SARDAR PATEL UNIVERSITY
Programme & Subject: M.Sc (Electronics & Communication)
Semester: IV
Syllabus with Effect from: June - 2023 - 24

Paper Code: PS04CELC51	**Total Credit: 4**
Title Of Paper: Mobile Communication	

Unit	Description in detail	Weightage (%)
I	Introduction to cellular mobile system, a basic cellular system, performance criteria, Uniqueness of mobile radio environment, Operation of cellular systems, Planning of cellular system, Elements of Cellular Radio System Design: General description of problem, Concept of frequency reuse, channels, Co channel interference, reduction factor, Hand off mechanisms, Cell splitting, Consideration of the components of cellular systems.	25%
II	Co-channel Interference, Co-channel interference measurement at mobile radio transceivers, Design of antenna system Omni directional and directional, Reduction of cochannel interference. Problem related to Cellular System Design. Types of Non co-channel interference- adjacent channel Interference, Near-End- Far-End interference, Effects on Near-End mobile units, Cross-Talk, Effects on coverage and interference by applying power decrease	25%
III	Cell coverage for signal and traffic, Obtaining the mobile point-to-point model, Propagation over water or flat open area, foliage loss, propagation in near in distance, long distance propagation, Cell site antenna heights and signal coverage cells, Mobile-to-mobile propagation.	25%
IV	Frequency management and Channel Assignment: Frequency management, Frequency spectrum utilization, Setup channels, Fixed channels assignment, Nonfixed channel assignment algorithms, Traffic and channel assignment. Handoffs and Dropped Calls: Types of Handoff, Cell-site Handoff and Intersystem Handoff, Dropped Call Rate. Digital Cellular System: GSM, Architecture, Multiple Access Scheme: CDMA, Introduction to CDMA	25%

Basic Text & Reference Books:-

- Cellular and Mobile Communication: W.C.Y.Lee, McGraw Hill.
- Wireless Communication: Rappaport, Pearson Education

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Paper Code: PS04CELC52	**Total Credit: 4**
Title Of Paper: 8051 Microcontroller Programming & Its Application	

Unit	Description in detail	Weightage (%)
I	Introduction, microcontroller and microprocessor, the 8051 family, architecture, pin description, 8051 assembly language programming, program counter and ROM space in 8051, 8051: data types, flag bits, PSW register, register banks, stack, addressing modes	25%
II	Loop instructions, jump instructions, call instructions, arithmetic instructions, logic and compare instructions, rotate instructions, data serialization, time delay for various 8051 chips, 8051 I/O programming	25%
III	Programming 8051 timers, counter programming, serial communication, 8051 connection to RS232, 8051 serial port programming	25%
IV	8051 Interrupts, programming timer interrupts, programming external hardware interrupts, programming the serial communication interrupt, LCD interfacing, keyboard interfacing, parallel and serial ADC, DAC interfacing.	25%

Basic Text & Reference Books:-

- The 8051 Microcontroller and Embedded systems: Mazidi & Mazidi, Pearson Prentice Hall.
- Microcontroller: Architecture, programming and application: Kenneth Ayala.

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Paper Code: PS04CELC53	**Total Credit: 4**
Title Of Paper: Telecommunication Switching System	

Unit	Description in detail	Weightage (%)
I	Evolution of Telecommunication, Simple Telephone Communication, Basic of a Switching System, Rotary Dial Telephone, Signaling Tones, Stronger Switching Components. Step-by-Step Switching, Design Parameters	25%
II	Principals, of Common Control, Touch Tone Dial Telephone, Principals of Crossbar Switching. Crossbar Switch Configurations, Cross point Technology	25%
III	Stored Program Control, Centralized SPC, Distributed SPC, Enhanced Services, Two-Stage Networks, Three-Stage Networks, Basic Time Division Space Switching, Basic Time Division Time Switching, Time Multiplexed Space Switching, Time Multiplexed Time Switching Combination Switching, Twice - Stage Combination Switching.	25%
IV	Network Traffic Load and Parameters. Grade of Service and Blocking Probability. Modeling Switching Systems, Incoming Traffic and Service Time Characterization, Blocking Models and Loss Estimates. Delay Systems.	25%

Basic Text & Reference Books:-

- Telecommunication Switching System and Networks: Thiagarajan Viswanathan, Prentice Hall India.
- Principles of Communication Systems: Taub & Schilling, Tata McGraw Hill.

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Paper Code: PS04CELC54	**Total Credit: 4**
Title Of Paper: Practical - I	

	Description in detail	Weightage (%)
1	Practical based on Microcontroller 8051.	
2	Practical based on Microcontroller 8051.	
3	Practical based on Microcontroller 8051.	
4	Practical based on Microcontroller 8051.	
5	Practical based on Microcontroller 8051.	
6	Practical based on Microcontroller 8051.	
7	Practical based on Microcontroller 8051.	
8	Practical based on Microcontroller 8051.	
9	Practical based on Microcontroller 8051.	
10	Practical based on Microcontroller 8051.	
11	Practical based on Microcontroller 8051.	
12	Practical based on Microcontroller 8051.	

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Paper Code: PS04EELC51	**Total Credit: 4**
Title Of Paper: Image Processing	

Unit	Description in detail	Weightage (%)
I	Gray scale and colour Images, image sampling and quantization. Two dimensional orthogonal transforms - DFT, FFT, WHT, Haar transform, KLT, DCT, filters in spatial and frequency domains, histogram-based processing, homomorphic filtering.	25%
II	Non parametric and mode! based approaches, LOG filters, localisation problem. Image Restoration - PSF, circulant and block - circulant matrices, deconvolution, restoration using inverse filtering, Wiener Filtering and maximum entropy-based methods.	25%
III	Binary morphology, dilation, erosion, opening and closing, duality relation, gray scale morphology, applications such as hit-and-miss transform, thinning and shape decomposition.	25%
IV	Parallel beam projection, Radon transform, and its inverse. Back-projection operator, Fourier-slice theorem, CBP and FBP methods. ART. Fan beam projection Image communication - JPEG, MPEGs and H 26x standards, packet video, error concealment.	25%

Basic Text & Reference Books:-

- Fundamentals of digital image processing: A. K Jain, Prentice Hall India.
- Computer and Robot Vision, Vol-1: R.M. Haralick, and L.G. S!iauiro, Addison Wesley, Reading.
- Machine Vision: R. Iain, R. Kastun and E.G. Schunck, McGraw- Hill International Edition.
- Digital image processing: W. K. Pratt, Prentice Hall.
- Digital image processing, Vols. 1 and 2: A Rosenfold and A. C. Kak, Prentice Hall.
- Digital image restoration: H. C. Andrew and B. R. Hunt, Prentice Hall.

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Paper Code: PS04EELC52	**Total Credit: 4**
Title Of Paper: Artificial Neural Network	

Unit	Description in detail	Weightage (%)
I	Introduction to Biological neurons and memory, structure and function of single neuron, artificial neural networks,	25%
II	Classification, clustering, vector quantization, pattern recognition, function approximation, forecasting, control, optimization, basic approach of working of ANN- training, learning, generalization.	25%
III	Supervised learning, single layer networks, perception linear separability, training algorithm, limitations, multi layer networks architecture, back propagation algorithm and other training algorithm, applications. Adaptive multilayer network architecture, training algorithms, recurrent networks, feed forward networks, radial basic function network.	25%
IV	Unsupervised learning, winner-takes-all networks, hamming network, maxnet, simple competitive learning, vector- quantization, counter propagation networks, adaptive resonance theory, Kohonen's self-organizing maps, principal component analysis.	25%

Basic Text & Reference Books:-

- Introduction to Artificial Neural Systems: J.M.Zurada, Jaico Publishers.
- Elements of Artificial Neural Networks: Kishan Mehrotra, Chelkuri K. Mohan, and Sanjay Ranka, Penram International.
- Artificial Neural Network: Simon Haykin, Pearson Education.
- Neural Networks- A comprehensive foundation: Simon Haykin, Macmillan publication.
- Neural Networks of Optimization and Signal Processing: A Cichocki and R Unbehauen.