Shri Rawatpura Sarkar University, Raipur

Examination Syllabus

For

Diploma

In

Computer Science Engineering

Semester-V

(Effective from the session: 2022-23)

SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR, CHHATTISGARH

FACULTY OF ENGINEERING

Three Years Diploma Programme
Scheme of Teaching and Examination
Diploma in Computer Science Engineering
Semester - V

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2022-2023)

S.No.	Course Code	Course Title	Hours / Week			Credit	Maximum Marks			Sem End Exam Duration (Hrs)
			L	T	P		Continuous Evaluation	Sem End Exam	Total	
1	EDP04501	Python Programming	3	1	-	4	30	70	100	3 Hrs.
2	EDP04502	Component Based Technology	3	1	-	4	30	70	100	3 Hrs.
3	EDP04503	Mobile Computing	3	1	-	4	30	70	100	3 Hrs.
4	EDP04504	Computer Hardware and Servicing	3	1	-	4	30	70	100	3 Hrs.
5	EDP04505	**Elective – I**	3	1	-	4	30	70	100	3 Hrs.
6	EDP04591	Python Programming Lab	-	-	2	1	15	35	50	3 Hrs.
7	EDP04592	Mobile Computing Lab	-	-	2	1	15	35	50	3 Hrs.
8	EDP04593	Computer Hardware and Networking Lab	-	-	2	1	15	35	50	3 Hrs.
9	EDP04594	Entrepreneurship & Development	-	-	2	1	15	35	50	3 Hrs.
Total Contact hr. per week: 26			**Total Credit 24**				**Grand Total Marks:**		**700**	

Table – I		
Elective – I		
Sr. No	**Subject Code**	**Subject Name**
1	EDP04505A	Wireless Communication
2	EDP04505B	Digital Image Processing
3	EDP04505C	E-Commerce & Technology

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Course Title	Python Programming				
Course Code	EDP04501				
Course Credits	**L**	**T**	**P**	**TC**	
	3	1	-	4	
Prerequisites	The students will be able to understand the python language.				
Course Objectives	• To understand the basics of algorithmic problem solving. • To learn to solve problems using Python conditionals and loops.				
Course Contents	**UNIT I** Fundamentals of Computing – Identification of Computational Problems - Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi. **UNIT II** Python interpreter and interactive mode, debugging; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points. **UNIT III** Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search. **UNIT IV** Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing – list comprehension; Illustrative programs: simple sorting, histogram, Students marks statement, Retail bill preparation. **UNIT V** Files and exception: text files, reading and writing files, format operator;				

	command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file, Voter's age validation, Marks range validation (0-100).
Course Outcomes	- Develop algorithmic solutions to simple computational problems. - Develop and execute simple Python programs. - Write simple Python programs using conditionals and looping for solving problems.
Text Books	1. Allen B. Downey, "Think Python: How to Think like a Computer Scientist", 2nd Edition, O'Reilly Publishers, 2016.
Reference Books	1. Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021. 2. G Venkatesh and Madhavan Mukund, "Computational Thinking: A Primer for Programmers and Data Scientists", 1st Edition, Notion Press, 2021.

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Course Title	Component Based Technology				
Course Code	**EDP04502**				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**		**4**	
Prerequisites	The students will be able to understand the technologies components.				
Course Objectives	• To understand the basics of component based technology. • To learn how to solve problems.				
Course Contents	**UNIT I** Software Components – Objects – Fundamental Properties of Component Technology – Modules – Interfaces – Callbacks – Directory Services – Component Architecture – Components and Middleware. **UNIT II** Threads – Java Beans – Events and Connections – Properties – Introspection – JAR files – Reflection – Object Serialization – Enterprise Java Beans – Distributed Object Models – RMI and RMI – IIOP. **UNIT III** Java and CORBA – Interface Definition language – Object Request Broker – System Object Model – Portable Object Adapter – CORBA Services – CORBA Component Model – Containers – Application Server – Model Driven Architecture. **UNIT IV** COM – Distributed COM – Object Reuse – Interfaces and Versioning – Dispatch Interfaces – Connectable Objects – OLE Containers and Servers – Active X controls – .NET Components – Assemblies – Appdomains – Contexts – Reflection – Remoting. **UNIT V** Connectors – Contexts – EJB Containers – CLR Contexts and Channels – Black Box Component Framework – Directory Objects – Cross–Development Environment – Component Oriented Programming – Component Design and Implementation Tools – Testing Tools – Assembly Tools.				
Course Outcomes	• Develop software with the help of algorithmic solutions to problems.				
Text Books	Clemens Szyperski, "Component Software Beyond Object, Oriented Programming", Addison Wesley, 2nd Edition 2002				

Reference Books	Ed Roman, "Enterprise Java Beans", 3rd Edition, Wiley, 2004.

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Course Title	Mobile Computing				
Course Code	**EDP04503**				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**		**4**	
Prerequisites	The students will be able to understand the basic of mobile computing devices.				
Course Objectives	• To understand the basic concepts of mobile computing. • To learn the basics of mobile telecommunication system .				
Course Contents	**UNIT I** Introduction to Mobile Computing — Applications of Mobile Computing- Generations of Mobile Communication Technologies- Multiplexing — Spread spectrum -MAC Protocols — SDMA- TDMA- FDMA- CDMA. **UNIT II** Introduction to Cellular Systems — GSM — Services & Architecture — Protocols — Connection Establishment — Frequency Allocation — Routing — Mobility Management — Security — GPRS- UMTS — Architecture — Handover — Security **UNIT III** Mobile IP — DHCP — AdHoc– Proactive protocol-DSDV, Reactive Routing Protocols — DSR, AODV , Hybrid routing –ZRP, Multicast Routing- ODMRP, Vehicular Ad Hoc networks (VANET) –MANET Vs VANET — Security. **UNIT IV** Mobile TCP– WAP — Architecture — WDP — WTLS — WTP –WSP — WAE — WTA Architecture — WML **UNIT V** Mobile Device Operating Systems — Special Constraints & Requirements — Commercial Mobile Operating Systems — Software Development Kit: iOS, Android, BlackBerry, Windows Phone — MCommerce — Structure — Pros & Cons — Mobile Payment System — Security Issues				
Course Outcomes	• Explain the basics of mobile telecommunication systems • Illustrate the generations of telecommunication systems in wireless networks				
Text Books	Jochen Schiller, ―Mobile Communications‖, PHI, Second Edition, 2003.				
Reference Books	Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems",Thomson Asia Pvt Ltd, 2005.				

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Course Title	**Computer Hardware and Servicing**				
Course Code	**EDP04504**				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**		**4**	
Prerequisites	The students will be able to understand the technologies used in computer.				
Course Objectives	• Know the evolution of Personal Computer from PC through Core i and Laptop. • Know and explain the major components that make up the system unit.				
Course Contents	**UNIT I** Primary and Secondary Memory:Introduction – Memory speed – Access time – Wait states. Main Memory – types – Memory errors. Hard Disk: Introduction – Construction – Working Principle – File Systems – Formatting and Troubleshooting.Removable Storage and Special Devices:DVD-ROM – Recordable DVD -Rewritable DVD. Blu-ray: Introduction – Blu-ray Disc Parameters – Recording and Playback Principles. Special drives: External drives, Memory stick, USB flash drive, Solid state drive. **UNIT II** Monitors:- CRT, LCD and LED Displays, Printers:- Dot-Matrix Printer, Inkjet Printer, Laser Printer Scanner:- Photo Scanner, Documents Scanner, Bar Cord Scanner Keyboards, Mouse, External Modem, Ports and Connectors, Batteries, Power supply, Pen Drives, SCSI interface devices, Laptop Computers, Digital Advance storage technology. **UNIT III** IDE and SATA Devices: Hard Disk Drive and CD/DVDs Drives, SCSI Devices, Floppy Disk, Zip Drive, Backup Drive, Expansion Cards- LAN Card, IDE Card , VGA and SVGA Cards, Sound Card, Interface Cards, I/O cards, Video Cards, USB Card, Fire-Wire Cards, Internal Ports, Cables and Connector Types. **UNIT IV** Introduction of Network Cable like UTP, STP, Fiber Optics, Hub, Unmanageable Switch, Manageable Switch, Router, Modem, Wi-Fi, Access Point, PCI Wireless Card, USB Wireless Device, Print Server, USB Network Sharer, Backup Device, Server Hardware etc. **UNIT V** Study of PC-AT/ATX System, Pentium, Core, Core 2 Cord, Core 2 Duo, I3, I5, I7 Processor Basics of Processor and CPU Block Diagram of Computer and Computer Generation Motherboards, Chipset and Controllers, BIOS and the Boot Process, Computer Memory.				
Course	• Develop knowledge about computer's architecture.				

Outcomes	
Text Books	Microprocessor Architecture Programming and Application with the 8085
Reference Books	Electronics and Radio Engineering M.L. Gupta Dhanpat rai & Sons, New Delhi

Course Title	Wireless Communication (Elective – I)

Course Code	**EDP04505A**

Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**		**4**	

Prerequisites	The students will be able to understand the how communication done in wireless network.

Course Objectives	• To study the characteristic of wireless channel • To understand the design of a cellular system

Course Contents	**UNIT I** Large scale path loss – Path loss models: Free Space and Two-Ray models -Link Budget design – Small scale fading- Parameters of mobile multipath channels – Time dispersion parameters-Coherence bandwidth – Doppler spread & Coherence time, fading due to Multipath time delay spread – flat fading – frequency selective fading – Fading due to Doppler spread – fast fading – slow fading. **UNIT II** Multiple Access techniques - FDMA, TDMA, CDMA – Capacity calculations– Cellular concept- Frequency reuse - channel assignment- hand off- interference & system capacity- trunking & grade of service – Coverage and capacity improvement. **UNIT III** Structure of a wireless communication link, Principles of Offset-QPSK, p/4-DQPSK, Minimum Shift Keying, Gaussian Minimum Shift Keying, Error performance in fading channels, OFDM principle – Cyclic prefix, Windowing, PAPR. **UNIT IV** Equalisation – Adaptive equalization, Linear and Non-Linear equalization, Zero forcing and LMS Algorithms. Diversity – Micro and Macro diversity, Diversity combining techniques, Error probability in fading channels with diversity reception, Rake receiver. **UNIT V** MIMO systems – spatial multiplexing -System model -Pre-coding - Beam forming - transmitter diversity, receiver diversity- Channel state information-capacity in fading and non-fading channels.

Course	• Characterize a wireless channel and evolve the system design

Outcomes	specifications • Design a cellular system based on resource availability and traffic demands
Text Books	Rappaport,T.S., ―Wireless communications‖, Pearson Education, Second Edition, 2010.
Reference Books	Wireless Communication –Andrea Goldsmith, Cambridge University Press, 2011

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Course Title	**Digital Image Processing (Elective – I)**				
Course Code	**EDP04505B**				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**		**4**	
Prerequisites	The students will be able to understand the image processing features.				
Course Objectives	• To study the characteristic of images. • To understand the design of a processing system.				
Course Contents	**UNIT I** Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels - Color image fundamentals - RGB, HSI models, Two-dimensional mathematical preliminaries, 2D transforms - DFT, DCT. **UNIT II** Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering– Smoothing and Sharpening Spatial Filtering, Frequency Domain: Introduction to Fourier Transform– Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters, Homomorphic filtering, Color image enhancement. **UNIT III** Image Restoration - degradation model, Properties, Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering. **UNIT IV** Edge detection, Edge linking via Hough transform – Thresholding - Region based segmentation – Region growing – Region splitting and merging – Morphological processing- erosion and dilation, Segmentation by morphological watersheds – basic concepts – Dam construction – Watershed segmentation algorithm. **UNIT V** Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, JPEG standard, MPEG. Boundary representation, Boundary description, Fourier Descriptor, Regional Descriptors – Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching.				
Course Outcomes	• Characterize a image and evolve the system specifications. • Design a processing system based on resource availability and demands				

Text Books	Rafael C. Gonzalez, Richard E. Woods, _Digital Image Processing', Pearson, Third Edition, 2010.
Reference Books	Kenneth R. Castleman, _Digital Image Processing', Pearson, 2006.

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Course Title	E-Commerce & Technology(Elective – I)				
Course Code	**EDP04505C**				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**		**4**	
Prerequisites	The students will be able to understand the e-commerce & it's technologies.				
Course Objectives	1. Discuss fundamentals of e-commerce, types and applications. 2. Evaluate the role of the major types of information systems in a business environment and their relationship to each other				
Course Contents	**UNIT I** Introduction What is E-Commerce, Forces behind E-Commerce Industry Framework, Brief history of ECommerce, Inter Organizational E-Commerce Intra Organizational E-Commerce, and Consumer to Business Electronic Commerce, Architectural framework Network Infrastructure for E-Commerce Network Infrastructure for E-Commerce, Market forces behind I Way, Component of I way Access Equipment, Global Information Distribution Network, Broad band Telecommunication. **UNIT II** Mobile Commerce Introduction to Mobile Commerce, Mobile Computing Application, Wireless Application Protocols, WAP Technology, Mobile Information Devices, Web Security Introduction to Web security, Firewalls & Transaction Security, Client Server Network, Emerging Client Server Security Threats, firewalls & Network Security. **UNIT III** Encryption World Wide Web & Security, Encryption, Transaction security, Secret Key Encryption, Public Key Encryption, Virtual Private Network (VPM), Implementation Management Issues. **UNIT IV** Electronic Payments Overview of Electronics payments, Digital Token based Electronics payment System, Smart Cards, Credit Card I Debit Card based EPS, Emerging financial Instruments, Home Banking, Online Banking. **UNIT V** Net Commerce EDA, EDI Application in Business, Legal requirement in E - Commerce, Introduction to supply Chain Management, CRM, issues in Customer Relationship Management.				

Course Outcomes	1. Understand the basic concepts and technologies used in the field of management information systems 2. Understand the processes of developing and implementing information systems
Text Books	Greenstein and Feinman, "E-Commerce", TMH
Reference Books	Ravi Kalakota, Andrew Whinston, "Frontiers of Electronic Commerce", Addision Wesley

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Course Title	Python Programming Lab				
Course Code	EDP04591				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**		**4**	
Prerequisites	Know the usage of various predefined functions on the above data types.				
Course Objectives	Know comprehensions, generators in python. Know exception handling in python.				
Course Contents	1. a. Write a program to get the list of even numbers upto a given number. b. Write a program to get the ascii distance between two characters. c. Write a program to get the binary form of a given number. d. Write a program to convert base36 to octal.				
	2. a. Write a program to get the number of vowels in the input string (No control flow allowed) b. Write a program to check whether a given number has even number of 1's in its binary representation (No control flow, the number can be in any base) c. Write a program to sort given list of strings in the order of their vowel counts.				
	3. a. Write a program to return the top 'n' most frequently occuring chars and their respective counts. E.g. aaaaaabbbbcccc, 2 should return [(a 5) (b 4)] b. Write a program to convert a given number into a given base. Note: Convert the given number into a string in the given base. Valid base is 2 <= base <= 36 Raise exceptions similar to how int ("XX", YY) does (play in the console to find what errors it raises). Handle negative numbers just like bin and oct do.				
	4. a. Write a program to convert a given iterable into a list. (Using iterator) b. Write a program to implement user defined map() function. Note: This function implements a map. It goes through the iterable and applies func on each of the elements and returns a list of results. Don't use a for loop or the builtin map function. Use exceptions, while loop and iter. c. Write a progra m to generate an infinite number of even numbers (Use generator) d. Write a program to get a list of even numbers from a given list of numbers.(use only comprehensions)				
	5. Write a program to implement round robin. Note: This routine to take a variable number of sequences and return elements from them in round robin till each sequence is exhausted. If one of the input sequences is infinite, this is also infinite. e.g if input is [1,2,3], (4,5) -> yield 1,4,2,5,3 one after the other. Use exception control and comprehensions to write elegant code. Hint: This requires you to use understand variable arguments, lists, list copy, comprehensions, iterators, generators, exception handling, control flow etc.				
	6. a. Write a program to sort words in a file and put them in another file. The output file should have only lower case words, so any upper case words from				

	source must be lowered.(Handle exceptions) b. Write a program return a list in which the duplicates are removed and the items are sorted from a given input list of strings.

7. a. Write a program to test whether given strings are anagrams are not. b. Write a program to implement left binary search. Note: Left binary search returns the left most element when a search key repeats. For e.g if input is [1,2,3,3,4,4,5] and I search 3, it should return 2 as index 2 is the left most occurrence of 3.

8. a. Write a class Person with attributes name, age, weight (kgs), height (ft) and takes them through the constructor and exposes a method get_bmi_result() which returns one of "underweight", "healthy", "obese" b. Write a program to convert the passed in positive integer number into its prime factorization form. Note: If number = a1 ^ p1 * a2 ^ p2 ... where a1, a2 are primes and p1, p2 are powers >=1 then we represent that using lists and tuples in python as [(a1, p1), (a2, p2), ...] e.g.[(2,1), (5,1)] is the correct prime factorization of 10. |
Course Outcomes	• Able to understand the working principles of the computer System and its components. • Comprehensive skills of Programming Languages, Software process models
Text Books	Mark Lutz & David Ascher, "Learning Python", Oreilly Publications, 5th edition.
Reference Books	Fluent Python: Clear, Concise, and Effective Programming.

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Course Title	Mobile Computing Lab				
Course Code	**EDP04592**				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**		**4**	
Prerequisites	Know the usage of various predefined mobile telecommunication system.				
Course Objectives	• To understand the basic concepts of mobile computing. • To learn the basics of mobile telecommunication system .				
Course Contents	This Lab is based on the following: Socket programming - TCP and UDP, peer-to-peer applications; reliable communications using unreliable datagrams; client-server using RPC; concurrent servers using threads or processes. Cisco Packet Tracer - Configuration of wired and wireless networks, Routing configurations, DHCP design. LAN Trainer Kit - Implementation of protocols over different network topologies, network troubleshooting and performance monitoring, etc. Network simulator -Simulation of wired and wireless routing protocols, network topologies, configuration and network performance measurement using ns 2.35 and NetSim tools.				
Course Outcomes	• Able to Understand the working principles of the mobile computing and its components.				
Text Books	Donn Felker, "Android Application Development for Dummies", Wiley, 2010.				
Reference Books	Reto Meier, "Professional Android 2 Application Development", Wrox"s Prog. To Programmer Series.				

Course Title	Computer Hardware and Networking Lab			
Course Code	**EDP04593**			
Course Credits	**L**	**T**	**P**	**TC**
	3	**1**		**4**
Prerequisites	Know the usage of various predefined protocols of system.			
Course Objectives	• To understand the basic concepts of computer hardware & networking.			
Course Contents	1 Study of complete network architecture of your institution (including topology, network devices cabling standards, protocol and security features). 2 Hands on experiment for configuring network interface card for connecting two systems. 3 Test the connectivity between two hosts. 4 Test all options of ping. 5 Write a Program to find the IP address and domain name of your system. 6 Write a Program to establish connection between a TCP client & server for studying nature of client server communication. 7 Write a Program to connect ftp server to get & put file. 8 Study IEEE standards & find out their implementation in networking environment. 9 Write a program to find an IP address of host and turn on IP address into domain name. 10 Make a report on LAN establishment in any of organization including hardware & networking aspects.			
Course Outcomes	• Able to Understand the working principles of the computer network.			
Text Books	A. S. Tanenbaum (2003), Computer Networks, 4th edition, Pearson Education/ PHI, New Delhi, India.			
Reference Books	Behrouz A. Forouzan (2006), Data communication and Networking, 4th Edition, Mc Graw-Hill, India.			

Course Title	Entrepreneurship & Development

Course Code	EDP04594

Course Credits	L	T	P	TC	
	3	1		4	

Prerequisites	Know the usage of various hidden managerial skills.

Course Objectives	• To understand the basic concepts of entrepreneurship & development.

Course Contents	**UNIT I** Foundation of Entrepreneurship Development, Concept and need of entrepreneurship; Characteristics and Types of Entrepreneurship; Entrepreneurship as a career; Entrepreneurship as a style of Management; The changing role of the entrepreneur; Entrepreneurial traits, factors affecting entrepreneurs. **UNIT II** Theories of Entrepreneurship Influences on entrepreneurship development; External influences on entrepreneurship development; Socio-cultural, Political, economical, personal entrepreneurial success and failure: reasons and remedies; Women entrepreneurs: Challenges and achievements of women entrepreneurs. **UNIT III** Business Planning Process The business plan as an entrepreneurial tool; Elements of business planning; Objectives; Market analysis; development of Product/idea; Marketing, Finance, Organization and management; Ownership; Critical risk contingencies of The proposal; Scheduling and milestones. **UNIT IV** Project Planning for Entrepreneurs Technical, Financial, Marketing, Personnel, and management feasibility reports; Financial schemes offered by various financial institutions, Like Commercial Banks, IDBI, ICICI, SIDBI, SFCs, Foreign currency Financing; Estimation of Financial requirements. **UNIT V** Entrepreneurship Development and Government Role of Central Government and State Government in promoting entrepreneurship with various incentives, subsidies, grants, programs, schemes and challenges. Government initiatives and inclusive entrepreneurial Growth.

Course	• Able to Understand the working principles of the enterpreneurship.

Outcomes	
Text Books	Khanna, S. S., Entrepreneurial Development, S. Chand, New Delhi.
Reference Books	Hisrich D. Robert, Michael P. Peters, Dean A. Sheperd, Entrepreneurship, McGraw-Hill,6 ed.