8. Custom shapes creation
9. Black & white and color photo conversion
10. Image size modification
11. Background changes
12. Texture and patterns designing
13. Filter effects & Eraser effects

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BCA	Semester – V (Skill Enhancement Course- Elective)	Credits:4
Course: 6B	**Cyber Security And Malware Analysis**	**Hrs/Wk:4**

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   periods: 14

- 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   periods: 10
- Introduction to the components of the framework
- Cybersecurity Framework Tiers
- What is NIST Cyber security framework
- Features of NIST Cyber security framework
- Functions of NIST Cyber security framework
- Turn the NIST Cybersecurity Framework into Reality/ implementing the framework

UNIT-III: OWASP   **periods: 14**

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

UNIT-IV: MALWARE ANALYSIS   **periods: 12**

- 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-internals Suite
    - ❖
- SOC-security operations controls   - Solar winds (study the tools)
- Network intrusion detection
    - ❖ Wireshark
    - ❖ IDS
    - ❖ IPS
    - ❖ Snort

UNIT-V: CYBER SECURITY: Legal Perspectives   **periods: 10**

- 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 SunitBelapure, Nina Godbole|Wiley Publications
4. TCP/IP Protocol Suite |Mcgraw-hill| Forouzan|Fourth Edition

Website References:

- https://csrc.nist.gov/Projects/cybersecurity-framework/nist-cybersecurity-framework-a-quick-start-guide
- https://owasp.org/www-project-top-ten/
- https://owasp.org/www-project-juice-shop/

Co-Curricular Activities:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)

2. Student seminars (on topics of the syllabus and related aspects (individual activity))

3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))

4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity)

B. General

1. Group Discussion

2. Try to solve MCQ's available online.

Recommended Continuous Assessment Methods:

Some of the following suggested assessment methodologies could be adopted;

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Practical assignments and laboratory reports,
4. Observation of practical skills,
5. Individual and group project reports.
6. Efficient delivery using seminar presentations,
7. Viva-Voce interviews.
8. Computerized adaptive testing, literature surveys and evaluations,
9. Peers and self-assessment, outputs form individual and collaborative work

B.C.A	Semester – V (Skill Enhancement Course-Elective)	Credits:1
Course: 6B	Cyber Security And Malware Analysis Lab	Hrs/Wk:2

COURSE OBJECTIVES:

The purpose of this course is to impart practical understanding on Cyber security and protection of electronic systems and information from malware attacks.

1. configure a LAN by using a switch
2. configure a LAN by using Router
3. steps to attack a victim computer by using "ProRat" trojan tool
4. Perform the packet sniffing mechanism by download the "wireshark" tool and extract the packets
5. Perform the task of creating mail messages by using fake mail id by using the "fake mailer" website (

https://emkei.cz)

6. Perform the IP scanning mechanism by using "tracert" and "arp" commands
7. Perform the port scanning mechanism by using NMAP tool
8. Perform an SQL Injection attack and its preventive measure to avoid Injection attack
9. Perform an activity to access a locked computer without knowing the user's password.

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BCA	Semester – V (Skill Enhancement Course- Elective)	Credits:4
Course: 7B	Internet Of Things	Hrs/Wk:4

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: ·

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

UNIT-1

1.1 IOT. Explain Characteristics and component of IOT.

1.2 Advantages and disadvantages of IOT.

1.3 various application areas of IoT.

1.4 Time for Convergence for IoT.

1.5 reasons to converge the technologies and shift to IOT.

1.6 smart parking IOT application using figure.

1.7 smart home IOT application using figure.

1.8 smart health using IoT.

1.9 Smart City application of IoT

UNIT-2

2.1 M2M Value Chains.

2.2 IoT architecture outline withdiagram.

2.3 IOT Value Chains using figure.

2.4 shifting from M2M to IoT.

2.5 design principles and needed capabilities of IOT.

2.6 I-GVC using figure.

2.7 Global Value Chain

2.8 M2M Value Chains.

2.9 IoT-Architecture.

UNIT 3:

3.1 ETSI M2M high-level architecture.

3.2 IOT referencemodel.

3.3 IOT function view.

3.4 IOT reference architecture's deployment and operational view.

3.5 reference architecture of IOT using figure.

3.6 Functional View, Information View, Deployment and Operational View, Other Relevant architectural views of IOT reference architecture.

3.7 Architecture Reference Model of IOT using figure.

3.8 IoT Domain Model

3.9 Open Geospatial Consortium Architecture with a diagram.

UNIT 4

4.1 shopping basket can tell: IoT for retailing industry?
4.2 future factory concepts.
4.3 four aspects in your business to master IoT.
4.4 Needs of IoT for Oil and Gas Industry.
4.5 creation from big data and serialization.
4.6 challenges faced by industry related IoT Applications.
4.7 four Aspects in one's business to master IoT.
4.8 eHealth IOT applications.
4.9 security concerns for industry.
4.10 shopping basket can tell: IoT for retailing industry
4.11 future factory concepts.
4.12 IoT for Oil and Gas Industry
4.13 Smart factory.

UNIT 5

5.1 GAMBAS adaptive middleware.
5.2 smartie approach for IoT.
5.3 security, privacy and trust in IoT-Data-Platforms for smart cities
5.4 Data aggregation for the IoT in smart cities security.
5.5 contributions from FP7Projects.
5.6 smartie approach, properties and characteristics.
5.7 privacy-preserving sharing of IoTData.
5.8 activity chain - governance, privacy and security issues.

Co-Curricular Activities:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A. Measurable
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2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity)

B. General
1. Group Discussion
2. Try to solve MCQ's available online.

Recommended Continuous Assessment Methods:

Some of the following suggested assessment methodologies could be adopted;

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Practical assignments and laboratory reports,
4. Observation of practical skills,
5. Individual and group project reports.
6. Efficient delivery using seminar presentations,
7. Viva-Voce interviews.
8. Computerized adaptive testing, literature surveys and evaluations,
9. Peers and self-assessment, outputs form individual and collaborative work

B.C.A	Semester – V (Skill Enhancement Course-Elective)	Credits:1
Course: 7B	Internet Of Things Lab	Hrs/Wk:2

IoT Lab Experiments:

1. Define and Explain Eclipse IoT Project
2. List and summarize few Eclipse IoT Projects.
3. Sketch the architecture of IoT Toolkit and explain each entity in brief.
4. Demonstrate a smart object API gateway service reference implementation in IoT toolkit.
5. Write and explain working of an HTTP-to-CoAP semantic mapping proxy in IoT toolkit
6. Describe gateway-as-a-service deployment in IoT toolkit.
7. Explain application framework and embedded software agents for IoT toolkit.
8. Explain working of Raspberry Pi.
9. Connect Raspberry Pi with your existing system components.
10. Give overview of Zetta.

BCA	Semester – V (Skill Enhancement Course- Elective)	Credits:4
Course: 6C	**Mobile Application Development**	**Hrs/Wk:4**

Course objectives:
1. Interpret the features of Android operating systems
2. Configure Android Environment and Development tools
3. Develop user interfaces by using layouts an 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:

CO 1. Identify basic terms ,tools and software related to android systems

CO 2. Describe components of IDE, understand features of android development tools

CO 3. Describe the layouts and controls

CO 4. Explain the significance of displays using the given view

CO 5. Explain the features of services and able to publish android Application

C0 6. Developing interesting Android applications using MIT App Inventor

UNIT-1   **10 Hrs**

1.1 Introduction to Android ,open headset alliance, Android Ecosystem

1.2 Need of Android

1.3 Features of Android

1.4 Tools and software required for developing an Application

1.5 Android architecture

UNIT-2   **12 Hrs**

2.1 operating system, java JDK, Android SDK

2.2 Android development tools

2.3 Android virtual devices

2.4 steps to install and configure Android studio and sdk

UNIT-3   **14 Hrs**

3.1 control flow, directory structure

3.2 components of a screen

3.3 fundamental UI design

3.4 linear layout, absolute layout , table layout, relative layout

3.5 text view

3.6 edit text

3.7 button, image button, radio button, toggle button

3.8 radio group, check box, and progress bar

3.9 list view , grid view, image view , scroll view

3.10 time and date picker

UNIT-4   **12 Hrs**

4.1 android platform services

4.2 Android system Architecture

4.3 Android Security model

4.4 Applications development: creating small application

UNIT-5   **12 Hrs**

5.1 Introduction of MIT App Inventor

    5.2 Application Coding

    5.3 Programming Basics & Dialog

    5.4 More Programming Basics

    5.5 Alarm Clock Application

    5.6 Audio & Video

    5.7 Drawing Application

    5.8 File

    5.9 Game

    5.10 Device Location

    5.11 Web Browsing

Text Books:

1. Erik Hellman, "Android Programming – Pushing the Limits", 1st Edition, Wiley India Pvt Ltd, 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 SPD Publishers, 2015.

2. J F DiMarzio, "Beginning Android Programming with Android Studio", 4th Edition, Wiley India Pvt Ltd, 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

6. Apps- Fundamentals

7. https://www.udacity.com/course/developing-android-appsfundamentals--ud853-nd

8. http://www.appinventor.mit.edu/

Recommended Co-Curricular Activities:

(Co-curricular activities shall not promote copying from textbook or from others

work and shall encourage self/independent and group learning)

A.   Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content
    and outside the syllabus content. Shall be individual and challenging)

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4. Study projects (by very small groups of students on selected local real-time
    problems pertaining to syllabus or related areas. The individual participation
    and contribution of students shall be ensured (team activity

B.   General

1. Group Discussion

2. Try to solve MCQ's available online.

3. Others

Recommended Continuous Assessment Methods:

Some of the following suggested assessment methodologies could be adopted;

1. The oral and written examinations (Scheduled and surprise tests),

2. Closed-book and open-book tests,

3. Problem-solving exercises,

4. Practical assignments and laboratory reports.

5. Observation of practical skills,

6. Efficient delivery using seminar presentations,

7. Viva voce interviews.

8. Computerized adaptive testing, literature surveys and evaluations,

9. Peers and self-assessment, outputs form individual and collaborative work

B.C.A	Semester – V (Skill Enhancement Course-Elective)	Credits:1
Course: 6C	Mobile Application Development Lab	Hrs/Wk:2

Course objectives:

1. know the components and structure of mobile application development framework for android

2. learn the basic and important design concepts

3. learn the development of mobile application

Outcomes:

1. Understand the android platform

2. Design and implementation of various mobile applications

Experiments:

1. Demonstrate mobile technologies and devices

2. Demonstrate Android platform and applications overview

3. Implement User interface design layouts

4. Working with texts , shapes, buttons and lists

5. Develop a calculator application

6. Implement an application that creates a alarm clock

Note: The list of experiments need not be restricted to the above list. *Detailed list of programming/software tool based exercises can be prepared by the concerned faculty members.*

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BCA	Semester – V (Skill Enhancement Course- Elective)	Credits:4
Course: 7C	Pc Hardware And Networking	Hrs/Wk:4

Course objectives: Upon successful completion of the course, a student will be able to:
Learning Outcomes:

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

UNIT-1 Introduction to computer hardware

1.1ntroduction & Definition of Computer

1.1.1 Block Diagram of computer

1.1.2Classification of computer

1.1.3 Characteristics of Computers

1.1.4Types of Languages and language translators.

1.1.5 History and Generation of computers, Memory - Bits, Bytes, KB,MB,GB,TB,PB,EB,ZB,YB,Brontope byte, Geeope Byte. Etc

IEC Units: kibi, mebi,gibi,tebi,pebi,exbi,zebi,yobi

1.1.6Computer Software, Types of Software with Ex. (System/Application/Utility S/W)

1.1.7 Computer Hardware- Intro. to Hardware components of computer

1.2. Components and its parts

1.2.1.Identifying the Important Hardware Components of PC.- CPU, Motherboard, RAM, HDD, ODD, SMPS, K/B, Mouse, Monitor (CRT,LCD,LED) etc

1.3. SMPS

1.3.1About SMPS

1.3.2 Types of SMPS

1.3.3 Power stored in UPS

1.3.4 Components and Circuits inside the SMPS Unit

1.4 UPS (Uninterrupted Power Supply)

1.4.1Types of UPS (Offline/Line Interactive & Online)

1.4.2 Working Principle of each type of UPS.

1.4.3 Connecting, Maintenance and Troubleshooting.

UNIT-2 Computer management and servicing

2.1 Assembling and dissembling PCs

2.2 Introduction to BIOS / CMOS Setup, POST (Power On SelfTest)

2.1.1Introduction to BIOS/CMOS Setup, POST (Power On Self-Test

2.1.2 Demonstration of BIOS/CMOS Configuration (Date, Time, Enable/Disable Devices).

2.1.3 Dual BIOS Feature

2.1.4 BIOS/CMOS Setup, Booting Sequence/Boot Order

2.3 Introduction to Operating System

2.3.1Definition and types of Operating Systems - MSDos, Windows 9x/XP/Vista/7/8, Linux, MAC OS, Android etc.

2.3.2 Process of Booting the Operating System.

2.3.3 Win XP/Win 7. Activation and Automatic Updating procedures.

2.4 Computer Management

    2.4.1 Computer Management, Disk Management, Defragmentation,

    2.4.2 Services and Applications,

    2.4.3 local Users and Groups

    2.4.4 Advanced System Settings

    2.4.5 Device Manager, Task Manager, Windows Registry

2.5 Partitioning

    2.5.1 Partitioning of Hard Drive - Primary, Extended, Logical partitions using Partition Tools.

UNIT-3 Overview of Networking

3.1 Overview of Networking

3.2 Classification of Networks–LAN, MAN, WAN

3.3 Hardware and Software Components, Wi-Fi, Bluetooth

3.5 Network Communication Standards.

3.6 NETWORKING MODEL -OSI Reference Model, TCP/IP Reference Model

3.7 LAN Cables, Connectors, wireless network adapter

3.8 Wireless network adapter

3.9 Functions of LAN Tools

    3.9.1 Anti-Magnetic mat

    3.9.2 Anti-Magnetic Gloves

    3.9.3 Crimping Tool

    3.9.4 Cable Tester

    3.9.5 Cutter

    3.9.6 Loop back plug

    3.9.7 Toner probe

    3.9.8 Punch down tool

    3.9.9 Protocol analyzer

    3.9.10 Multi meter

3.10 Network Topologies

    2.7.1 Bus

    2.7.2 Ring

    2.7.3 Star

    2.7.4 Mesh

    2.7.5 Hybrid Topologies

UNIT- 4 Network Addressing and sub-netting

4.1 Network Addressing.

4.2 TCP/IP Addressing Scheme

4.3 Components of IP Address and classes

4.4 Sub-netting

4.5 Internet Protocol Addressings - IPv4 ,IPv6

4.6 Classful addressing and classless addressing

UNIT-5 Networks protocols and management

5.1 protocols in computer networks

5.2. Hyper Text Transfer Protocol(HTTP)

 5.2.1 File Transfer Protocol(FTP)

5.2.2 Simple Mail Transfer Protocol(SMTP)

5.2.3address Resolution Protocol(ARP)

5.2.4 Reverse Address Resolution Protocol(RARP)

5.3. Telnet, ICMP

5.4. Simple Network Management Protocol(SNMP)

5.5. DHCP, DNS

5.6 Network Management.

5.7 Network Monitoring and Troubleshooting.

5.8 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-Hill Publication

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

B.C.A	Semester – V (Skill Enhancement Course-Elective)	Credits:1
Course:7C	Pc Hardware And Networking Lab	Hrs/Wk:2

Course objectives:

To train the officials to acquire basic knowledge in computer hardware and peripherals for installation, PC assembly, trouble shooting and maintenance including system management and its backup and to undertake disaster prevention, a basic knowledge of TCP/IP networks work group, internet and intranet.

Outcomes:

The student will able to know the Basic of Computer assembling and trouble shooting. This course will provide the brief knowledge of Computer networking and trouble shooting

Experiments:

1. Introduction to PC Hardware and its pheripherals
2. Hardware installation and configuration
3. PC Debugging, troubleshooting andbasic preventive maintenance
4. Assembling and Dissembling of a Computer System
5. Preparation of Boot disk or USB drive (demo)
6. Software installation and Configuration with CD/DVD or USB drive
7. Installation of commonly used software (Office Suites, Virus Scanners & Utilities)
8. Printer Installation & Print Test Page (Demo)
9. Installation of Web cam and tools like zoom/Edx/Microsoft teams (optional) for online class
10. Identifying network componentsand devices (hub, Switch and router)
11. Cables – Coaxial and UTP and it connectors/Jacks and preparation of a patch cord
12. Networking Basic and Configuration
13. Run All Types of Network Troubleshooting Commands
        (ipconfig, ping, traceroute etc)
14. installation and configuring the proxy server for internet access
15. Exercise on Setting of particular IP address (static) to an existing terminal system
16. Exercise on Installation of network operating system
17. Exercise on Configuration of DHCP and DNS.
18. Exercise on File/Folder accessing rights for sharing and printer sharing
19. Exercise on remote desktop
20. Exercise on setting up of VPN on network
21. Design a network with Cisco Packet tracer 8.0 (freely downloadalbe)
        a. Simple network with one server with five desktops (configure static IP addresses)
        b. Adding and removing network cards in a PC or server
        c. Design a Network with one DHCP server with 5 desktops
        (Try exercises 13,16 and 17 using Cisco packet tracer)

Tools required for PC assembling and software installation

1. Multimeter - 1Rs 500/ basic version

                                                        or

Digital voltage tester – 1 Rs 150 (taparia)

2. Earth checking plug – 1 Rs 350 (Mx)
3. Mother board diagnosis card -1 Rs 400/-
4. SMPS power supply tester - 1   Rs 400/-
5. Screw driver kit – 4 Nos   Rs 40 each
6. External CD/DVD writer – 1 Rs 2000/-
6. Media for operating system (CD/DVD) or USB drive
(Try with trial versions for windows) or Ubuntu desktop(Linux)

Note : Un used old desktops can be used for installation

Tools Required for Network

1. RJ45 crimp tool – 1 Rs 250/- basic model
2. Cable tester   - 1 Rs 350/-
3. Rj45 jacks   - 100 nos Rs 250(ordinary)   - consumables
4. UTP cable   - 10 mts for each class Rs 20 per metre - consumables

MODEL QUESTION PAPER
BCA DEGREE EXAMINATIONS
Semester: V
Paper SEC-1: **MACHINE LEARNING USING PYTHON**

Time: 3 hours   Max Marks: 75M

SECTION – A

Answer any 5 questions. Each question carries 5 marks   5 X 5M = 25M
(Total 8 questions and at least two questions should be given from each unit)

1. What is machine learning? Write its applications?
2. Explain about the problems not to be solved using Machine learning?
3. Explain about model representation?
4. Write about training a model?
5. Explain why Bayesian methods are important?
6. Explain Simple linear regression?
7. Explain Bayes' Theorem?
8. Differentiate Unsupervised and Supervised Learning?

SECTION-B

Answer all of the following.   5X10=50M

9. (a) Explain about Data pre-processing?
                    (OR)
(b) Write about Machine learning activities?

10. (a) Explain about Feature Transformation?
                    (OR)
(b) Explain about evaluating performance of a model?

11. (a) Explain Bayesian Belief Network?
                    (OR)
(b) Explain Polynomial Regression Model?

12. (a) Explain k-Nearest Neighbour (kNN)?
                    (OR)
(b) Explain Decision tree?

13. (a) Explain Different types of clustering techniques?
                    (OR)
(b) Explain Apriori algorithm?

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MODEL QUESTION PAPER
BCA DEGREE EXAMINATIONS
Semester: V
Paper SEC-2: **DIGITAL IMAGING**

Time: 3 hours   Max Marks: 75M

SECTION – A

Answer any 5 questions. Each question carries 5 marks   5 X 5M = 25M
(Total 8 questions and at least two questions should be given from each unit)

1. Explain Types of Graphics?
2. Explain about Different color modes?
3. What is GIMP?
4. Write about Image window?
5. Explain Changing colors in layers?
6. Explain Working with selections?
7. Explain Erasing tool on digital images?
8. Explain Clone tool?

SECTION-B

Answer all of the following.   5X10=50M

9. (a) Explain Types of Image Scanners?
(OR)
(b) Write about Types of Objects?

10. (a) Explain Image window menus?
(OR)
(b) Explain layers Dialog?

11. (a) Explain Using layer to add text, Using move tool?
(OR)
(b) Explain Cropping on Digital Image?

12. (a) Explain Filling with patterns and gradients on digital images?
(OR)
(b) Explain various Selection tools on Digital Images?

13. (a) Explain various Filters?
(OR)
(b) Explain Dodge and burn tool, Smudging tool, Blurring with Gaussian Blur?

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MODEL QUESTION PAPER
BCA DEGREE EXAMINATIONS
Semester: V
Paper SEC-3: CYBER SECURITY AND MALWARE ANALYSIS

Time: 3 hours   Max Marks: 75M

SECTION – A

Answer any 5 questions. Each question carries 5 marks   5 X 5M = 25M
 (Total 8 questions and at least two questions should be given from each unit)

1. Write about different types of computer networks?
2. Write about networking devices?
3. What are features of NIST cyber security?
4. Write about insecure deserilization?
5. Write about cross site scripting?
6. Explain different types of malwares?
7. Write about antivirus softwares?
8. Define cyber crime; write any two cyber crimes in detailed?

SECTION-B

Answer all of the following.   5X10=50M

9. (a)Explain OSI Reference model with neat diagram?
                    (OR)
   (b)What are the differences between TCP/IP and OSI models?

10. (a) Explain about cyber security framework tiers?
                    (OR)
   (b) Explain NIST cyber security framework?

11. (a) What is OWASP;explain any five OWASP vulnerabilities?
                    (OR)
   (b) Explain about web application firewalls?

12. (a) Explain about network intrusion detection?
                    (OR)
   (b) What is firewall;explain different types of firewalls in detailed?

13. (a) Explain about Indian ITACT-2000 in detailed?
                    (OR)
   (b) What are the amendments of the Indian IT ACT?

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Bachelor of Computer Applications Syllabus (w.e.f:2020-21 A.Y)

MODEL QUESTION PAPER
BCA DEGREE EXAMINATIONS
Semester: V
Paper SEC-4: INTERNET OF THINGS

Time: 3 hours   Max Marks: 75M

SECTION – A

Answer any 5 questions. Each question carries 5 marks   5 X 5M = 25M
 (Total 8 questions and at least two questions should be given from each unit)

1. What are the advantages and dis advantages of IOT?
2. Write about various application areas of IOT?
3. Write M2M value chain in detailed?
4. Write Global value chain in detailed?
5. Write about IOT Domain Model?
6. Write about security concerns related to IOT?
7. What is data aggregation for IOT?
8. Write about *smartie* approach for IOT?

SECTION-B

Answer all of the following.   5X10=50M

9. (a)Explain characteristics and components of IOT?

(OR)

(b)Explain about smart home IOT application?

10. (a) Draw and explain IOT architecture?

(OR)

(b) What are different design principles and needed capabilities ?

11. (a) Draw and explain architecture reference model of IOT?

(OR)

(b) Explain different types of views of IOT reference architecture?

12. (a) Explain about different types of challenges faced by industry related IOT applications?

(OR)

(b) What are the needs of IOT for Oil and Gas Industry?

13. (a) Explain security,privacy and trust in IOT Data platforms?

(OR)

(b) Explain about GAMBAS adaptive middleware technologies?

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MODEL QUESTION PAPER
BCA DEGREE EXAMINATIONS
Semester: V
Paper SEC-5: **MOBILE APPLICATION DEVELOPMENT**

Time: 3 hours   Max Marks: 75M

SECTION – A

Answer any 5 questions. Each question carries 5 marks   5 X 5M = 25M
(Total 8 questions and at least two questions should be given from each unit)

1. Explain Features of Android?
2. Explain about Android Ecosystem?
3. Explain Android SDK?
4. Explain about components of a screen?
5. Explain list view, grid view, image view, scroll view?
6. Explain android platform services?
7. Explain Device Location Android Application?
8. Explain Audio & Video Managing in Android Application?

SECTION-B

Answer all of the following.   5X10=50M

9. (a) Explain Android architecture?

(OR)

(b) Write about Tools and software required for developing an Application?

10. (a) Explain Android development tools?

(OR)

(b) Explain Android virtual devices?

11. (a) Explain creation of time and date picker?

(OR)

(b) Explain linear layout, absolute layout, table layout, relative layout?

12. (a) Explain Android Security model?

(OR)

(b) Explain Android system Architecture?

13. (a) Explain Alarm Clock Application?

(OR)

(b) Explain Drawing Application?

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MODEL QUESTION PAPER
BCA DEGREE EXAMINATIONS
Semester: V
Paper SEC-6: **PC HARDWARE AND NETWORKING**

Time: 3 hours   Max Marks: 75M

SECTION – A

Answer any 5 questions. Each question carries 5 marks   5 X 5M = 25M
(Total 8 questions and at least two questions should be given from each unit)

1. Explain Characteristics of Computers?
2. Explain Types of UPS?
3. Explain BIOS?
4. Explain Classification of Networks–LAN, MAN, WAN?
5. Explain TCP/IP Reference Model?
6. Explain TCP/IP Addressing Scheme?
7. Explain Sub-netting?
8. What is protocol and list different types of protocols?

SECTION-B

Answer <u>all</u> of the following.   5X10=50M

9. (a) Explain Classification of computers?
                         (OR)
  (b) Explain about Block Diagram of computer?

10. (a) Explain Computer Management?
                         (OR)
   (b) Explain Partitioning of Hard Drive?

11. (a) Explain various Network Topologies?
                         (OR)
   (b) Explain OSI Reference Model?

12. (a) Explain Internet Protocol Addressing - IPv4, IPv6?
                         (OR)
   (b) Explain Components of IP Address and classes?

13. (a) Explain DHCP, DNS?
                         (OR)
   (b) Explain Simple Mail Transfer Protocol (SMTP)?
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