

INDEX SHEET

#	Subject code	Subject	Faculty Handling
1	UE18EC400D	Engineering Management	Prof. Deepak Shyam (MBA Dept.)
2	UE18EC400F	Reconfigurable Computing	Prof. S S Rekha
3	UE18EC400I	Multimedia Communication	Prof. Prajeesha
4	UE18EC400L	Matrix Theory	Dr. Sanjeev G Ms. Ashwini H R
5	UE18EC400M	RISC-V Microprocessor Design and Implementation	Dr. K Sudeendra Kumar

ENGINEERING MANAGEMENT (2-0-0-2)

Subject Code: UE18EC400D

No. of Hours: 26

Faculty: DS / MR

Class #	Chapter Title/Reference Literature	Topics to be Covered	of Portion Covered	
			Reference chapter	Cumulative
UNIT-1				
1-4	Engineering and Management:	Engineering - origin, Management – Definition, management levels, management skills, managerial roles, Functions of managers, Management is Art or Science. Engineering management – synthesis	15	15
UNIT-2				
5-10	Planning, Forecasting, Decision making:-	Methods, Technological forecast Nature of planning, The foundation for planning-Vision, purpose, mission, strategic planning, strategic management of Technology, Goals & objectives, MBO & MBE. Planning concepts. Forecasting-quantitative & qualitative ting, Strategies for managing Technology. Nature of Decision Making. Tools for decision making- under certainty, risk, uncertainty.	23	38
UNIT-3				
11-16	Organizing, Human aspects of organizing, Motivating & Leading Technical people :-	Nature of organizing, Traditional organizational theory-Departmentation, span of control, Impact of the information revolution Authority & Power, Delegation. Motivation- various theories, Leadership-Nature, traits, approaches, styles. Motivating and Leading Technical Professionals.	23	61
UNIT-4				
17-21	Managing the Research Function and Engineering Design:-	Protection of Ideas-patents, trademarks, copy rights, trade secrets, Creativity, Making R&D organization successful, Nature of Engineering Design, Systems Engineering/New Product Development, Design Review, Designing for reliability, Other “Ilites” in design	19.5	80.5

Class #	Chapter Title/Reference Literature	Topics to be Covered	of Portion Covered	
			Reference chapter	Cumulative
UNIT-5				
22-26	Project Planning, acquisition and organization:-	Project Planning, acquisition and organization: - The characteristics of a project, the project proposal process, project planning tools, types of Contracts. The project organization, the project manager, motivating project performance, Controlling cost & schedule	19.5	100

Literature:

Book Type	Title & Author	Publication Info	
		Publisher	Edition
Reference Book 1	“Managing Engineering and Technology”, Babcock and Morse	PHI	3 rd Edition, 2004
Reference book 2	“Management-A Competency based Approach”, Hellriegel, Jackson and Slocum,	Thomson South Western	9 th edition 2001
Reference book 3	“Management”, Harold Koontz and Heinz Weir Rich,	McGraw Hill 2010	9th Edition, 2010
Reference book 4	“Principles of Management “, P.C Tripathi and P.N. Reddy,	McGraw Hill 2008	4 th edition 2008
Reference Book 5	“Management”, Stephen P Robbins, Mary Coulter, Neharika Vohra	Pearson	10 th Edition 2013

RECONFIGURABLE COMPUTING (2-0-0-0-2)

Subject Code: UE18EC400F

No. of Hours: 28

Faculty: SSR

Class #	Chapter Title/Reference Literature	Topics to be Covered	of Portion Covered	
			Reference chapter	Cumulative
Unit 1: Device Architecture				
1	T1: 1.1 Page #: 3-6	Logic—The Computational Fabric	3.5	21
2	T1: 1.2 Page #: 6-8	The Array and Interconnect	3.5	
3	T1: 1.2 Page #:9-12	The Array and Interconnect	3.5	
4	T1: 1.3 Page #:12-16	Extending Logic	3.5	
5	T1: 1.4 Page #:16 -18	Configuration	3.5	
6	T1: 1.4 Page #:16-18	Configuration	3.5	
Unit 2: Reconfigurable Computing Architectures				
7	T1: 2.1, 2.1.1 Page #: 30 -32	Fine-grained Arch. - Garps nonsymmetrical RPF	4	41
8	T1: 2.1.2 Page #: 32 -35	PipeRench Architecture.	4	
9	T1: 2.2, 2.2.1 Page #: 35 - 40	RPF integration to traditional systems - RaPiD	4	
10	T1: 2.2.2 Page #: 40 - 42	Processor + RPF Architectures	4	
11	T1: 2.2.2 Page #: 42-44	Processor + RPF Architectures	4	
Unit 3: Reconfigurable Computing Systems & Management				
12	T1: 3.1 Page #: 47-49	early system, introduction	3.5	62
13	T1: 3.2 Page #: 49-52	PAM, VCC, and Splash,	3.5	
14	T1: 3.3 Page #: 52- 54	Small-scale Reconfigurable Systems	3.5	
15	T1: 3.6 Page #: 59-62	Reconfigurable Supercomputing	3.5	
16	T1: 4.1 -4.2.2 Page #: 65-70	Reconfiguration Management: Configuration Architectures	3.5	
17	T1: 4.2.3- 4.2.6 Page #: 70 -75	Reconfiguration Management: Configuration Architectures	3.5	

Class #	Chapter Title/Reference Literature	Topics to be Covered	of Portion Covered	
			Reference chapter	Cumulative
Unit 4: Compute Models and System Architectures & Programming				
18	T1: 4.3 – 4.3.3 Page #: 75 -79	Managing the Reconfiguration Process	3.5	82
19	T1:4.3.4 - 4.4 Page #: 79 -82	Reducing Configuration Transfer Time	3.5	
20	T1: 6.1 – 6.1.3 Page #:129-138	Programming FPGA Applications in VHDL: VHDL Programming	3	
21	T1: 6.1.4 Page #:138-149	Programming FPGA Applications in VHDL: VHDL Programming	3	
22	T1: 5.1 – 5.1.4 Page #: 91 -105	Compute Models, System Architectures	3.5	
23	T1: 5.2 – 5.2.2 Page #:105-118	Compute Models, System Architectures	3.5	
Unit 5: Mapping Designs to reconfigurable platforms				
24	T1: 13.1–13.1.2 Page #:276-282	Technology Mapping: Structural Mapping Algorithms,	3.5	100
25	T1:13.1.3–13.1.4 Page #:282-284	Structural Mapping Algorithms,	4	
26	T1:13.2 –13.2.2 Page #:284-287	Integrated Mapping Algorithms,	3.5	
27	T1: 13.2.3 Page #:287-291	Integrated Mapping Algorithms,	3.5	
28	T1: 13.3 Page #:291-293	Mapping Algorithms for Heterogeneous Resources	3.5	

Note: Page# mentioned are with reference to the soft copy of textbook

Literature:

Book Type	Author & Title	Publication info
		Publisher
Text	“Reconfigurable Computing”, Scout Hauck and Andre Dehon,	Elsevier, 2008.
Reference	“Partial Reconfiguration on FPGAs Architectures, Tools and Applications”, Dirk Koch.	Springer, 2013.
Reference	“Multicore Technology: Architecture, Reconfiguration and Modeling”, Muhammad Yasir Qadri, Stephen J. Sangwine,	CRC Press, 2014.

MULTIMEDIA COMMUNICATION (2-0-0-2-2)

Subject Code: UE18EC400I

No. of Hours: 28

Faculty: PR

Class #	Chapter Title/Reference Literature	Topics to be Covered	of Portion Covered	
			Reference chapter	Cumulative
1-6 06 hrs	UNIT I Multimedia Communications T1: 1.1- 1.5	Introduction Multimedia information representation Multimedia networks Multimedia applications Media types Communication modes Network types Multipoint conferencing Network QoS Application QoS.	21	21
7- 11 5 hrs	UNIT II Multimedia Information Representation T1: 2.1-2.6	Introduction Digital principles Text Images Audio Video	18	39
12-17 6hrs	UNIT III Text And Image Compression T1: 3.1-3.4	Introduction Compression principles Text compression Image compression	21	60
18- 23 6hrs	UNIT IV Audio And Video Compression T1: 4.1-4.4	Introduction Audio compression DPCM ADPCM APC LPC Video compression Video compression principles H.264 H.265 MJPEG.	21	81
24 - 28 5hrs	UNIT V Multimedia Information Networks T1: 8.1-8.8	Introduction LANs Ethernet Token ring Bridges FDDI High-speed LANs LAN protocol	19	100

Text Books:

1. "Multimedia Communications: Applications, Networks, Protocols, and Standards", Fred Halsall, 1st Edition, Addison Wesley, 2000.
2. "Multimedia Information Networking", Nalin K. Sharda, PHI, 2003.

Reference Books:

1. "Multimedia Fundamentals: Vol 1 – Media Coding and Content Processing", Ralf Steinmetz, Klara Narstedt, Pearson Education, 2004.
2. "Multimedia Systems Design", Prabhat K. Andleigh, Kiran Thakrar, PHI, 2004.
3. "Fundamentals of Multimedia", Ze-Nian Li and Mark S. Drew, Pearson Education, 2004.

MATRIX THEORY (2-0-0-0-2)

Subject Code: UE18EC400L

No. of Hours: 28

Faculty: SG / AHR

Pre-Requisite Course: Nil

Class #	Chapter Title/Reference Literature	Topics to be Covered	Portions Covered	
			Reference chapter	Cumulative
1	UNIT-I Matrix as a Linear Transformation (T: Chap. 0, R: Chaps. 3,4,6)	Vector spaces, Linear transformation, Matrix multiplication, Linear independence, Basis, Fundamental theorem of linear algebra, Rank-nullity theorem	17.85	17.85
2		Gaussian elimination, LU decomposition, Inner products, Cauchy-Schwarz inequality		
3		Orthogonality, Gram-Schmidt and QR decomposition		
4		Determinants and properties		
5		Lab session using Python		
6	UNIT-II Matrix Norms (T: Chap. 5, R: Chap. 5)	Norms and inner products	25.00	42.85
7		equivalence of matrix norms, dual norm		
8		Matrix norms, Induced norms		
9		Spectral norm and spectral radius		
10		Properties of spectral norm, Equivalence of matrix norms		
11		Lab session using Python		
12	Applications: OMP			
13	UNIT-III Similar Matrices (T: Chap. 1, R: Chap. 7)	Eigenvalues and eigenvectors	17.85	60.7
14		Similarity in matrices, Diagonalizability		
15		Eigenspace, Algebraic and geometric multiplicities		
16		Unitary equivalence, Related problems		
17		Lab session using Python		
18	UNIT-IV Matrix Decompositions (T: Chap. 2)	Schur 's triangularization, Cayley-Hamilton theorem	10.71	71.41
19		Quadratic form, Nilpotent matrices, Index of a matrix		
20		Normal matrices, Unitary diagonalizability		

Class #	Chapter Title/Reference Literature	Topics to be Covered	Portions Covered	
			Reference chapter	Cumulative
21	UNIT-V Use Cases and Theorems (T: Chap. 3,4,7)	Jordan canonical form, SVD	28.57	100
22		Least-squares, Cholesky decomposition		
23		Principal Component Analysis		
24		Hermitian matrices, Positive Definite Matrices, Rayleigh-Ritz		
25		Lab session using Python		
26		Applications: Least squares and Cholesky decomposition, SVD in a MIMO setup		
27		Applications: PCA in Image processing		
28		Revision and an overall summary		

References:

Book Type	Code	Title & Author	Publication info	
			Publisher	Edition
Text Book	T	Matrix Analysis by R. A. Horn and C. R. Johnson	Cambridge University Press	2
Reference Book	R	Matrix Analysis and Applied Linear Algebra by Carl D Meyer	SIAM: Society for Industrial and Applied Mathematics	-

RISC-V PROCESSOR DESIGN AND IMPLEMENTATION (2-0-0-2-2)

Subject Code: UE18EC400M

No. of Hours: 28

Faculty: KSK

Class #	Chapter Title/Reference Literature	Topics to be Covered	of Portion Covered	
			Reference chapter	Cumulative
1	I RISC-V Ecosystem	History of RISC-V	15	15
2		RISC-V Community and Ecosystem		
3		Open-source ISA		
4-5		Difference between ARM and RISC-V ISA		
6	II RISC-V ISA	ISA of RISC-V	33	48
7		Memory and Arithmetic Operands		
8		RISC-V Fields and Logical Operations		
9		Addressing Modes -I		
10		Addressing Modes -II		
12		RISC-V Variants based on Addressing modes		
13		Implementation of ISA (Demo)		
14		Implementation of ISA (Demo)		
15		Special Addressing modes and applications		
16	III RISC-V Architecture Design	Building Datapath	23	71
17		Clocking methodology		
18		ALU design and control		
19		Pipelining -1		
20		Pipelining -2		
21		Implementation of Datapath Demo		
22	Implementation of ALU control Demo			
23	IV RISC-V Verification	Agile approach to build RISC-V microprocessor	17	88
24		Specification and testing of RISC-V ISA Compliance		
25		RISC -V Tool chain		
26		ALP Development and Demo		
27	Code and Functional Coverage			
28	V RISC-V Case Studies	Customizing RISC V (IoT and Functional Safety)	12	100
29		Security and POSIT Extensions to RISC-V		
30		Data Centre applications		

Text Books and References:

1. Patterson and Hennessy, "Computer Organization, RISC-V Edition", Elsevier, 2017.
2. Research Papers and Whitepapers prescribed by the instructor.