# Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal
## New Scheme of Examination as per AICTE Flexible Curricula
## VI Semester B.Tech. 3 D Animation & Graphics
## Syllabus

## AG601-COMPUTER NETWORK

**Course Objectives-**
- To provide students with an overview of the concepts and fundamentals of computer networks
- To familiarize with the basic taxonomy and terminology of computer networking area.
- Describe how computer networks are organized with the concept of layered approach
- To experience the designing and managing of communication protocols while getting a good exposure to the TCP/IP protocol suite

**Unit I**
Importance of computer networks, broadcast and point to point networks, Local area networks and Wide area networks , ISO-OSI reference model, TCP/IP model , interfaces and services, Protocol data unit, connection oriented and connectionless services, service primitives, Binding Protocol Address- ARP & RARP, packet format, Encapsulation.

**Unit II**
Data-Link layer: - Data link layer design issues, framing , flow & error control , physical addressing, Stop & Wait protocol ,Go back N ARQ ,selective repeat ARQ ,piggybacking and pipelining ,HDLC LAN Protocol stack-Logical link control and Media Access Control sublayer, IEEE 802.2 LLC Frame format; MAC layer Protocols- static and dynamic allocation, Pure and slotted ALOHA, Carrier sense multiple access, Persistent and non persistent CSMA, IEEE standard 802.3, 802.4, 802.5, FDDI,

**Unit III**
The Network layer- logical addressing, classful & classless addressing, packet delivery & forwarding. unicast routing protocols , multicast routing protocols, Routing algorithm- Least Cost, Dijkstra's, Bellman-ford, Introduction to Internet protocol, IPv4 header, IPv4 Datagrams, Encapsulation, Fragmentation and Reassembly, IP routing, Subnet addressing, Subnet mask, Super netting- special case of IP addresses, Ipv6- Motivation, frame format and addressing. ICMP: Introduction, ICMP Header, ICMP message types.

**Unit IV**
Transport layer- TCP: Introduction ,Transport services , Process to process delivery, TCP ,congestion control algorithms, quality of service, headers, connection establishment and termination, timeout of connection establishment, maximum segment size, port no. and socket addresses, TCP timers, UDP: Introduction, UDP header, UDP checksum, UDP operations, encapsulation & decapsulation, queuing, SCTP-Services, transmission sequence number, stream identifier, stream sequence number, packet format.

**Unit V**
Application layer - BOOTP:-operation, packet format, DHCP:-Address allocation, configuration & packet Format, DNS: Distribution of name spaces, DNS in the internet, FTP:-Connection, Communication, command processing, TFTP, E-Mail: SMTP, POP, IMAP, SNMP. study of internetworking devices and their configuration– switches, hubs, Bridges, routers and Gateways.

**References -**
1. ."Computer Networks" - Tanenbaum ,PHI Learning
 2. "Data Communication & Networks " , Fourouzan TMH
3. "TCP/IP-Protocol suite", Forouzan, TMH 3rd edition
 4. "Computer Networks and Internets", D.E.Comer, Pearson
5. "TCP/IP Illustrated" W. Richard Stevens, Volume I, Addison Wesley,
6. "Internetworking with TCP/IP Vol. I, II & III", Comer , PHI Learning.

| 1 Hr Lecture | 1 Hr Tutorial | 2 Hr Practical |
|---|---|---|
| 1 Credit | 1 Credit | 1 Credit |

**Course Outcomes-**
Upon successful completion of this course the students will be able to-

1. Understanding the OSI Reference Model and its Layers
2. Identify core networking and infrastructure components and the roles they serve; and given requirements and constraints,
3. Design an IT infrastructure including devices, topologies, protocols, systems software, management and security
4. Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies
5. Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocol

| 1 Hr Lecture | 1 Hr Tutorial | 2 Hr Practical |
|---|---|---|
| 1 Credit | **1 Credit** | **1 Credit** |

# AG602-3D MODELING

**Course Objectives-**
To develop an understanding of 3D modeling production pipeline

**Unit I**
Digital Modeling introduction, 3D vs 2D, 3D model or 3D mesh, 3D Model usage, Types of 3D modeling, 3D software, 2D software, Modeler's role, Production pipeline stages: Preproduction: Story, Visual design, storyboard, Animatics, Audio; Production: Modeling, Rigging, Scene setup, Texturing, Animation, Effects, Lighting, Rendering; Postproduction: Composting, Audio, Final edit and delivery

**Unit II**
Tools of a digital modeler, Gathering reference material, preparing reference material; A Model's anatomy, Model Classification, Model styles; Digital Modeling methods: Build Out, Primitive modeling, Box Modeling, Patch modeling, Digital sculpting, 3D scanning

**Unit III**
Professional modeling practices; Polygonal modeling: Modeling 3D polygonal text, vector and raster images, subdivision surface modeling, modeling a realistic head: edge extend vs box modeling, Modeling a stylized character

**Unit IV**
Product modeling for print graphics, Digital sculpting, Uses of digital sculpting, Sculpting technology, Modeling vs Sculpting, Elements of sculpture, Digital sculpting software, Techniques of sculpting, game modeling

**Unit V**
3D Printing of digital models; 3D printing overview and applications, preparing a digital model for 3D printing, Guidelines for 3D printing, 3D printing to manufactured toy

**References-**
1. William Vaughan, "Digital Modeling", Pearson Education, 2012
2. Danan Thilakanathan," 3D Modeling for Beginners", Createspace Independent Pub
3. Cameron Coward, " A Beginner's Guide to 3D modeling", No starch press

**Course Outcomes -**
Upon successful completion of this course the students will be able to:
1. Understand the 3D model production pipeline
2. Use tool s for creating 3D models
3. Practice professional modeling
4. Create 3D models for games
5. Understand the 3D model printing process

| 1 Hr Lecture | 1 Hr Tutorial | 2 Hr Practical |
|---|---|---|
| 1 Credit | **1 Credit** | **1 Credit** |

# AG 603 (A) WEB TECHNOLOGY

**Course Objective-**
Enable the students to understand the Web at a fundamental level and provide a solid foundation on web development tools based on the technologies

**Unit I**
Web Essentials: Client, Server and communication, The Internet, Basic Internet protocols, TCP/IP, UDP, DNS, Domain names, The World Wide Web, HTTP request message, HTTP response message, Web clients, Web servers

**Unit II**
Markup Languages: HTML, XHTML, syntax and semantics, HTML Elements, Relative URLs, Lists, Tables, Frames, Forms; Style Sheets: CSS, CSS core syntax, style rule cascading and inheritance, Text properties, Box model, Normal flow box layout, style properties

**Unit III**
Client Side programming: Javascript language, Introduction to scripting languages, Writing and testing Javascript programs, Basic syntax, variables and datatypes, statements, operators, literals, functions, objects, arrays, Built-in objects, Javascript debuggers

**Unit IV**
Host objects: Browsers and the DOM, DOM history and levels, Intrinsic event handling, The document tree, DOM event handling
Server Side programming: Java Servlets, Servlet architecture overview, Servlet lifecycle, Parameter data, Sessions, Cookies, URL rewriting, other servlet capabilities, Data storage, Servlets and concurrency

**Unit V**
Representing Web Data: XML, XML versions, XML declaration, XML Namespaces, Ajax, SAX, XSL, Displaying XML documents in browsers
Separating programming and presentation: JSP, Introduction to Java Server Pages, JSP and Servlets, Running JSP applications, Basic JSP
Web Services: Web service concepts, WSDL, SOAP

**References-**

1. Jeffrey C. Jackson, "Web Technologies: A Computer Science Perspective", Pearson Education
2. Kogent Learning solutions," Web Technologies Black Book", Dreamtech Press
3. Laura Lemay, Rafe Colburn, Jennifer Kyrnin, "Mastering HTML, CSS & Javascript Web Publishing", BPB Publications
4. Godbole, Khate, "Web Technologies", McGraw Hill Education
5. Raj Kamal, "Internet and Web Technologies", Tata McGraw-Hill.

**Course Outcomes -**
Upon successful completion of this course the students will be able to:
1. Analyze a web page and identify its elements and attributes.
2. Create web pages using XHTML and Cascading Style Sheets.
3. Build dynamic web pages using JavaScript (Client side programming)
4. Write a server side java application called Servlet to catch form data sent from client, process it and store it on database
5. Create XML documents and Schemas ,Build interactive web applications using AJAX.

| 1 Hr Lecture | 1 Hr Tutorial | 2 Hr Practical |
|---|---|---|
| 1 Credit | **1 Credit** | **1 Credit** |

# AG 603 (B) EMBEDDED SYSTEMS

**Course Objectives-**
1. To introduce students with knowledge about the basic functions and applications of embedded systems
2. To introduce the architecture of embedded systems
3. To introduce the various communication protocols
4. To enable students to have knowledge of the memory types and supporting technologies of embedded systems.
5. To enable students to have knowledge about the development of embedded software

**UNIT-I** Introduction to Embedded Systems: Definition of embedded system, embedded systems vs. general computing systems, history of embedded systems, classification, major application areas, purpose of embedded systems, characteristics and quality attributes of embedded systems, common design metrics, and processor technology: general purpose processor, application specific processor, single purpose processor.

**UNIT-II** Embedded System Architecture: Von Neumann v/s Harvard architecture, instruction set architecture, CISC and RISC instructions set architecture, basic embedded processor, microcontroller architecture, CISC & RISC examples: 8051, ARM, DSP processors.

**UNIT-III** Input Output and Peripheral Devices Timers and counters, watchdog timers, interrupt controllers, PWM, keyboard controller, analog to digital converters, real time clock. Introduction to communication protocols: basic terminologies, concepts, serial protocol: I2C, CAN, firewire, USB. Parallel protocols: PCI bus, IrDA, bluetooth, IEEE 802.11, wireless protocols.

**UNIT-IV** Memory System Architecture Caches, virtual memory, MMU, address translation, memory and interfacing, memory write ability and storage performance. Memory types, composing memory – advance RAM interfacing, microprocessor interfacing I/O addressing, interrupts, direct memory access, arbitration multilevel bus architecture.

**UNIT-V** Embedded System Supporting Technologies Difference between normal OS and RTOS, scheduling algorithms. Case study: Tiny OS, VxWorks, QNX. Overview of VLSI technology, introduction to device drivers. Case studies: washing machine, air-conditioning, auto focus camera.

**References-**
1. F Vahid, T Giogarvis, Embedded systems: A unified hardware/software approach, Wiley, 1999.
2. Raj Kamal, Embedded Systems Introduction, 2nd Ed., TMH publication, 2015.
3.David E Simons, An Embedded Software Primer, Pearson, 1999.

**Course Outcomes-**
Upon successful completion of this course, the students will be able to:
1. Explain the embedded system concepts and architecture of embedded systems
2. Describe the architecture of 8051 microcontroller and write embedded program for 8051 microcontroller
3. Select elements for an embedded systems tool.
4. Understand the memory types used in embedded systems
5. Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

| 1 Hr Lecture | 1 Hr Tutorial | 2 Hr Practical |
|---|---|---|
| 1 Credit | **1 Credit** | **1 Credit** |

# AG 603 (C) SIMULATION & MODELING

**Course Objective-**
The objective of this course is to introduce students to basic simulation methods and tools for modeling and simulation of continuous, discrete and combined systems. The objective is to impart knowledge of simulation principles. The ability to create simulation models of various types.

**Unit I** Modeling & Simulation Concepts Modeling & Simulation Concepts: System Concepts, What is a Model? Type of Models, Modeling & Simulation, Continuous vs. Discrete System Simulation, Numerical Integration vs. Continuous Simulation, Analog vs. Digital Simulation, Simulation vs. Monte- Carlo Simulation, Nature of Computer Modeling and Simulation, When to Use Simulation? Limitations of Simulation

**Unit II** Probability Concepts in Simulation Stochastic variables, Random numbers: Pseudo-random generators, Testing of Pseudo-random number generators, Generation of non-uniformly distributed random numbers, discrete and continuous random variables, and density and distributive functions. Study of few distributions such as Poisson, Normal, Uniform

**Unit III** Simulation of Continuous Systems Introduction, Differential equations, Pure Pursuit Problem, Simulation of Chemical Reaction, Autopilot Simulation and Simulation of other Continuous systems

**Unit IV** Simulation of Discrete Systems Arrival patterns and service times, Simulation of Queuing System - Elementary idea about networks of Queuing with particular emphasis to computer system environment

**Unit V** Verification & Validation Design of simulation experiments and validation of simulation experiments comparing model data units and real system data Simulation Language A brief introduction to important discrete and continuous languages such as GPSS (Study & use of the language). Use of data base & AI techniques in the area of modeling and simulation

**References-**
1. Deo, Narsing "System Simulation with Digital Computers"
2. Gorden G, "System Simulation", Prentice Hall
3. Shridhar Bhai Trivedi, Kishore "Probability & Statistics with reliability Queuing, Computer Science Applications"
4. Payer, T.A., "Introduction to System Simulation", McGraw Hill
5. Reitman, J, "Computer Simulation Application", Wiley
6. Barnes B, "Modeling and Performance Measurement of Computer System
7. Spriet, WIA. "Computer Aided Modeling and Simulation (Academic Press).

**Course Outcomes-**
Upon successful completion of this course, the students will be able to:
1. Define, describe and apply basic concepts related to modeling, identification and simulation
2. Classify various simulation models and give practical examples for each category.
3. Demonstrate the ability to apply knowledge of probability and statistics for simulation & modeling,
4. Generate and test random numbers and apply them to develop simulation models.
5. Construct a model for a given set of data and motivate its validity.

| 1 Hr Lecture | 1 Hr Tutorial | 2 Hr Practical |
|---|---|---|
| 1 Credit | **1 Credit** | **1 Credit** |

# AG 604 (A)COMPUTER AIDED DESIGN

**Course Objectives-**
Provide basic foundation in computer aided design

**Unit I**
**Introduction:** Fundamentals of CAD, Applications, CAD Hardware and Software, CAD System Tools, CAD Libraries, Application-Oriented CAD Systems, Advantages of CAD

**Unit II**
**Basics of Geometric Modeling:** Geometric models, Requirements of geometric modeling, Geometric construction methods, Modeling facilities desired
**Structure of Computer-Aided Design Modeling:** Introduction, Window Identification, Unit Settings, Sketch Entities, Objects, and Classification, Datums, Sketch Entities, 3-D Curves, Surfaces Solids, Regional Operations, Sketching Operations, Use of Model Tree and Sequence of Operation, Accessing of CAD Libraries

**Unit III**
**Curve Entities:** Introduction, Curves, Curve representation methods, Lines, Circles, Ellipses, Parabolas, Hyperbolas, Conics, Cubic Splines, Bezier Curves, B-Spline Curves, Curve manipulations
**Sketching:** Introduction, Sketching Tools, Modification Tools, Annotation Tools, Advanced Tools, Parametric Sketching

**Unit IV**
**Part Modeling:** Introduction, Feature, Surface, Properties and Their Classification, Family Tables Use of Macro/Map Key, Parametric Modeling, Parametric Modeling Procedures, Modeling, Techniques, Application-Based Modeling
**Assembly Methods:** Introduction, Assembly Workspace, Degree of Freedom, Assembly Methods Assembly Operations, Family Table in Assembly, Application-Based Assembly Techniques
**Production Drawing Generation:** Introduction, Structure of Drawing, Drawing View Setting and Creation, Dimension, Annotations
**Sheet Metal:** Introduction, Features, Operation

**Unit V**
**Analysis:** Introduction, Dimensional Analysis, Finite Element Analysis, Kinetic Analysis
**Mechanism:** Introduction, Joint Modeling, Joint Classification Based on Degree of Freedom, Connections, Curve Tracing
**Graphical Presentation and Animation:** Introduction, Presentations and Classifications, Application of Presentation, Rendering, Animation

**References-**
1. Jayanta Sarkar, "Computer Aided Design: A Conceptual Approach", CRC Press
2. Chennakesava R. Alavala,"CAD/CAM Concepts and Applications", PHI Learning
3. Mikell P.Groover, Emory W. Zimmers, "CAD/CAM: Computer-Aided Design and Manufacturing", Pearson Education
4. H P Pitroda, "Computer Aided Design: Text Book and Practice Book", Walnut Publication
5. Srinivasa Prakash Regalla, "Computer Aided Analysis and Design", Wiley

**Course Outcomes -**
Upon successful completion of this course the students will be able to:

| 1 Hr Lecture | 1 Hr Tutorial | 2 Hr Practical |
|---|---|---|
| 1 Credit | **1 Credit** | **1 Credit** |

1. Describe basic structure of CAD workstation
2. Understand basic CAD concepts for geometric modeling
3. Execute the steps required in CAD software for developing 2D and 3D models and perform transformations
4. Make more accurate representations and modify them easily to improve design quality
5. Perform dimensional analysis of CAD models

| 1 Hr Lecture | 1 Hr Tutorial | 2 Hr Practical |
|---|---|---|
| 1 Credit | **1 Credit** | **1 Credit** |

# AG 604 (B) AUDIO AND VIDEO EDITING

Objective:

The objective of this course is to provide an introduction to Audio and Video editing concepts and methods prevalent in the industry.

## Unit I
Introducing Digital Audio, Time compression and expansion, Error correction and concealment, channel coding, Disk based recording, digital audio broadcasting, Audio principles: level and loudness, Frequency discrimination, Frequency response and linearity, The sine wave, decibels: Digital Principles: Time base correction, Multiplexing, Gain control, Digital faders and controls, A digital mixer, Filters, Sampling rate conversion, Transforms, Sampling and aliasing, Reconstruction, Filter design, choice of sampling rate, Quantizing, Basic Digital-to- Analog and Analog-to-Digital conversion, oversampling, noise shaping

## Unit II
Compression, Principles and types, Audio compression tools, Guidelines, compression formats,
Digital Coding Principles: Types of transmission channels, lines, recording medium, equalization and data separation, slicing and jitter rejection, channel coding, codes, randomizing, synchronizing, error correction, concealment

## Unit III
Different Aims of Audio editing; Corrective editing: Cutting, copying, pasting and moving, Fades and cross fades, Different fade shapes, Destructive vs Non destructive edits, Different types of level control, Tonal matching, Comping and alternate takes; Creative editing: Beat mapping and recycling, Time stretching, Elastic audio, pitch shifting,; Restorative editing: Applications of audio restoration, Demixing

## Unit IV
Digital video introduction, The tools of digital video, Editing software, Digital video hardware, workstation, Video capture, Import and export, Data formats, Foundation of digital video, static 2D concepts, Movement in digital video, Frames and frame rates, Digital video compression algorithms, codecs, Digital video resolutions, Digital video storage, Bit rates and playback, Digital video optimization

## Unit V
Digital camera concepts and Technology, Resolution, aspect ratio, camera sensors, Image data formats, camera interface, The workflow for digital video, Timeline editing, Color correction, Pixel processing, Pixel scaling, Popular video standards, Digital video playback: captive vs streaming,

**References-**
1. John Watkinson, "Introduction to Digital Audio", Routledge, O Reilly
2. Simon Langford, "Digital Audio Editing", Taylor and Fransis
3. Wallace Jackson, "Digital Audio Editing Fundamentals", Apress
4. Wallace Jackson,"Digital Video Editing Fundamentals", Apress

**Course Outcomes -**
Upon successful completion of this course the students will be able to:

1. Understand how audio is recorded and saved
2. Perform audio compression using various tools

| 1 Hr Lecture | 1 Hr Tutorial | 2 Hr Practical |
|---|---|---|
| 1 Credit | **1 Credit** | **1 Credit** |

3. Perform digital audio recording, editing and reproduction
4. Understand  video editing concepts
5. Work on the different platforms for video editing.

| 1 Hr Lecture | 1 Hr Tutorial | 2 Hr Practical |
|---|---|---|
| 1 Credit | **1 Credit** | **1 Credit** |

# AG604(C) FUNDAMENTALS OF MANAGEMENT

**Course Objectives-** To impart knowledge about different forms of organizations and to discuss historical evolution of management thought and contemporary management approaches

### UNIT – I

**Management Theories:** Concept and Foundations of Management, Evolution of Management Thoughts [Pre-Scientific Management Era (before 1880), Classical management Era (1880-1930), Neo-classical Management Era (1930-1950), Modern Management era (1950-on word). Contribution of Management Thinkers: Taylor, Fayol, Elton Mayo etc.

### UNIT – II

**Functions of Management**- Planning, Organizing, Staffing, Directing, Controlling

### UNIT – III

**Organization Behavior:** Introduction, Personality, Perception, Learning and Reinforcement, Motivation, Group Dynamics, Power & Influence, Work Stress and Stress Management, Decision Making, Problems in Decision Making, Decision Making, Organizational Culture, Managing Cultural Diversity

### UNIT – IV

**Organizational Design:** Classical, Neoclassical and Contingency approaches to organizational design; Organizational theory and design, Organizational structure (Simple Structure, Functional Structure, Divisional Structure, Matrix Structure)

### UNIT – V

**Managerial Ethics:** Ethics and Business, Ethics of Marketing & advertising, Ethics of Finance & Accounting, Decision – making frameworks, Business and Social Responsibility, International Standards, Corporate Governance, Corporate Citizenship, Corporate Social Responsibility

**Leadership:** Concept, Nature, Importance, Attributes of a leader, developing leaders across the organization, Leadership Grid.

**References-**

1. Understanding the Theory and Design of Organizations by Richard L. Daft, 11e, Cengage, 2020
2. Management by James Arthur, Finch Stoner, R. Edward Freeman, and Daniel R Gilbert 6th Ed; Publisher: Pearson Education/Prentice Hall
3. Organizational Behaviour by Stephen P. Robbins, Prentice Hall, 2013
4. Organizational Behaviour by Fred Luthans, Mc Graw-Hill, 2013
5. Organizational Behavior by Stephen P. Robbins, Timothy A. Judge, Neharika Vohra, 16e, Pearson Education, 2016
6. Business Ethics: Ethical Decision Making & Cases, by O. C. Ferrell, John Fraedrich, Linda Ferrell, 12th edition, Cengage, 2017

**Course Outcomes -**
Upon successful completion of this course the students will be able to:
1 Understand the Concept and Foundations of Management
2 Understand the functions of management
3 Handle work stress and problems in decision making
4 Understand organizational structure
5 Practice managerial ethics in team work

| 1 Hr Lecture | 1 Hr Tutorial | 2 Hr Practical |
|---|---|---|
| 1 Credit | 1 Credit | 1 Credit |

# AG 605- HTML5/JavaScript/WebGL Lab

**Course Objectives-**
To introduce tools for web programming

**Unit I**
HTML 5- Introduction to Web Programming-  Creating a website, web page example, HTML tags, elements, attributes,  HTML coding conventions, cascading style sheets (CSS) CSS rules, CSS Syntax and style, Lists, Figures, Tables an CSS layout

**Unit II**
HTML 5-  Links and Images, Image manipulations, Audio and video

**Unit III**
Javascript- Introduction to Javascript, Functions, DOM, Forms, Event Handlers, window object, if statement, Strings, Numbers, Input validation

**Unit IV**
Javascript- Loops, Additional controls, Manipulating CSS with Javascript, Object oriented programming and Arrays, Canvas

**Unit V**
WebGL- WebGL API, WebGL program, Graphics, Animation, Interaction, Integrating 2D and 3D

**References-**
 1 John Dean, "Web Programming", Jones & Bartlett Learning
 2 Faithe Wempen,"Step by Step HTML 5", Microsoft
 3 Tony Parisi, "WebGL Up and Running", O'Reilly

**Course Outcomes-**
 Upon successful completion of this course the students will be able to:
   1 Understand HTML 5 syntax and rules
   2 Develop Javascript code
   3 Develop interactive websites
   4 Understand the use of WebGL

| 1 Hr Lecture | 1 Hr Tutorial | 2 Hr Practical |
|---|---|---|
| 1 Credit | **1 Credit** | **1 Credit** |

# AG606-Computer Aided Design Lab

**Course Objectives-**

To develop skill to use software to create 2D and 3D models.


LIST OF EXPERIMENT:

1. Introduction to CAD

2. AutoCAD – BASICS

2.1 Starting with AutoCAD
2.2 Layout and sketching
 2.3 Drawing environment
2.4 Elements of drawing
2.4.1 Draw commands

2.5 3D functions

3. 2D – FIGURES for practice USING AutoCAD 2013

4. ISOMETRIC DRAWING for practice USING AutoCAD2013

5. 3-D SOLID FIGURES USING ACAD 2013

References:
1  Engineering graphics with Auto CAD- R.B. Choudary/Anuradha Publishres

| 1 Hr Lecture | 1 Hr Tutorial | 2 Hr Practical |
|---|---|---|
| 1 Credit | **1 Credit** | **1 Credit** |