Course Code	CYBER SECURITY		L	T	P	C
20APC3618			3	1	0	3
Pre-requisite	CNS	Semester	III-II			

Course Objectives:

- Appraise the current structure of cyber security roles across the DoD enterprise, including the roles and responsibilities of the relevant organizations.
- Evaluate the trends and patterns that will determine the future state of cyber security

Course Outcomes(CO):

CO1: Analyze threats and risks within context of the cyber security architecture
CO2: Appraise cyber security incidents to apply appropriate response
CO3: Evaluate decision making outcomes of cyber security scenarios

UNIT- I		9Hrs

Cyber crime: Mobile and Wireless devices-Trend mobility-authentication service security-Attacks on mobile phones-mobile phone security Implications for organizations- Organizational measurement for Handling mobile-Security policies and measures in mobile computing era. Cases.

UNIT-II		9Hrs

Tools and methods used in cyber crime-Proxy servers and Anonymizers – Phishing Password cracking-Key loggers and Spy wares-Virus and worms-Trojan Horse and Backdoors-Steganography-SQL Injection-Buffer overflow-Attacks on wireless network. Cases.

UNIT-III		9Hrs

Understanding computer forensic-Historical background of cyber forensic, Forensic analysis of e-mail-Digital forensic life cycle-Network forensic-Setting up a computer forensic Laboratory-Relevance of the OSI 7 Layer model to computer Forensic-Computer forensic from compliance perspectives. Cases.

UNIT-IV		8Hrs

Forensic of Hand –Held Devices-Understanding cell phone working characteristics- Hand-Held devices and digital forensic-Toolkits for Hand-Held device-Forensic of i-pod and digital music devices-Techno legal Challenges with evidence from hand-held Devices. Cases.

UNIT-V		10Hrs

Cyber Security –Organizational implications-cost of cybercrimes and IPR issues Web threats for organizations: the evils and Perils-Social media marketing Security and privacy Implications-Protecting people privacy in the organizations Forensic best practices for organizations. Cases.

Textbooks:

1. Nina Godbole &SunitBelapure "Cyber Security", Wiley India, 2012.

ReferenceBooks:

1. Harish Chander, "cyber laws & IT protection", PHI learning pvt.ltd, 2012.
2. Dhiren R Patel, "Information security theory &practice",PHI learning pvt ltd,2010.
3. MS.M.K.Geetha&Ms.SwapneRaman"Cyber Crimes and Fraud Management, "MACMILLAN,2012. Pankaj Agarwal : Information Security & Cyber Laws (Acme Learning), Excel, 2013.
4. Vivek Sood, Cyber Law Simplified, TMH, 2012.

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		3												
CO2		3												
CO3				3										

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3 High)

Course Code	Advanced IoT Programming		L	T	P	C
20APC3620			3	0	0	3
Pre-requisite	**ES & IOT**	**Semester**	**III - II**			

Course Outcomes (CO):

CO1: Demonstrate knowledge on the characteristics of sensors and principles of IoT.
CO2: Select appropriate sensors for the given application development.
CO3: Design basic IoT Applications using Arduino.
CO4: Design IoT Applications using Raspberry Pi.
CO5: Perform Data Acquisition and analysis using Cloud and Tkinter

UNIT – I	**Sensors**	9 Hrs

Introduction to Sensors: Sensors, Criteria to choose a Sensor, Generation of Sensors. Optical Sources and Detectors: Electronic and Optical properties of semiconductor as sensors, LED, Semiconductor lasers, Fiber optic sensors, Thermal detectors, Photo multipliers, photoconductive detectors. Strain, Force, Torque and Pressure sensors: Strain gages, strain gage beam force sensor, piezoelectric force sensor, load cell, torque sensor, Piezo-resistive and capacitive pressure sensor, optoelectronic pressure sensors, vacuum sensors.

UNIT – II	**Introduction to Raspberry Pi**	9 Hrs

Basics of Raspberry Pi: Introduction to Raspberry pi, Installation of NOOBS on SD Card, Installation of Raspbian on SD Card, Terminal Commands, Installation of Libraries on Raspberry Pi, Getting the static IP address of Raspberry Pi, Run a Program on Raspberry Pi, Installing the Remote Desktop Server, Pi Camera, Face Recognition using Raspberry Pi, Installation of I2C driver on Raspberry Pi, SPI (serial peripheral interface) with Raspberry Pi,

UNIT – III	**Sensors with Raspberry Pi**	9 Hrs

Hosting Sensors with Raspberry Pi – Temperature Sensor Node – Building a Raspberry Temperature Sensor Node – Barometric Pressure Sensor Node – Building a Raspberry Barometric Pressure Sensor Node – Xbee Sensor Nodes - Creating a Raspberry Pi Data Collector for Xbee Sensor Nodes

UNIT – IV	**Programming in Raspberry Pi**	9 Hrs

Programming a Raspberry Pi: Play with LED and Raspberry Pi, Reading the digital input, Reading an edge triggered input, Interfacing of Relay with Raspberry Pi, Interfacing of Relay with Raspberry Pi, Interfacing of LCD with Raspberry Pi, Interfacing LCD with Raspberry Pi in I2C mode, Interfacing of DHT11 sensor with Raspberry Pi, Interfacing of ultrasonic sensor with Raspberry Pi, Interfacing of camera with Raspberry pi

UNIT – V	**Applications of IoT using Raspberry Pi**	9 Hrs

Home Automation - Smart Cities - Energy, Retail Management – Logistics – Agriculture - Health and Lifestyle - Industrial IoT - Legal challenges - IoT design Ethics - IoT in Environmental Protection.

Textbooks:

1. Rajesh Singh, Anita Gehlot, Lovi Raj Gupta, Bhupendra Singh, Mahendra Swain, Internet of Things with Raspberry Pi and Arduino, CRC Press, 2019.
2. Beginning Sensor Networks with Arduino and Raspberry Pi by charles bell, Technology In Action, A Press Publication, 2013.
3. J. Fraden, Handbook of Modern Sensors: Physical, Designs, and Applications, AIP Press, Springer, Fourth Edition, 2010.

Reference Books:

1. D. Patranabis, Sensors and Transducers, PHI Publication, New Delhi,2003.
2. Jan Holler and Vlasios Tsiatsis, From Machine-to-Machine to the Internet of Things Introduction to a New Age of Intelligence, Elsevier Ltd., 2014.
3. David Hanes and Gonzalo Salgueiro, IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things, Cisco Press, 2017.

Online Learning Resources:

- https://www.guru99.com/iot-tutorial.html
- https://developer.ibm.com/technologies/iot/tutorials/

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2	3	2	2	1									2	1
CO3	3	2	2	1									2	1
CO4	3	2	2	1									2	1
C05	3	3												

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3 High)

Course Code	BUILDING PRIVATE BLOCKCHAIN		L	T	P	C
20APC3622			3	0	0	3
Pre-requisite	**FBT**	**Semester**	**III - II**			

Course Outcomes (CO):

CO1: Recall the structure and mechanism of Bitcoin, Ethereum, Hyperledger and Multichain Blockchain platforms
CO2: Infer the importance of consensus in transactions and how transactions are stored on Blockchain.
CO3: Setup your own private Blockchain and deploy smart contracts on Ethereum.
CO4: Deploy the business network using Hyperledger Composer.
CO5: Implement Blockchain for various use cases.

UNIT – I	**INTRODUCTION TO BLOCKCHAIN**	9

What is Block chain? Basic ideas behind Blockchain, how it is changing the landscape of digitalization, Uses of Blockchain. Abstract Models for BLOCKCHAIN - GARAY model - RLA Model, what is Multichain? Objective of Multichain, Features of Multichain, Uses of Multichain, Process of mining in Multichain technology, Analyse Multichain platform, why it is better than other open platforms Blockchain Architecture and Design: Basic crypto primitives: Hash, Signature,) Hash chain to Blockchain, Basic consensus mechanisms

UNIT – II	**CONSENSUS & DAPPS**	9

Requirements for the consensus protocols, Proof of Work (PoW), Scalability aspects of Blockchain consensus protocols Permissioned Blockchains: Design goals, Consensus protocols for Permissioned Blockchains (DAPPS) - Characteristics of Decentralized application, Setting up a Private Blockchain, Multiple configurable Blockchains using Multichain Deployment scenarios of Multichain, Centralized currency settlement, Bond issuance and peer-to-peer trading Consumerfacing rewards scheme in Decentralized Applications

UNIT – III	**HYPERLEDGER FABRIC**	9

Hyperledger Fabric (A): Decomposing the consensus process , Hyperledger fabric components, Chain code Design and Implementation Hyperledger Fabric (B): Beyond Chain code: fabric SDK and Front End (b) Hyperledger composer tool

UNIT – IV	**USECASE MODEL – PRIVACY BLOCKCHAIN**	9

Use case 1: Blockchain in Financial Software and Systems (FSS): (i) Settlements, (ii) KYC, (iii) Capital markets, (iv) Insurance Use case 2: Blockchain in trade/supply chain: (i) Provenance of goods, visibility, trade/supply chain finance, invoice management discounting, etc.

UNIT – V	**USECASE MODEL – BLOCKCHAIN DIGITAL IDENTITY**	9

Use case 3: Blockchain for Government: (i) Digital identity, land records and other kinds of record keeping between government entities, (ii) public distribution system social welfare systems Blockchain Cryptography, Privacy and Security on Blockchain

Textbooks:

1. Andreas M. Antonopoulos , "Mastering Bitcoin: Unlocking Digital Cryptocurrencies", O'Reilly Media Inc, 2015
2. Melanie Swa "Blockchain", First Edition, O'Reilly Jan 2015

Reference Books:

1. Hyperledger Fabric - https://www.hyperledger.org/projects/fabric
2. Zero to Blockchain - An IBM Redbooks course, by Bob Dill, David Smits - https://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/crse0401.html

Online Learning Resources

https://www.udemy.com/course/build-blockchain/

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2	3													
CO3	3	2	2	1									2	1
CO4	3	2	2	1									2	1
C05	3	2	2	1									2	2

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3 High)

Course Code	MOBILE APPLICATION DEVELOPMENT		L	T	P	C
20APE3604			3	0	0	3
Pre-requisite	**NIL**	**Semester**	**III - II**			

Course Outcomes (CO):

CO1:Demonstrate knowledge on mobile platforms, mobile user interface and user interface design requirements.
CO2: Design user interfaces by analyzing user requirements
CO3: Develop mobile applications for Messaging, Location-Based Services, and Networking
CO4: Develop mobile applications and publish in different mobile platforms
CO5:Use Android studio and iOS tools to develop mobile applications.

UNIT – I	**Introduction to Android**	9

The Android 4.1 jelly Bean SDK, Understanding the Android Software Stack, installing the Android SDK, Creating Android Virtual Devices, Creating the First Android Project, Using the Text view Control, Using the Android Emulator, The Android Debug Bridge(ADB), Launching Android Applications on a Handset.

UNIT – II	**Basic Widgets**	9

Understanding the Role of Android Application Components, Understanding the Utility of Android API, Overview of the Android Project Files, Understanding Activities, Role of the Android Manifest File, Creating the User Interface, Commonly Used Layouts and Controls, Event Handling, Displaying Messages Through Toast, Creating and Starting an Activity, Using the Edit Text Control, Choosing Options with Checkbox, Choosing Mutually Exclusive Items Using Radio Buttons.

UNIT – III	**Building Blocks for Android Application Design**	9

Introduction to Layouts, Linear Layout, Relative Layout, Absolute Layout, Using Image View, Frame Layout, Table Layout, Grid Layout.
ADVANCED USER INTERFACE AND DATA PERSISTENCE: Basic views, Picker views, List view, Image view, Menus with views, Web view, saving Creating and using databases.

UNIT – IV	**Using Selection widgets and Debugging**	9

Using List View, Using the Spinner control, Using the GridView Control, Creating an Image Gallery Using the ViewPager Control, Using the Debugging Tool: Dalvik Debug Monitor Service(DDMS), Messaging, Location-Based Services and Networking SMS messaging, sending e-mail, displaying maps, getting location data, monitoring a location, Consuming web services using HTTP.

UNIT – V	**ANDROID SERVICES, PUBLISHING ANDROID APPLICATIONS**	9

Services, Communication between a service and an activity, Binding activities to services, Threading, Preparing for publishing, Deploying APK files. Building the app in android debugging an android app. iOS tools, iOS project, Debugging iOS apps.

Textbooks:

1. Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education, 2nd ed. (2011)
2. J. F. DiMarzio, Beginning Android Programming with Android Studio, Wiley India, 4 thEdition, 2017.
3. Wei – Meng Lee, Beginning Android 4 Application Development, Wrox, 2017.
4. Jeff McWherter and Scott Gowell, Professional Mobile Application Development,Wiley India, 1st Edition, 2012.

Reference Books:

1. Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd
2. Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd
3. Android Application Development All in one for Dummies by Barry Burd, Edition:
4. Neils Smyth, Android Stduio Development Essentials, Creative Space Independent publishing platform, 7 th Edition 2016.

Online Learning Resources

https://www.udemy.com/course/build-blockchain/

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2												
CO2	3	2											3	
CO3	3	2	2	2	1								2	1
CO4	3	2	2	2	1								2	1
C05	3	2	2	2	1								2	1

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3 High)

Course Code	REAL TIME OPERATING SYSTEMS		L	T	P	C
20APE3605			3	0	0	3
Pre-requisite	Operating Systems	Semester	III-II			

Course Objectives:

To understand how to solve complex problems

- Acquire skills necessary to design and develop embedded applications by means of real-time operating systems
- Understand embedded real-time operating systems

Course Outcomes :

CO1: Characterize real-time systems and describe their functions
CO2: Design and implement a real-time system
CO3: Apply formal methods to the analysis and design of real-time systems
CO4: Apply formal methods for scheduling real-time systems
CO5: Characterize and describe reliability and fault tolerance issues and approaches.

UNIT - I 9 Hrs

Typical Real time Applications: Digital control, High-level control, Signal processing, other Real-time Applications.
Hard versus Soft Real-Time Systems: Jobs and processors, Release time, deadlines and Timing constraints, Hard and soft timing constraints, Hard Real time systems, Soft Real-time Systems.
A Reference Model of Real Time Systems: Processors and resources, Temporal parameters of Real time workload, periodic task model, precedence constraints and data dependency, Functional parameter, Resource Parameters of Jobs and Parameters of Resources, Scheduling Hierarchy.
Commonly used Approaches to real time Scheduling: Clock-Driven Approach, Weighted Round-Robin Approach, Priority driven Approach, Dynamic vs Static Systems, Effective release time and deadlines, Optimality of the EDF and LST algorithms, Nonoptimality of the EDF and LST algorithms, Challenges in validating timing constraints in priority driven System, Off line vs On line scheduling, summary.

UNIT - II 9Hrs

Clock-Driven Scheduling: Notations and Assumptions, static, Timer-Driven scheduler, General Structure of the Cyclic Scheduler, Improving the average response time of Aperiodic Jobs, Scheduling sporadic Jobs, Practical considerations and generalizations, Algorithm for generating Static Schedules, Pros and cons of Clock-driven scheduling, summary.

UNIT - III 9 Hrs

Priority-Driven Scheduling of periodic Tasks : Static Assumption, Fixed-priority vs Dynamic-priority Algorithms, Maximum Schedulable Utilization, Optimality of the RM and DM Algorithms, A Schedulability test for Fixed-priority tasks with Short Response time, A Schedulability test for Fixed-priority tasks with arbitrary Response time, Sufficient Schedulability conditions for the RM and DM Algorithms, summary.

UNIT - IV 9 Hrs

Scheduling Aperiodic and Sporadic Jobs in Priority Driven Systems: Assumptions and approaches, Diferrable servers, Sporadic Servers, Constant utilization, total bandwidth and weighted fair –Queueing servers, Slack stealing in Dead-line Driven System, Stack stealing in Fixed-priority systems, Scheduling of sporadic jobs, Real-time performance for jobs with soft timing constraints, A two-level scheme for Integrated scheduling.

UNIT - V 9 Hrs

Resources and Resource access control: Assumptions on Resources and their usage, Effects of Resource contention and resource access control, Non Preemptive critical section, Basic Priority inheritance protocol, Basic Priority ceiling protocol, Stack –based, Priority ceiling protocol, Use of priority ceiling protocol in Dynamic priority systems, pre-emption ceiling protocol, Controlling accesses to Multiple unit Resources, Controlling concurrent accesses to data objects. Multiprocessor Scheduling, Resource access control, and Synchronization: Model of Multiprocessor and Distributed Systems, Task assignment, Multiprocessor Priority ceiling protocol, Elements of Scheduling Algorithms for End-to-End Periodic Tasks, Schedulability of Fixed-priority End-to-End periodic Tasks, End to End tasks in heterogeneous Systems, Predictability and validation of Dynamic Multiprocessor Systems, Summary.

Textbooks:

1. “Real-Time Systems” by Jane W.S Liu, Pearson Edition, 2006.

Reference Books:

1. Real-Time Systems: Scheduling, Analysis, and Verification, Cheng, A. M. K.: Wiley, 2002.
2. Z.: Scheduling in Real-Time Systems, by Cottet, F., Delacroix, J., Kaiser, C., Mammeri John Wiley & Sons, 2002.
3. Real-Time Systems, C. M., Shin, K. G. McGraw-Hill, Krishna 1997.

Online Learning Resources:

https://www.youtube.com/watch?v=dHsHP9RrXBw&list=PLJ5C_6qdAvBH-JNRIlupFb44miyx9M8JD

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2													
CO2		3	2										3	3
CO3		2	3										2	2
CO4			3											2
CO5	2													

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3 High)

Course Code	Design and Analysis Of Algorithms		L	T	P	C
20APE3606			3	0	0	3
Pre-requisite	**NIL**	**Semester**	**III-II**			

Course Objectives:

- To know the importance of the complexity of a given algorithm.
- To study various algorithm design techniques.
- To utilize data structures and/or algorithmic design techniques in solving new problems.
- To know and understand basic computability concepts and the complexity classes P, NP, and NP-Complete.
- To study some techniques for solving hard problems.

Course Outcomes (CO):

CO1: Analyze the complexity of the algorithms
CO2: Use techniques of greedy and dynamic programming to solve the problems.
CO3: Implement traversal, backtracking and searching techniques.
CO4: choose the appropriate algorithm for solving minimization problem.
CO5: Able to prove that a certain problem is NP-Complete

UNIT - I		9Hrs

Introduction: What is an Algorithm, Algorithm specification, Performance analysis.
Divide and Conquer: General method, Binary Search, Finding the maximum and minimum, Merge sort, Quick Sort, Selection sort, Stressen's matrix multiplication.

UNIT - II		9 Hrs

Greedy Method: General method, Knapsack problem, Job Scheduling with Deadlines, Minimum cost Spanning Trees, Optimal storage on tapes, Single-source shortest paths.
Dynamic programming: General Method, Multistage graphs, All-pairs shortest paths, Optimal binary search trees, 0/1 knapsack, The traveling sales person problem.

UNIT - III		9 Hrs

Basic Traversal and Search Techniques: Techniques for binary trees, Techniques for Graphs,
Connected components and Spanning trees, Bi-connected components and DFS
Back tracking: General Method, 8 – queens problem, Sum of subsets problem, Graph coloring and Hamiltonian cycles, Knapsack Problem.

UNIT - IV		8 Hrs

Branch and Bound: The method, Travelling salesperson, 0/1 Knapsack problem, Efficiency
Considerations.
Lower Bound Theory: Comparison trees, Lower bounds through reductions – Multiplying triangular matrices, inverting a lower triangular matrix, computing the transitive closure.

UNIT - V		10Hrs

NP – Hard and NP – Complete Problems: NP Hardness, NP Completeness, Consequences of beingin P, Cook's Theorem, Reduction Source Problems, Reductions: Reductions for some known problems

Textbooks:

1. "Fundamentals of Computer Algorithms", Ellis Horowitz, S. Satraj Sahani and Rajasekhran, 2nd edition, University Press.2014,
2. "Design and Analysis of Algorithms", Parag Himanshu Dave, Himanshu Bhalchandra Dave, Pearson Education, Second Edition, 2009.

Reference Books:

1. "Introduction to Algorithms", second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, PHI Pvt. Ltd./ Pearson Education.
2. "Introduction to Design and Analysis of Algorithms A strategic approach", R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc Graw Hill.
3. "Design and Analysis of algorithms", Aho, Ullman and Hopcroft, Pearson education.

Online Learning Resources:

nptel videos

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	2										3	
CO2	2	2	2										2	
CO3	2	2	2	2									2	
CO4	2	2	2	2									2	
CO5	2	1	2										2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3 High)

Course Code	Cyber Security Lab		L	T	P	C
20APC3619			0	0	3	1.5
Pre-requisite	Computer and Network Security	Semester	III - II			

Course Objectives:

- Learn to implement the algorithms DES, RSA,MD5,SHA-1
- Learn to use network security tools like GnuPG, KF sensor, Net Strumbler.

Course Outcomes(CO):

CO1: Analyze and resolve security issues in networks and computer systems to secure an IT infrastructure.
CO2: Interpret and forensically investigate security incidents
CO3: Recognize attacks on systems and Designing a counter attack incident response and incident response methodology.
CO4: Use forensic tools and collect evidence of a computer crime.

Laboratory Experiments

1. How to protect personal computer system by creating User Accounts with Passwords and types of User Accounts for safety and security.
2. How to provide the security to the Microsoft word document by remove Password option.
3. How to protect and secure databases.
4. How to make strong passwords and write down the steps to crack passwords techniques.
5. Write down the steps to hack a strong password.
6. Implement the Signature Scheme - Digital Signature Standard Demonstrate intrusion detection system (ids) using any tool (snort or any other s/w)
7. How to Recover Deleted Files using Forensics Tools
8. To study the steps for hiding and extract any text file behind an image file/ Audio file using Command prompt.
9. How to Extracting Browser Artifacts.
10. How to View Last Activity of Your PC.
11. Find Last Connected USB on your system (USB Forensics).
12. Comparison of two Files for forensics investigation by Compare IT software.
13. Live Forensics Case Investigation using Autopsy.

Textbooks:

1. Nina Godbole &SunitBelapure “Cyber Security”, Wiley India, 2012.

Reference Books:

1. Harish Chander, “cyber laws & IT protection”, PHI learning pvt.ltd, 2012.
2. Dhiren R Patel, “Information security theory &practice”,PHI learning pvt ltd,2010.
3. MS.M.K.Geetha&Ms.SwapneRaman”Cyber Crimes and Fraud Management, ”MACMILLAN,2012.
4. Pankaj Agarwal : Information Security & Cyber Laws (Acme Learning), Excel, 2013.
5. Vivek Sood, Cyber Law Simplified, TMH, 2012.

OnlineLearningResources:

1.http://www.computersecuritystudent.com/SECURITY_TOOLS/DVWA/

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	2										3	
CO2	2	2	2										2	
CO3	2	2	2	2									2	
CO4	2	2	2	2									2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3 High)

Course Code	Advanced IoT Programming Lab		L	T	P	C
20APC3621			0	0	3	1.5
Pre-requisite	**Embedded and IoT Lab**	**Semester**	**III - II**			

Course Outcomes (CO):

CO1: Identify different types of Sensors and study their functionality in IoT
CO2: Demonstrate skills in connecting peripherals to Arduino/Raspberry Pi for data exchange.
CO3: Develop a Cloud platform to upload and analyze any sensor data
CO4: Demonstrate skills in connecting GSM, GPS, Gateways to micro controllers and perform Data Management in IoT.
CO5: Build a complete working IoT system involving prototyping, programming and data analysis.

List of Experiments:

1. Introduction to Raspberry Pi platform and programming
2. Measuring Temperature, Pressure, and Humidity in real time using Sensors using Raspberry Pi.
3. Study the Light, Distance, Motion, Accelerometer, Position Data using Sensors using Raspberry Pi.
4. Log Data using Raspberry PI and upload to the cloud platform (using Tkinter)
5. Develop an IoT application using Raspberry Pi for fire alarm.
6. Develop an IoT application to measure soil moisture, air and water quality using Raspberry Pi.
7. Develop an IoT application using Raspberry Pi to monitor heartbeat, blood pressure, etc. of a person and to upload health information to cloud
8. Build Smart Parking application using IoT Platform
a) Monitored Parameters: Vehicle detection
b) Function1: Provide information to user about free space in parking slots
9. Build Smart Home system using IoT Platform
a) Monitored Parameters: People presence, Outside ambient conditions, IAQ parameters
b) Function1: Control Home appliances through manual application control
c) Function2: Intelligently control appliances based on monitoring parameters

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2												
CO2	3	2	2	2	1								2	
CO3	3	2	2	2	1								2	1
CO4	3	2	2	2	1								2	
C05	3	2	2	2	1								2	1

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3 High)

Course Code	BUILDING PRIVATE BLOCKCHAIN LAB		L	T	P	C
20APC3623			0	0	3	1.5
Pre-requisite	NIL		III - II			

Course Objectives:

The student should be made to:

- To deploy Private Blockchain and smart contracts on Ethereum.
- To understand the importance of consensus
- To implement Blockchain for various use cases

Course Outcomes :

CO1: Recall the structure and mechanism of Bitcoin, Ethereum, Hyperledger and Multichain Blockchain platforms
CO2: Infer the importance of consensus in transactions and how transactions are stored on Blockchain.
CO3: Setup your own private Blockchain and deploy smart contracts on Ethereum.
CO4: Deploy the business network using Hyperledger Composer.
CO5: Implement Blockchain for various use cases.

List of Experiments

1. Create a Simple Blockchain.
2. Building and Deploying Multichain private
3. Deposit some Ether in your MetaMask accounts.
4. Create several accounts and make some transactions between these accounts
5. Creating a Business Network using Hyperledger
6. Creating a Business Network using Hyperledger – II
7. Implementation of Use case – 1: Blockchain in Financial Software and Systems
8. Implementation of Use case – 2: Blockchain for Government.
9. Building a Private Ethereum Network.
10. Deploying Smart Contract & Security

Reference Books:

1. Hyperledger Fabric - https://www.hyperledger.org/projects/fabric
2. Zero to Blockchain - An IBM Redbooks course, by Bob Dill, David Smits –
3. https://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/crse0401.html

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3												2	
CO2	2				1									
CO3	2				3									1
CO4	2		2		1							1	1	
CO5	1				1									

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3 High)

Course Code	Basics of Cloud Computing		L	T	P	C
20ASA0501			1	0	2	2
Pre-requisite	**OPERATING SYSTEM**	**Semester**	**III - II**			

Course Objectives:

- To provide students with the fundamentals and essentials of Cloud Computing.
- Be exposed to tool kits for cloud environment
- Gain knowledge on the concept of virtualization that is fundamental to cloud computing.
- Learn to run virtual machines of different configuration.

Course Outcomes (CO):

The student should be able to:

CO1: Ability to understand various service delivery models of a cloud computing architecture.
CO2: Understanding cloud service providers.
CO3: Configure various virtualization tools such as Virtual Box, VMware workstation.
CO4: Analyze authentication, confidentiality and privacy issues in cloud computing.

UNIT – I		Hrs

Cloud Computing Fundamentals: Motivation for Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Definition of Cloud computing, a Service Principles of Cloud computing, Five Essential Characteristics, Four Cloud Deployment Models, Challenges Ahead, and Historical Developments.

1. To study in detail about cloud computing.
2. Working of Google Drive to make spreadsheet and notes.
3. Installation and Configuration of Justcloud.
4. Working in Cloud9 to demonstrate different language.

UNIT – II		9 Hrs

Cloud Architecture, programming model: NIST reference architecture, architectural styles of cloud applications, deployment models-public, private, hybrid, community; Types of cloud computing: utility computing, cluster; computing Cloud services: Amazon, Google, Azure, online services Applications of cloud computing

1. Install Google App Engine. Create hello world app and other simple web applications using Python/java.
2. Deployment and Configuration options in Google Cloud
3. Deployment and Configuration options in Microsoft Azure

UNIT – III		Hrs

Cloud Service Models: Defining Clouds for the Enterprise- Storage-as-a-Service, Databases- as-Service, Platform-as-a-Service, Pros and Cons of PaaS, Infrastructure-as-a-Service. Pros and Cons of IaaS, Software as a Service, Pros and Cons of SaaS, Other Cloud Service Models.

Programs on SaaS

1. Create an word document of your class time table and store locally and on the cloud with doc,and pdf format. (use www.zoho.com anddocs.google.com)
2. Create a spread sheet which contains employee salary information and calculate gross and total sal using the formula DA=10% OF BASIC HRA=30% OF BASIC PF=10% OF BASIC IF BASIC<=3000 12% OF BASIC IF BASIC>3000 TAX=10% OF BASIC IF BASIC<=1500 =11% OF BASIC IF BASIC>1500 AND BASIC<=2500 =12% OF BASIC IF BASIC>2500 (use www.zoho.com and docs.google.com) NET_SALARY=BASIC_SALARY+DA+HRA-PF-TAX
3. Prepare a ppt on cloud computing –introduction, models, services, and architecture PPT should contain explanations, images and at least 20 pages (use www.zoho.com and docs.google.com)
4. Create your resume in a neat format using Google and zoho cloud

Programs on PaaS

1. Write a Google app engine program to generate n even numbers and deploy it to google cloud
2. Google app engine program multiply two matrices
3. Write a Google app engine program to display nth largest no from the given list of numbers and deploy it into google cloud.

UNIT – IV		Hrs

Cloud resource virtualization: Basics of virtualization, types of virtualization techniques, merits and demerits of virtualization, Full vs. Para - virtualization, virtual machine monitor/hypervisor. Virtual machine basics, taxonomy of virtual machines, process vs. system virtual machines.

1. Install Virtual box/VMware Workstation with different flavours of Linux or windows OS on top of windows7 or 8.
2. Install a C compiler in the virtual machine created using virtual box and executes Simple Programs

UNIT – V		Hrs

Security: Security: Disaster Recovery, Privacy Design, Data Security, Network Security, Compromise Response Disaster Recovery, Disaster Recovery, Planning, Cloud Disaster Management.
Case Study: PAAS (Face book, Google App Engine), **AWS Case Study:** Amazon.com

Textbooks:

1. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014
2. Cloud Computing – Web Based Applications That Change the way you Work and Collaborate Online – Michael Miller, Pearson Education.
3. Cloud Application Architectures, 1st Edition by George Reese O'Reilly Media.

Reference Books:

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.
3. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp 2011.

Online Learning Resources:

https://nptel.ac.in/courses/106105167
https://azure.microsoft.com/en-in/resources/cloud-computing-dictionary/what-is-cloud-computing/#cloud-computing-models
https://aws.amazon.com/what-is-cloud-computing/
https://archive.nptel.ac.in/courses/106/105/106105167/
https://www.coursera.org/specializations/cloud-computing

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2											3	
CO2	3	3	2										2	
CO3	2	3	3										2	
CO4	2	1	3	2									2	
CO5	2	1	3	3	2			2				3	2	2

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3 High)

Course Code	Professional Ethics and Human Values		L	T	P	C
20AHS9902			2	0	0	0
Pre-requisite	Universal Human Values	Semester	III-II			

Course Objectives:

- To create an awareness on Engineering Ethics and Human Values.
- To study the moral issues and decisions confronting individuals and organizations engaged in engineering profession.
- To study the related issues about the moral ideals, character, policies, and relationships of people and corporations involved in technological activity.

Course Outcomes :

CO1: It ensures students sustained happiness through identifying the essentials of human values and skills.
CO2: The students will understand the importance of Values and Ethics in their personal lives and professional careers.
CO3: The students will learn the rights and responsibilities as an employee, team member and a global citizen.
CO4: Students understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature.
CO5: Students can able to develop appropriate technologies and management patterns to create harmony in professional and personal life.

UNIT - I	9 Hrs

Introduction to Human Values: Need, basic Guidelines, Content and Process for Value Education, Self Exploration - 'Natural Acceptance' and Experiential Validation. Continuous Happiness and Prosperity - A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities. Understanding Happiness and Prosperity correctly.

UNIT - II	9Hrs

Understanding Harmony in the Family and Society: Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. Understanding the harmony in the society (society being an extension of family). Visualizing a universal harmonious order in society - Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) - from family to world family!

UNIT - III	9 Hrs

Introduction to Professional Ethics: Basic Concepts, Governing Ethics, Personal & Professional Ethics, Ethical Dilemmas, Life Skills, Emotional Intelligence, Thoughts of Ethics, Value Education, Dimensions of Ethics, Profession and professionalism, Professional Associations, Professional Risks, Professional Accountabilities, Professional Success, Ethics and Profession.

UNIT - IV	9 Hrs

Professional Practices in Engineering: Work Place Rights & Responsibilities, Professions and Norms of Professional Conduct, Norms of Professional Conduct vs. Profession; Responsibilities, Obligations and Moral Values in Professional Ethics, Professional codes of ethics, the limits of predictability and responsibilities of the engineering profession. Central Responsibilities of Engineers – The Centrality of Responsibilities of Professional Ethics; lessons from 1979 American Airlines DC-10 Crash and Kansas City Hyatt Regency Walk away Collapse.

UNIT - V	9 Hrs

Global issues in Professional Ethics: Introduction – Current Scenario, Technology Globalization of MNCs, International Trade, World Summits, Issues, Business Ethics and Corporate Governance, Sustainable Development Ecosystem, Energy Concerns, Ozone Depletion, Pollution, Ethics in Manufacturing and Marketing, Media Ethics, War Ethics, Bio Ethics, Intellectual Property Rights.

Textbooks:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Professional Ethics: R. Subramanian, Oxford University Press, 2015. 3.Ethics in Engineering Practice & Research, Caroline Whitbeck, 2e, Cambridge University Press 2015.

Reference Books:

1.Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.
2.Ivan IIlich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
3.Engineering Ethics, Concepts Cases: Charles E Harris Jr., Michael S PritchaMichael J Rabins, 4e , Cengage learning, 2015.
4.Business Ethics concepts & Cases: Manuel G Velasquez, 6e, PHI, 2008.

Online Learning Resources:

https://www.youtube.com/watch?v=9LSEBK03CiY&list=PLysZquKdjuWSv87TaE7pByn5TE_e46O2C

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1								2						
CO2								2						
CO3								3						
CO4								2						
CO5								1						

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3 High)