Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020
Master of Technology (Computer Science Engineering)
SEMESTER-III(2021-23)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
MTCS203	DCC	Simulation and Modeling	60	20	20	30	20	2	-	2	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

The student will have ability to:
1.Introduce students to the simulation and modeling techniques.
2. Provide a way for students with opportunities to develop basic simulation and modeling
3. Introduce concepts of modeling layers of society's&industrialreal world problems.
4. Build tools to view and control simulations and their results.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.

The students will be able to
1. Characterize a given engineering system in terms of its essential elements, that is, purpose, parameters, constraints, performance requirements, subsystems, interconnections and environmental context.
2. Develop a modeling strategy for a real world engineering system, which considers prediction and evaluation against design criteria, and integrates any required sub-system models.
3. Assess and select a model for an engineering system taking into consideration its suitability to facilitate engineering decision making and predicted advantages over alternative models.
4. Interpret the simulation results of an engineering system model, within the context of its capabilities and limitations, to address critical issues in an engineering project.

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UNIT I10HRS
Basic Simulation Modeling: The Nature of simulation system, models and simulation, discrete-event simulation, simulation of a single-server queuing, alternative approaches to modeling and coding simulations, network simulation, parallel and distributed simulation, simulation across the internet and web based simulation, steps in a sound simulation study, other types of simulation: continuous simulation, combined discrete-continuous simulation, Monte Carlo simulation, advantages, disadvantages and pitfalls of simulation.

UNIT II 9HRS
Modeling Complex Systems: Introduction, list processing in simulation, approaches to stering lists in a computer linked storage allocation
Simulation examples using any simulation language: Single-server Queuing simulation with time-shared computer model, job-shop model, and event-list manipulation.

UNIT III10HRS
Discrete System Modeling: Classification of simulation models the simulation process, system investigation validation and translation, simulation of complex discrete-event systems with application in industrial and service organization tactical planning and management aspects, Random variable generation and analysis.

UNIT IV 8HRS
Simulation Software: Comparison of simulation packages with programming languages classification of simulation software, general-purpose simulation packages, object-oriented simulation, building valid, credible and appropriately detailed simulation models, experimental design, sensitivity analysis and optimization simulation of manufacturing systems.

UNIT V 7HRS
Embedded System Modeling: Embedded systems and system level design, models of computation, specification languages, hardware/software code design, system partitioning, application specific processors and memory, low power design
Real-Time system modeling, Fixed Priority scheduling, Dynamic Priority Scheduling
Data Communication Network modeling, IP network intradomain (e.g. OSPF, RIP) routing simulation.

Text Book:
1.Law Kelton,"Simulation Modeling and Analysis", McGraw-Hill

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References:

1. Geoffrey Gordon,"System Simulation", PHI
2. Communication Systems S. Haykin, John Willy & Sons.
3. Communication Systems: A.B. Carlson, Mc-Graw-HW.

Practical's List:
1. Simulate CPU scheduling algorithm using queueing system a) FCFS b) SJF c) Priority.
2. Simulate multiplxer/concentrator using queuing system.
3. Simulate congestion control algorithms.. Simulate Disk scheduling algorithms.. Simulate a Manufacturing shop and write a program in GPSS.
4. Simulate Telephone system model and write a program in SIMSCRIPT
5. Implementation of Link state routing algorithm
6. Implementation of data encryption and decryption
7. Implementation of VoIP using OPNET network simulator.
8. Install Network Simulator 2 and study network topologies.

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MTCS103	**DCC**	**Advance Computer Network**	**60**	**20**	**20**	**30**	**20**	**2**	**-**	**2**	**3**

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Course Educational Objectives (CEOs):

1. To be able to demonstrate an understanding of the physical properties and performance characteristics of communication media; specifically copper cable, fibre optics and wireless networks
2. To be able to demonstrate an understanding of the importance of communication standards, including an appreciation of protocol layer models and enhancements to those standards
3. To be able to demonstrate an appreciation of the theory and practice of common local area networks including virtual and wireless LANs.
4. To be able to demonstrate an appreciation of the theory and practice of wide area networks and their interconnection
5. To be able to demonstrate an appreciation of the significance of network and inter-network protocols; specifically IPv4, IPv6, TCP and UDP
6. To be able to describe the importance of reliability and quality of service, including examples of error recovery strategies, traffic differentiation and prioritization

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.

The students will be able to

1. Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies;
2. Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols;

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MTCS103	DCC	Advance Computer Network	60	20	20	30	20	2	-	2	3

3. Analyze, specify and design the topological and routing strategies for an IP based networking infrastructure
4. Have a working knowledge of datagram and internet socket programming

Syllabus

UNIT I **10HRS**

Introduction Concepts: Goals and Applications of Networks, Requirements , Network architecture , Networking principles, Network services and Layered architecture .The OSI reference model, services, Network Topology Design - Delay Analysis, Back Bone Design, Local Access Network Design, Physical Layer Transmission Media, Switching methods, ISDN, Terminal Handling

UNIT II **9HRS**

Medium Access sub layer: Medium Access sub layer - Channel Allocations, LAN protocols - ALOHA protocols - Overview of IEEE standards - FDDI. Data Link Layer - Elementary Data Link Protocols, Sliding Window protocols, Error Handling Protocol architecture - Protocols - OSI - TCP/IP - LAN architecture - Topologies - MAC - Ethernet, Fast Ethernet, Token ring, Wireless LANS ,Switches.

UNIT III **8HRS**

Circuit switching vs. packet switching / Packet switched networks – IP – ARP – RARP – DHCP – ICMP – Queueing discipline – Routing algorithms – RIP – OSPF – Subnetting – CIDR – Interdomain routing – BGP – Ipv6 – Multicasting – Congestion avoidance in network layer

UNIT IV **7HRS**

Transport Layer - Design issues, connection management, session Layer Design issues, remote procedure call. Presentation Layer-Design issues, Data compression techniques, cryptography - TCP - Window Management UDP – TCP – Adaptive Flow Control – Adaptive Retransmission - Congestion control – Congestion avoidance – QoS.). Application Layer: Application Layer: File

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Transfer, Access and Management, Electronic mail, Virtual Terminals, Other application. Example Networks - Internet and Public Networks

UNIT V **8HRS**

Email (SMTP, MIME, IMAP, POP3) – HTTP – DNS- SNMP – Telnet – FTP – Security – PGP – SSH. Control of networks: objectives and methods of control, Circuit switched networks, datagram and ATM networks. Mathematical background for control of networks like Circuit switched networks, Datagram and ATM networks Wireless LAN, 802.11, DHCP, outing in the Internet, MOSTF DVMRP, IP Over ATM, Storage Area Networks, Traffic Engineering Planning, WAP, Tiny OS, NEST Cellular Network, Multimedia Over Internet, RTP, RSVP, Tuning RED for Web Traffic, XCP, Skype, Internet Telephony, Enterprise Network Security, SNAT, DNAT.

Text Book:

1. Computer Networks (4th edition), Andrew Tanenbaum, Prentice Hall

Reference Books:

1. Computer Networking- A Top-Down approach, 5th edition, Kurose and Ross, Pearson
2. Computer Networks- A Top-Down approach, Behrouz Forouzan, McGraw Hill
3. Computer Networking and the Internet,Fred Halsall, Addison Wesley
4. Data Communications and Networking, Behrouz Forouzan, McGraw Hill
5. TCP/IP Protocol Suite (3rd edition), Behrouz Forouzan, McGraw Hill

Practical's List:

1. Simulate cyclic redundancy check (crc) error detection algorithm (crc) for noisy channel.
2. Simulate and implement stop and wait protocol for noisy channel.
3. Simulate and implement go back n sliding window protocol.
4. Simulate and implement selective repeat sliding window protocol.
5. Simulate and implement distance vector routing algorithm.
6. Simulate and implement dijkestra algorithm for shortest path routing.

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7. Programs for ip address conversion function
8. Client server applications using inter process communication and synchronous
    a. Mechanisms fifo, Message queues, Shared memory
9. Connection oriented client server applications with tcp
10. Connectionless client server applications with UDP
11. Programs using rpc remote procedure call
12. Client server applications using concurrent server
13. Client server applications using multi protocol server.

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