

CURRICULUM FRAMEWORK (ELECTRONICS ENGINEERING)

MIT Academy of Engineering (An Autonomous Institute)			COURSE STRUCTURE (2016 - 2018)			
DEPARTMENT OF ELECTRONICS ENGINEERING			W.E.F	:	2016-17	
FY MTECH			RELEASE DATE	:	1/06/2016	
			REVISION NO.	:	0.0	
TRIMESTER: I						
SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	T	CREDIT
1.	PC1	AS501	Computing and Mathematics	2	2	4
2.	PC2	CS501	Management System	2	2	4
3.	PC3	CS502	Modern Technologies	2	2	4
TOTAL				06	06	12
TRIMESTER: II						
SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	PC4	EX501	Research Methodology	2	-	2
2.	DC1	EX511	Advance Embedded Architecture & Processor	3	2	4
3.	DC2	EX512	Analog CMOS Design	3	2	4
TOTAL				08	04	10
TRIMESTER: III						
SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	PC5	EX502	Technical Writing	2	-	2
2.	DC3	EX521	Real Time Operating System & Design	3	2	4
3.	DC4	EX522	Digital CMOS Design	3	2	4
4.	DC5	EX523	Project Work - I	-	4	2
TOTAL				08	08	12



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RELEASE DATE : 1/06/2017

REVISION NO. : 0.0

TRIMESTER: IV

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC6	EX63#	Elective course I – Refer Annexure	3	—	3
2.	DC7	EX64#	Elective course II– Refer Annexure	3	—	3
3.	DC8	EX601	Project Work - II	—	08	4
TOTAL				06	08	10

TRIMESTER: V

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC9	EX611	Project Work - III	—	20	10
TOTAL				—	20	10

TRIMESTER: VI

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
5.	DC10	EX621	Project Work - IV	—	20	10
TOTAL				—	20	10



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CREDITS					
1 Lecture hour = 1 Credit 2 Lab Hours = 1 Credit 1 Tutorial Hour = 1 Credit					
SL. NO.	YEAR	TRIMESTER			TOTAL
		1	2	3	
1.	First Year	12	10	12	34
2.	Second Year	10	10	10	30
TOTAL					64

CONTACT HOURS					
SL. NO.	YEAR	TRIMESTER			TOTAL
		1	2	3	
1.	First Year	12	12	16	40
2.	Second Year	14	20	20	54
TOTAL					94



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Annexure

Elective Course I : 1 Course		
Sl. No.	Course Code	Course
1	EX631	Embedded Network Design
2	EX632	Distributed System
3	EX633	Optimal Control

Elective Course II : 1 Course		
Sl. No.	Course Code	Course
1	EX641	Image Processing
2	EX642	ASIC Design
3	EX643	Reconfigurable computing



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 MIT Academy of Engineering (An Autonomous Institute)		COURSE SYLLABI (2016 -2018)	
DEPARTMENT OF ELECTRONICS ENGG.		W.E.F. :	2016-17
FY M.TECH.		COURSE NAME :	Computing and Mathematics
		COURSE CODE :	AS501
		COURSE CREDIT :	4
RELEASE DATE :	1/06/2016	REVISION NO. :	0.0

TEACHING SCHEME :		EVALUATION SCHEME :					
LECTURE	TUTORIAL	THEORY			PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
		ITA	ETA	IA			
2	2	40	50	10	Nil	Nil	100

PRE-REQUISITE:
Nil

COURSE OBJECTIVES:
<ol style="list-style-type: none"> AS501.CEO.1: To learn different numerical methods to solve differential equations and obtain the solution. AS501.CEO.2: To understand different sampling techniques, analyze the data and process it to obtain a quality product. AS501.CEO.3: To learn mathematical methodologies, techniques and mathematical tools to obtain an optimal solution of the problems.

COURSE OUTCOMES:
The students after completion of the course will be able to
<ol style="list-style-type: none"> AS501.CO.1: Identify the accurate solution method (minimizing the error) to solve the differential equation with given conditions and obtains the particular solution of the problem.




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2. AS501.CO.2: Collect, categorize, analyze, processing mathematically the data, thereby to obtain a quality proven product.
3. AS501.CO.3: Understand the physical situation, identify the accurate mathematical model and solve the problem mathematically or with the use of Statistical tools available and finally interpret it in the original context.

THEORY:

Unit I	Computational Methods to Ordinary Differential Equations	8 Hours
Euler's Method, Heun's Method, Mid- point Method, Runge-Kutta Method and Multi step Methods- Explicit Adams-Bash forth technique and Implicit Adams-Moulton techniques, Adaptive RK Method, Embedded RK Method, Higher Order Ordinary differential equation- Shooting Method.		
Unit II	Operations Research	8 Hours
Simplex method: Feasible solution to system of equations, reduction of feasible to basic feasible solution, solution of LPP: computational procedure, Penalty (Big M) method. Transportation problem: North-West corner method, Least-cost method, Vogel's approximation method.		
Unit III	Statistics and Quality Control	8 Hours
Central Tendency of data, Variance, Standard Deviation, Coefficient of Variance, Moments, Correlation, Coefficient of Correlation, Regression lines. Control Charts for Process Location: \bar{X} Chart, Control Charts for Process Variation: S Chart, R charts.		

PRACTICAL:

Tutorial No. 1	Title	2 Hours
Introduction to first order first degree Differential equation and its actual solution.		
Tutorial No. 2	Title	2 Hours
Euler's Method, Heun's Method, Mid- point Method, Runge-Kutta Method.		
Tutorial No. 3	Title	2 Hours
Adams-Bash forth technique and Implicit Adams-Moulton techniques.		
Tutorial No. 4	Title	2 Hours
Adaptive RK Method, Embedded RK Method, Shooting Method.		
Tutorial No. 5	Title	2 Hours




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Solution of system of equations using simplex method (Feasible soln).		
Tutorial No. 6	Title	2 Hours
Solution of system of equations using simplex method (Feasible to basic feasible soln).		
Tutorial No. 7	Title	2 Hours
Transportation problem: North-West corner method, Least-cost method.		
Tutorial No. 8	Title	2 Hours
Transportation problem: Vogel's approximation method.		
Tutorial No. 9	Title	2 Hours
Central Tendency of data, Variance, Standard Deviation		
Tutorial No. 10	Title	2 Hours
Moments, Correlation, Coefficient of Correlation.		
Tutorial No. 11	Title	2 Hours
Regression Lines.		
Tutorial No. 12	Title	2 Hours
\bar{X} Chart, S Chart, R chart.		

TEXT BOOK:

1. Numerical Methods for Engineers by Steven C. Chapra & Raymond P. Canale, sixth edition, ISBN 978-0-07-340106-5, MHID 0-07-340106-4.
2. Operations Research by Kanti Swarup, P.K. Gupta, Man Mohan, ISBN: 81-8054-226-2.
3. Statistical Methods Vol. 2 by Das, ISBN:9780070263512.

REFERENCES:

1. Numerical Methods by V.N. Vedamurthy & N.Ch.S.N. Iyenger, First edition, ISBN: 9788125906308.
2. Operations Research by S.D. Sharma.
3. Statistical Methods Vol. 1 by Das, ISBN:9780070263505.
4. Introduction to Probability and Statistics by Milton, ISBN: 9780070636941.

Research Paper :

1. The numerical analysis of ordinary differential equations: Runge-Kutta and general linear methods, JC Buckner,dl.acm.org, 1987.




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2. Operations Research: Applications and Algorithms, WL Winston and JB Goldberg, 2008
3. AHA Statistical Update, AS Go, D Mozaffarian, VL Roger, EJ Benjamin... - Circulation, 2013 - Am Heart Assoc.

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DEPARTMENT OF ELECTRONICS
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W.E.F. : 2016-17

FY MTECH

COURSE NAME : Management System

COURSE CODE : CS501

COURSE CREDIT : 4

RELEASE DATE : 1/06/2016

REVISION NO. : 0.0

TEACHING SCHEME :

EVALUATION SCHEME :

LECTURE	TUTORIAL	THEORY			PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
		ITA	ETA	IA			
2	2	40	50	10	Nil	Nil	100

PRE-REQUISITE:

Nil

COURSE OBJECTIVES:

1. CS501.CEO.1: To enable post graduate students for efficiently discharging the business roles they may be entrusted with and for effectively handling situations they may encounter in their businesses or professional career by imparting them with essential knowledge and skills.
2. CS501.CEO.2: To inculcate a spirit of entrepreneurship by promoting inquisitiveness for technological innovations, their conversion into business ideas and evolving strategy for induction of new products in new markets for growth of their entrepreneurial projects.

COURSE OUTCOMES:

The students after completion of the course will be able to

1. CS501.CO.1: Describe and explain the internal and external environment which may affect their business.




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2. CS501.CO.2: Critically analyze the organizational structure, systems, competencies and weaknesses of their organization and identify areas for improvement.
3. CS501.CO.3: Draw a model of and analyze the power structure and potential change agents which may take an organization to greater heights
4. CS501.CO.4: Identify and describe inherent and potential problem areas and proactively create and install measures to avert likely disastrous situations.
5. CS501.CO.5 : Provide effective leadership to their group, for achievement of their assigned tasks and remain integrated to the organization they belong to.
6. CS501.CO.6: Identify areas of growth and development of knowledge workers in their organization.
7. CS501.CO.7: Create a conducive managerial environment in their organizations with spirit of cooperation, collaboration and better understanding.

THEORY:

UNIT	24 Hours
<p>Concept of Systems; Nature, Process and Principles of a Management. Role of a Business Firm as a national economic entity with understanding of Macro, Micro and International economics. An understanding of products and services, circular model of flow of money, products and services in a society. Functioning and growth of a business unit with understanding of Break-Even Analysis, Abell's Three Dimensional model of business growth, various business functions in an organization and changing focus from product oriented business to customer orientation and value co-creation. Schools of Thought on Management based on changing concepts of economics and evolution of Business Strategy. Need to understand innovative ways to evolve a new suitable management system for an organization with special focus on new Strategies at the bottom of the pyramid, quality as strategy, disruptive innovation and diffusion of technology. Human Relations practices in organizations with preponderance of knowledge workers, development and training for leadership, motivation and conflict management. Concept of Invention and Innovation, Entrepreneurship and technology management for induction of new products in market. Business startups and growth in current Indian Environment. Presentation on Entrepreneurial plans.</p>	

PRACTICAL/ TUTORIAL:

Tutorial No. 1	Title	4 Hours
<p>A corporate management case to be selected by students out of several cases given to them well in time, for their study research analysis and presentation, to be evaluated</p>		




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faculty.		
Tutorial No. 2	Title	4 Hours
Preparation and submission of an innovative and entrepreneurial Business Plan of student's choice, presenting and defending it before the class, to be evaluated by two peers. Faculty will modulate the evaluations.		
Tutorial No. 3	Title	4 Hours
Written presentation of Business plan (Soft copy)		

TEXT BOOK:

1. Harold Koontz, Heinz Wehrichand Mark V-Cannice, "Management –A Global and Entrepreneurial Perspective" , Tata McGraw Hill Publications, 12th Edition, 2008. ISBN : 9780070660199
2. Vachaspati Mishra , "Management and Entrepreneurship in Indian Environment – A Perspective through Joining the Dot" , Himalaya Publishing House, First Edition, 2016. ISBN : 978-93-5262-132-3

REFERENCES:

1. Dr A Sivathanu Pillai , "Technology Leadership – A Revolution in the Making" , Tata McGraw Hill Publishing Company Ltd, New Delhi, Third edition , 2005 , ISBN : 9780070583283
2. James A Alexander and Mark W Hordes , "S-Business: Reinventing the Services Organisations," , Select Books Inc Biztantra, 2006 , ISBN : 978-1590790540
3. Vohra ND, "Quantitative Techniques in Management", Tata McGraw Hill Publishing Company Limited, Third Edition 2007 , ISBN : 978-0070146730.
4. Nakkiran S and Karthikeyan M , "Training Techniques for Management Development" , Deep and Deep Publications Pvt Ltd; 2007 , ISBN : 9788176299725
5. Arvind Pangariya; INDIA, " The Emerging Giant" , Oxford University Press, Indian Edition, 2nd Edition , 2008 , ISBN : 978-0199751563.
6. Prahalad, CK and Krishnan MS, "The New Age of Innovation - Driving Co-Created Value Through Global Networks" , Tata McGraw-Hill , 2008, ISBN : 978-0070248618
7. Joe Tidd, John Bessant and Keith Pavitt, "Managing Innovation – Integrating Technological, Market and Organisational Change" ,Wiley India, Third Edition, 2011 , ISBN : 978-8126557134.
8. Sushama Khanna , "Understanding Organisational Behaviour" , Oxford University




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Press, Third Edition, 2012, ISBN : 978-0199454716.


9. Kazmi, Dr Azhar and Dr Adela, "Strategic Management", Fourth Edition (Tata McGraw-Hill Education (India) Private Limited, 2015

Research Paper :

1. Kshetri, Nir, "The Indian Environment for Entrepreneurship and Small Business Development" in StudiaNegotia, 56 (LVI), 4, 2011, 35-52
2. Management systems: purpose and benefits <http://www.thecqi.org/Knowledge-Hub/Knowledge-portal/Corporate-strategy/Management-systems/>



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DEPARTMENT OF ELECTRONICS ENGG.		W.E.F. :	2016-17	
FY M.TECH.		COURSE NAME :	Modern Technologies	
		COURSE CODE :	CS502	
		COURSE CREDIT :	4	
RELEASE DATE	:	1/06/2016	REVISION NO. :	0.0

TEACHING SCHEME :		EVALUATION SCHEME :					
LECTURE	TUTORIAL	THEORY			PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
		ITA	ETA	IA			
2	2	40	50	10	Nil	Nil	100

PRE-REQUISITE:
Nil

COURSE OBJECTIVES:
<ol style="list-style-type: none"> 1. CS502.CEO.1: To get familiar with big data, wireless sensor networks and Internet of Things technology. 2. CS502.CEO.2: To acquire the knowledge of geometrical transformation and grasp the animation techniques. 3. CS502.CEO.3: Study basic principles of nano car and different modern technologies. 4. CS502.CEO.4: Apply their knowledge to understand different statistical tools and analysis software.

COURSE OUTCOMES:
The students after completion of the course will be able to
<ol style="list-style-type: none"> 1. CS502.CO.1: Understand the knowledge of advanced software's. 2. CS502.CO.2: Apply their knowledge in different fields. 3. CS502.CO.3: Apply advance technologies in automobile industry.




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THEORY:**Unit I****24 Hours**

Big Data: Big Data, Hadoop Distributed File System, Network: Types of Networks, Internet Architecture, Wired and Wireless MAC, RFID, Internet of Things, IoT Applications, R Programming.

2D and 3D Geometrical Transformations: Scaling, Translation, Rotation, Reflection, Viewing Transformations: Parallel and Perspective Projection, Curves and Surfaces: Cubic Splines, Bezier Curves, B-Splines, Animation Technology – OpenGL, Maya, Blender.

Advance technologies: Nano Car Air velocity, Air conditioning system, Different modern energy storage devices, Modern evacuated tube technologies, Advanced Sensor technology, recent photovoltaic technology, Controlling of thermal power plants and its instrumentation, Agricultural robot, Closed ecological systems, Artificial photosynthesis, Energy harvesting.

Modern statistical tools like MATLAB, SPSS, etc., Mathematical Modeling, Data interpretation technologies like ANOVA, Introduction of Analysis software's like ANSYS, Star CD, etc., ERP system, SCADA, PLC System, Electronic Control Unit (ECU), Sources of Energy storage, fuel efficient engine through closed loop control system. Advances in Electronic Cooling Equipment's, Bio-medical devices, their Applications, FDA approval procedures, A Certification.

Advances in automotive electronics: Night vision systems, Driver alertness monitoring, Event data recorders (automotive black boxes), Accident recorders, Adaptive cruise control systems, Autonomous emergency braking systems, Electronic throttle control, On-Board diagnostics systems, Blind spot detection, Navigation systems, Communication systems, Engine control.

PRACTICAL/ TUTORIAL:**Tutorial No. 1****Title****2 Hours**

Case study on Animation Technologies

Tutorial No. 2**Title****2 Hours**

Case study on Wireless Sensor Application.

Tutorial No. 3**Title****2 Hours**

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Arduino, Raspberry Pi and BeagleBone Black", McGraw-Hill Education, ISBN-13: 978-0071835206, 2015.

4. Madhu Jagadeesh, Soumendra Mohanty, Harsha Srivatsa, "Big Data Imperatives: Enterprise Big Data Warehouse, BI Implementations and Analytics", First Edition, Apress, ISBN-13: 978-1430248729, 2013.
5. Nihal Kulratna, "Energy storage devices for electronics system", Academic Press, Second Edition, ISBN: 978-0-12-407947-2, 2015.
6. Ralph Remsburg, "Advanced thermal design for electronics equipment", International Thomson Publishing Thomson Science, ISBN: 978-1-4613-4633-3.
7. Asier Perallos, Unai Hernandez-Jayo, Enrique Onieva, Ignacio Julio Garca Zuazola, John Wiley and sons, "Intelligent Transport Systems: Technologies and Applications", ISBN: 978-1-118-89478-1, 2015.
8. Galip Ulsoy, Huei Peng, Melih Çakmakci, "Automotive Control Systems", Cambridge 2012. ISBN : 978110701011.

Research Paper :

- 1 Jayavardhana Gubbi, Rajkumar Buyya "Internet of Things (IoT): A Vision, architectural elements and future directions", Elsevier Journal on Future Generation Computer Systems, 29, pages 1645-1660, 2013.
- 2 Madden, Sam. "From databases to big data", Article, IEEE, Internet Computing, IEEE 16.3 (2012): 4-6, <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6188576>.
- 3 Daryl Oster, Masayuki Kumada, Yaoping Zhang, "Evacuated tube transport technologies (ET3) tm: a maximum value global transportation network for passengers and cargo." 2013, Journal of Modern Transportation, ISSN: 2196-0577.
- 4 All Bahrami, Shahram Mohammad nejad, Saeede Soleimaninezhad "Photovoltaic cells technology: principles and recent developments", Springer US, Online ISSN: 1572-817X, 2012.
- 5 Martin Kaiser, "Electronic control unit (ECU)", Springer US, Online ISBN 978-3-658-03964-6, pages 254-259, 2015.
- 6 Pritpal Singh, Tanjot Sethi, Bunil Kumar Balaban taray, Bibhuti Bhushan Biswal, "Advanced vehicle security system", IEEE, International Conference on "Innovations in Information, Embedded and Communication Systems (ICIIECS)", pages 1-6, 2015.
- 7 Hermann Kopetz, Stephan Poledna, "Autonomous Emergency Braking: A System-of-Systems perspective", IEEE, Conference on "Dependable Systems and Networks Workshop (DSN-W)", 43rd Annual IEEE/IFIP, pages 1-7, 2013.



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Case study on IoT (Smart City, Healthcare, Agriculture).		
Tutorial No. 4	Title	2 Hours
Case study on Big Data – Hadoop Configuration.		
Tutorial No. 5	Title	2 Hours
Case study on Data interpretation technologies.		
Tutorial No. 6	Title	2 Hours
Case study on Agricultural robot.		
Tutorial No. 7	Title	2 Hours
Case study on Electronic cooling equipment.		
Tutorial No. 8	Title	2 Hours
Case study on Adaptive cruise control system.		

TEXT BOOK:


1. S. Harrington, S. Harrington, "Computer Graphics", 2nd Edition, McGraw-Hill Publications, 1987, ISBN 0 – 07 –100472 – 6.
2. Anthony F. Collings , Christa Critchley,"Artificial Photosynthesis: From Basic Biology to Industrial Application." 2014, ISBN: 978-3-527-31090-6.
3. NasimulAlam Syed, Sanjib Islam, Saroj Kumar Patel, "Advanced Guide to MATLAB: Practical Examples in Science and Engineering" I K International Publishing House Pvt. Ltd., 2015, ISBN: 978-9384588359.
4. William B. Ribbens, Ph.D., Norman P. Mansour, Gerald Luecke, Charles W. Battle, Edward C. Jones and Leslie E. Mansir, "Understanding Automotive Electronics", ISBN: 978-0-7506-7599-4.
5. Bosch Automotive Electrics and Automotive Electronics: Systems and edited by Robert Bosch GmbH, Springer science and digital media, ISBN-13: 978-3658017835, 2013.

REFERENCES:

1. J. Foley, V. Dam, S. Feiner, J. Hughes, "Computer Graphics Principles and Practice", 2nd Edition, Pearson Education, 2003, ISBN 81 – 7808 – 038 – 9.
2. Robert Faludi, "Building Wireless Sensor Network" Second Edition, O'Reilly Publication, 2010. ISBN : 978-1784395582.
3. Donald Norris, " The Internet of Things: Do-It-Yourself at Home Projects for




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 MIT Academy of Engineering (An Autonomous Institute)		COURSE SYLLABI (2016 -2018)	
DEPARTMENT OF ELECTRONICS ENGG.		W.E.F. :	2016-17
FY MTECH		COURSE NAME :	Research Methodology
		COURSE CODE :	EX501
		COURSE CREDIT :	2
RELEASE DATE :	1/06/2016	REVISION NO. :	0.0

TEACHING SCHEME :		EVALUATION SCHEME :					
LECTURE	TUTORIAL	THEORY			PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
		ITA	ETA	IA			
2	Nil	40	50	10	Nil	Nil	100

PRE-REQUISITE:
Nil

COURSE OBJECTIVES:
<ol style="list-style-type: none"> 1. EX501.CEO.1: To develop understanding of the basic framework of research process. 2. EX501.CEO.2: To develop an understanding of various research designs and techniques. 3. EX501.CEO.3: To identify various sources of information for literature review and data Collection. 4. EX501.CEO.4: To develop an understanding of the ethical dimensions of conducting applied research. 5. EX501.CEO.5: Appreciate the components of scholarly writing and evaluate its quality.

COURSE OUTCOMES:
The students after completion of the course will be able to




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1. EX501.CO.1: Illustrate the objective & paradigm for the research.
2. EX501.CO.2: Establish & validate the results & analysis.
3. EX501.CO.3: Explore the ethical issues concerning the participation & data collection.

THEORY:

Unit I	Research - Introduction	6 Hours
What is research, Research definition, Objective & paradigm for the research, Terminologies, Identifying & defining the research problem, Type of research, Literature & its analysis, Development of theoretical and conceptual frame work, Ethical Issues concerning research participants, Ethical issues in data collection, Data collection methods.		
Unit II	Hypothesis, Data processing	6 Hours
What is Hypothesis - Definition and functions of hypothesis, Processing operations, Different types of Hypothesis, Problems in data processing, Coding descriptive data and quantitative data, Sampling techniques.		
Unit III	Statistics in research	6 Hours
Multivariate analysis, Concept of regression, Establishing validity and reliability of the result, Principal component analysis, variance & covariance- ANOVA, ANOCOVA.		
Unit IV	Writing research proposal	6 Hours
Interpretation and its meaning, Readability of Manuscript, techniques, Contents, Report writing, structure, types of report, Procedure of writing research proposal, Writing as thinking, Habit of writing, Skills and thought process in technical writing, Role of computer in technical writing.		

TEXT BOOK:

1. John W. Creswell, "Research Design-Qualitative & Quantitative Approaches", SAGE publications, New Delhi, Second Edition, ISBN: 0-8039-5254-6
2. Ranjit Kumar, "Research Methodology- A Step by Step Guide for Beginners", Pearson publication, New Delhi, Second edition, ISBN: 978-81-317-0496-7

REFERENCES:

1. C. R. Kothari, "Research Methodology, Methods & Techniques", New Age International Publication, Second Edition, ISBN: 978-81-224-1522-3
2. Hamdy A. Taha, "Operation Research- An Introduction", Pearson Publication,



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W.E.F. : 2016-17

FY MTECH

COURSE NAME : Advanced Embedded Architecture & Processor

COURSE CODE : EX511

COURSE CREDIT : 4

RELEASE DATE : 1/06/2016

REVISION NO. : 0.0

TEACHING SCHEME :

EVALUATION SCHEME :

LECTURE	PRACTICAL	THEORY			PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
		ITA	ETA	IA			
3	2	40	50	10	-	25	125

PRE-REQUISITE:

Nil

COURSE OBJECTIVES:

1. EX 511.CO.1: To review basic organizational and architectural techniques.
2. EX511.CO.1: To learn the performance metrics of microprocessors, memory, networks and disks.
3. EX511.CO.3: To exploit ILP using dynamic scheduling, multiple issue and speculation.

COURSE OUTCOMES:

The students after completion of the course will be able to

1. EX 511.CO.1: Explain pipelining, instruction set architectures, memory addressing.



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Ninth Edition, ISBN : 978-9332518223

Research Paper :

1. Wilson, Shawn, "What is indigenous research methodology?", *Canadian Journal of Native Education*; 2001; 25, 2; ProQuest Central, pp. 175



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2. EX 511.CO.2: Propose various techniques to enhance a processors ability to exploit Instruction-level parallelism (ILP), and its challenges.
3. EX 511.CO.3: Describe multithreading by using ILP and supporting thread-level parallelism (TLP).
4. EX 511.CO.4: Describe TI DSP processor family, Intel® Atom™ Processor N2000 .

THEORY:		
Unit I	Architectural Techniques	16 Hours
Classification of set of architecture, basic parallel processing techniques, classification of parallel architecture, Instruction level parallelism, Dynamic scheduling, Dynamic scheduling using Tomasulo's approach, Hierarchical memory organization, Virtual memory design, RAID, Practical approach of Interconnecting networks, Intel IA-64ILP, Multicore architecture.		
Unit II	Processors family	20 Hours
Vector processing, Graphics Processing units, Review of modern processor, LPC 17XX microcontroller, Programmable DSP (P-DSP) processor, TI DSP Family, TMS320C6000 series processors, on chip peripherals, Intel Xscale © Atom™ Processor N2000, Interrupts, Overlays & Virtual memory.		

PRACTICAL: Perform at least 7 practical (including case study) using any controller of LPC17xx series:		
Practical No. 1	Title	6 Hours
Interfacing with RGB LED.		
Practical No. 2	Title	2 Hours
Interfacing of ADC and display on LCD.		
Practical No. 3	Title	2 Hours
Generation of PWM signal and verify output using LED and Buzzer.		
Practical No. 4	Title	2 Hours
Interfacing of Graphical LCD.		
Practical No. 5	Title	2 Hours
Interfacu SD Card.		
Practical No. 6	Title	2 Hours



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Interface EEPROM using I2C protocol.		
Practical No. 7	Title	2 Hours
Implement CAN Protocol.		
Practical No. 8	Title	2 Hours
Implement ETHERNET protocol.		
Practical No. 9	Capstone mini projects	4 Hours
Case Study: Control the speed of Motor using PWM signal		

TEXT BOOK:

1. Hennessey and Patterson, "Computer Architecture: A quantitative Approach", Fifth Edition, Morgan Kaufman Series, ISBN-13: 978-0123838728.
2. Kai Hwang, Faye A. Brigs., "Computer Architecture and Parallel Processing", McGraw-Hill, Inc. New York, 1990, First Edition, ISBN: 0070315566.
3. David Culler, J.P. Singh with Anoop Gupta, "Parallel Computer Architecture: A Hardware/Software Approach", Morgan Kaufman, 1998, ISBN 1-55860-343-3.

REFERENCES:

1. Dezso Sima, Terence Fountain, Peter Kacsuk, "Advanced Computer Architectures: A Design Space Approach", Seventh Impression, Pearson Education, ISBN 978-81-317-0208-6.
2. John P. Shen, Mikko Lipasti, "Modern Processor Design: Fundamentals of Superscalar Processors", Waveland PrInc, 2013, ISBN 13: 978-1478607830.
3. Geoffrey C. Fox, Roy D. Williams, Paul C. Messina, "Parallel Computing Works!", First Edition, Morgan Kaufman, 1994, ISBN-13: 978-1558602533.

Research Papers:

1. Ben A. Abderazek, Arquimedes Canedo, Tsutomu Yoshinaga, Masahiro Sowa, "The QC-2 parallel Queue processor architecture" Journal of parallel and distributed computing, Elsevier, 2007, doi:10.1016/j.jpdc.2007.08.004, available online at ScienceDirect, J. Parallel Distrib. Comput. 68, Pages 235–245, 2008.
2. Peter Cowling, Marcus Johansson, "Using real time information for effective dynamic scheduling" Elsevier European Journal of Operational Research, 139, Pages 230–244, 2002.
3. Vinay G. Vaidya, Priti Ranadive, Sudhakar Sah, "Dynamic scheduler for multi-core systems" IEEE Xplorer through Software Technology and Engineering



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DEPARTMENT OF ELECTRONICS
ENGG.

W.E.F. : 2016-17

FY MTECH

COURSE NAME : Technical Writing

COURSE CODE : EX502

COURSE CREDIT : 2

RELEASE DATE : 1/06/2016

REVISION NO. : 0.0

TEACHING SCHEME :

EVALUATION SCHEME :

LECTURE	PRACTICAL	THEORY			PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
		ITA	ETA	IA			
2	Nil	40	50	10	Nil	Nil	100

PRE-REQUISITE:

Nil

COURSE OBJECTIVES:

1. EX502.CEO.1: Provide overview of technical English for research paper writing,
2. EX502.CEO.2: Research methods for classroom based studies of pedagogical innovations.
3. EX502.CEO.3: Study guidelines for review of technical publications.

COURSE OUTCOMES:

Students successfully completing the course will be able to,

1. EX502.CO.1: Apply correct verb tenses; write more effectively in English for argument essays.
2. EX502.CO.2: Evaluate plagiarism and explain how to prevent it
3. EX502.CO.3: Analyze several articles to form your own opinion on a topic - make connections between several articles.
4. EX502.CO.4: Summarize a 7-8 page research paper - use source material correctly with MLA format




(ICSTE), 2010 2nd International Conference on 3-5 Oct. 2010, DOI: 10.1109/ICSTE.2010.5608969, Electronic ISBN: 978-1-4244-8666-3.

4. N. P. Jouppi, "The Nonuniform Distribution of Instruction-Level and Machine Parallelism and its Effect on Performance", IEEE Transactions on Computers, Volume 38, Issue 12, Pages 1645-1658, 1989.

SECTION NUMBER		SECTION TITLE		AUTHOR(S)	
1	2003	2003	2003	2003	2003
2	2004	2004	2004	2004	2004
3	2005	2005	2005	2005	2005
4	2006	2006	2006	2006	2006
5	2007	2007	2007	2007	2007
6	2008	2008	2008	2008	2008
7	2009	2009	2009	2009	2009
8	2010	2010	2010	2010	2010
9	2011	2011	2011	2011	2011
10	2012	2012	2012	2012	2012
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13	2015	2015	2015	2015	2015
14	2016	2016	2016	2016	2016
15	2017	2017	2017	2017	2017
16	2018	2018	2018	2018	2018
17	2019	2019	2019	2019	2019
18	2020	2020	2020	2020	2020
19	2021	2021	2021	2021	2021
20	2022	2022	2022	2022	2022



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 MIT Academy of Engineering (An Autonomous Institute)		COURSE SYLLABI (2016-2018)	
DEPARTMENT OF ELECTRONICS ENGG.		W.E.F. :	2016-17
FY MTECH		COURSE NAME :	Real Time Operating System & Design
		COURSE CODE :	EX521
		COURSE CREDIT :	4
RELEASE DATE :	1/06/2016	REVISION NO. :	0.0

TEACHING SCHEME :			EVALUATION SCHEME :				
LECTURE	PRACTICAL	THEORY			PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
		ITA	ETA	IA			
3	2	40	50	10	NIL	25	125

PRE-REQUISITE:

- EX511 : Advanced Embedded Architecture & Processor

COURSE OBJECTIVES:

- EX521.CEO.1: To develop necessary Software skill required for real time OS development.
- EX521.CEO.1: To provide practical knowledge and understanding of real time kernel.

COURSE OUTCOMES:

The students after completion of the course will be able to

- EX521.CO.1: Discuss the foundation of OS and RTOS
- EX521.CO.2: Create and run multiple tasks.
- EX521.CO.3: Communicate between different tasks.
- EX521.CO.4: Synchronize different task to perform in a particular order.
- EX521.CO.5: Manage different input/output and memory resources and better utilization.




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THEORY	24 Hours
<p>Introduction to Technical Communication, Reading Skill, Basics of English Grammar, Technical Writing, Reports and Proposals, Referencing and Styling.</p> <p>Anatomy of a Research Article , Sternberg's 12 steps of Writing, Research Paper Writing, Technology- enabled Communication, Interpretation and Use of Charts, Graphs and Tables, Software Tools for Technical Writing</p>	
<p>TUTORIAL:</p> <ol style="list-style-type: none"> 1. A Group Discussion or 'Role Play' on a topic / case to be assigned to students well in time, with groups comprising six students drawn from various disciplines. Members of the group will be evaluated by two peers, all to be assigned impromptu in the class. Faculty attending will modulate the evaluations. 2. Preparation, submission of an innovative research article in the field of their interest / specialization. 	

TEXT BOOKS:
<ol style="list-style-type: none"> 1. Advanced Learners's Dictionary. 8th edition, 2013., Oxford University Press; 9th Edition: (2014), ISBN : 978-0194799485 2. Paul V. Anderson, Technical Communication: A Reader-centered Approach, 8th edition, 1st Indian reprint, new Delhi: Cengage Learning, 2014, ISBN: 9780131514030

REFERENCES:
<ol style="list-style-type: none"> 1. Mark Hewings; Advanced Grammar in Use, Cambridge University Press, 2013, Second Edition , ISBN: 9780521532921. 2. Michael Swan, Practical English Usage. 3rd Edition, Oxford University Press-New Delhi, 2006, First Edition , ISBN: 9780195679892 3. John Seely, The Oxford Guide to Effective Writing and Speaking, Oxford University Press, 2005, Third Edition , ISBN: 9780199652709. 4. [http://onlinestatbook.com/Online_Statistics_Education.pdf]



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THEORY:		
Unit I	Fundamentals of OS and RTOS	12 Hours
This course introduces the principles of OS and then real-time operating systems. The course begins with the fundamental elements OS. Followed by real-time multitasking embedded application software design and development.		
Unit II	Fundamentals of OS and RTOS	12 Hours
Linux Internals: Process Management, File Management, Memory Management, I/O Management. Introduction to Linux Device Drivers: Character, USB, Block & Network		
Unit III	RTOS Structure	12 Hours
Processor and operating system concepts relevant to multitasking systems are examined, with focus on preemptive task scheduling, inter task communication and synchronization. Topics include timer services, dynamic memory allocation schemes, network communication programming interfaces and device driver supervisors. Student will get experience with major real-time operating systems (RTOSs), micro-C/OS.		

PRACTICALS: Experiments have to perform on ARM cortex M3 based microcontroller with RTOS (RTOS) by considering the Application of Three story Building lift management.		
Practical No. 1	Title	2 Hours
Development of Task management.		
Practical No. 2	Title	2 Hours
Implementation of time delay and interval.		
Practical No. 3	Title	2 Hours
Exploring Multitasking features.		
Practical No. 4	Title	2 Hours
Implementation of Semaphore Service.		
Practical No. 5	Title	2 Hours
Exploring Mailbox Service.		
Practical No. 6	Title	2 Hours
Exploring Message Queue Services.		




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Practical No. 7	Title	2 Hours
Demonstrate ISR		
Practical No. 8	Title	2 Hours
Real Time Application Development.		
Practical No. 9	Title	4 Hours
Integration of Real Time Application services implemented.		

TEXT BOOK:

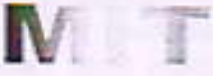
1. Jean Labrosse, "MicroC/OS-II The Real Time Kernel", CMP Books, 2nd Edition , ISBN-13: 978-1578201037
2. Getting Started For ARM Processor-Based Microcontrollers Building Applications with RL-ARM, by Keil Tools by ARM. (Keil's Online support Document)
3. <http://www.keil.com/pack/doc/CMSIS/RTOS/html/index.html>.

REFERENCES:

1. Dr. K V K Prasad, "Embedded Real time Systems: Concept, design and programming", Dream tech press. New Edition (2003) ISBN-13: 978-8177224610.
2. Jonathan Valvano , "Embedded Systems: Real-Time Operating Systems for the Arm Cortex-M3" , Create Space Independent Publishing Platform; Fourth edition (2012), ISBN-13: 978-1466468863.




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 MIT Academy of Engineering (An Autonomous Institute)		COURSE SYLLABI (2016-2018)	
DEPARTMENT OF ELECTRONICS ENGG.		W.E.F. :	2016-17
4 th SEMESTER FY MTECH		COURSE NAME :	Digital CMOS Design
		COURSE CODE :	EX522
		COURSE CREDIT :	4
RELEASE DATE :	1/06/2016	REVISION NO. :	0.0

TEACHING SCHEME :		EVALUATION SCHEME :					
LECTURE	PRACTICAL	THEORY			PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
		ITA	ETA	IA			
3	2	40	50	10	NIL	25	125

PRE-REQUISITE:
Nil

COURSE OBJECTIVES:
1. EX522-Obj-1: To understand the fundamental in Digital domain. 2. EX522-Obj-2: To show skill in Digital CMOS domain. 3. EX522-Obj-3: To aware design tool in IC technology.

COURSE OUTCOMES:
The student after completion of the course will be able to 1. EX522-Obj-1: Design Digital circuits using CMOS. 2. EX522-Obj-2: Demonstrate Circuit design using backend software tool. 3. EX522-Obj-3: Model Digital Circuits using VHDL.

THEORY:		
<table border="1" style="width: 100%;"> <tr> <td>Module - Introduction</td> <td style="text-align: right;">20 Hours</td> </tr> </table>	Module - Introduction	20 Hours
Module - Introduction	20 Hours	




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ASIC Design Flow , MOSFET Structure & behavior , Issue in Digital Integrated Circuit Design , Quality metrics of a Digital Design, Static CMOS inverter, Switching threshold and noise margin concepts and their evaluation ,Stick diagram, Design Rule Check (DRC), CMOS parasitic, Technology scaling, Lambda parameter.
Self-Study :- Static, dynamic and short circuit power dissipations.

Module II	Sequential & Combinational Logic	20 Hours
Sequential Ckts. Design of FSM, Moore & Mealy machines, Metastability, Solutions to Metastability, Synchronization methods, VHDL codes for complex sequential machines, Hazards, Types of hazards, Method to eliminate hazards, case studies, Domino logic ,NORA logic. Self-Study :- Advanced technology in VLSI design.		

PRACTICAL:


Practical No. 1	Title	4 Hours
To design, prepare layout and simulate CMOS Inverter for the given specifications of load capacitance, propagation delay, power dissipation, foundry etc .		
Practical No. 2	Title	4 Hours
To design CMOS logic for $F = A + B (C + D) + EFG$ and prepare layout .		
Practical No. 3	Title	4 Hours
To draw FSM diagram, write VHDL code, synthesis, simulate, place & route for any real time application like Tea/Coffee vending machine or Traffic light controller etc.		
Practical No. 4	Title	4 Hours
To design and simulate combinational logic to demonstrate hazards. Also, simulate the same logic redesigned for removal of hazards.		
Practical No. 5	Capstone mini project	8 Hours
Case study : Implementation of real time application using VHDL.		

TEXT BOOK:

1. J P Rabaey, A P Chandrakasan, B Nikolic, "Digital Integrated circuits: A design perspective", Prentice Hall electronics and VLSI series, Second Edition , ISBN:978-0130909961
2. Sung-Mo Kang, Yusuf Leblebici, "Cmos Digital Integrated Circuits", Second edition, Tata McGraw-Hill Education. , ISBN: 9780070530775.



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 MIT Academy of Engineering (An Autonomous Institute)		COURSE SYLLABI (2016-2018)	
DEPARTMENT OF ELECTRONICS ENGG.		W.E.F. :	2016-17
FY MTECH		COURSE NAME :	Project Work I
		COURSE CODE :	EX523
		COURSE CREDIT :	2
RELEASE DATE :	1/06/2016	REVISION NO. :	0.0

TEACHING SCHEME :		EVALUATION SCHEME :					
LECTURE	PRACTICAL	THEORY			PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
		ITA	ETA	IA			
Nil	4	---	---	---	NIL	50	50

PRE-REQUISITE:
1. EX501 : Research Methodology
2. CS502 : Technical Writing

COURSE OBJECTIVES:
1. EX521.CEO.1: To Manage the selection and initiation of individual projects.
2. EX521.CEO.2: To Conduct project planning activities that accurately forecast project costs, timelines, and quality.

COURSE OUTCOMES:
The students after completion of the course will be able to
1. EX523.CO.1: Identify important concepts / real time problems from the knowledge of current trends /survey.
2. EX523.CO.2: Develop effective communication and presentation skills.
3. EX523.CO.3: Describe the time needed to successfully complete a project, considering factors such as task dependencies and task lengths.





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REFERENCES:

1. P. E. Allen and D. R. Holberg, "CMOS Analog Circuit Design", Second Edition, Oxford University Press , Second Edition , ISBN: 9780195116441.
2. Neil H. E. Weste, David Money Harris "CMOS VLSI Design: A Circuits and Systems Perspective" , Third Edition , ISBN: 9788131762653.




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MIT Academy of Engineering (An Autonomous Institute)		COURSE SYLLABI (2016-2018)	
DEPARTMENT OF ELECTRONICS ENGG.		W.E.F. :	2017-18
SY MTECH		COURSE NAME :	Embedded Network Design
		COURSE CODE :	EX631
		COURSE CREDIT :	3
RELEASE DATE :	1/06/2017	REVISION NO. :	0.0

TEACHING SCHEME :		EVALUATION SCHEME :					
LECTURE	PRACTICAL	THEORY			PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
		ITA	ETA	IA			
3	--	40	50	10	Nil	Nil	100

- PRE-REQUISITE:**
- EX501 : Research Methodology
 - CS502 : Technical Writing

- COURSE OBJECTIVES:**
- EX631.CEO.1: To expose knowledge of Serial and parallel communication protocols
 - EX631.CEO.2: To learn Wireless sensor network communication protocols.
 - EX631.CEO.3: To develop application using USB and CAN bus for PIC microcontrollers
 - EX631.CEO.4: To develop application using Embedded Ethernet for Rabbit processors

- COURSE OUTCOMES:**
- After completion of the course, students will be able to:
- EX631.CO.1: Use serial & parallel communication protocol.
 - EX631.CO.2: Use communication systems through wired, wireless technology in embedded system.




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Description		48 Hours
<p>Project work is divided in to four stages namely Project Stage I, Project Stage II, Project Stage III and Project Stage IV.</p>		
<p>Project Stage is entirely related with selection of topic/problem by the students related to thrust areas identified by respective departments. Synopsis submission and Mid trimester presentation will be conducted by department based on following points,</p>		
<ul style="list-style-type: none"> • Literature survey • Motivation and Problem Statement • Goals and Objectives • Problem statement • System Architecture • Proposed Algorithm 		
<p>Final Project Stage I Report submission and Presentation shall be conducted at the end of the trimester. End-Trimester Assessment (ETA) presentation shall be conducted in front of eminent expert from Academics or Industry.</p>		




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3 EX631.CO.3: Implement applications using USB and CAN protocols.

THEORY:

Unit I	EMBEDDED COMMUNICATION PROTOCOL	6 Hours
Embedded Networking: Introduction–Serial / Parallel Communication, Introduction to serial communication protocols, connectors, Bus Architecture & Interfacing of external instruments to – RS232 standard – RS485 – Synchronous Serial Protocols - Serial Peripheral Interface (SPI) – Inter Integrated Circuits (I2C). PC Parallel port programming -ISA/PCI Bus protocols – Firewire		
Unit II	WIRELESS EMBEDDED NETWORKING	6 Hours
Wireless sensor networks – Introduction – Sensor node architecture – Commercially available sensor nodes -Network Topology –Localization – Time Synchronization - Energy efficient MAC protocols – SMAC –Energy efficient and robust routing – Data Centric routing Applications of sensor networks- WSN Applications - Home Control - Building Automation - Industrial Automation.		
Unit III	USB AND CAN BUS	6 Hours
USB bus – Introduction – Speed Identification on the bus – USB States – USB bus communication: Packets –Data flow types –Enumeration –Descriptors –PIC 18 Microcontroller USB Interface – C Programs –CAN Bus – Introduction - Frames –Bit stuffing –Types of errors – Nominal Bit Timing – PIC microcontroller CAN Interface –A simple application with CAN		
Unit IV	CONTROLLER AREA NETWORK	6 Hours
Controller Area Network – Underlying Technology, CAN Overview – Selecting a CAN Controller – CAN development tools. Implementing CAN open Communication layout and requirements – Comparison of implementation methods – Micro CAN open – CAN open source code – Conformance test – Entire design life cycle		
Unit V	ETHERNET BASICS	6 Hours
Elements of a network – Inside Ethernet – Building a Network: Hardware options – Cables, Connections and network speed – Design choices: Selecting components –		



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Ethernet Controllers – Using the internet in local and internet communications – Inside the Internet protocol

Unit VI

EMBEDDED ETHERNET

6 Hours

Exchanging messages using UDP and TCP – Serving web pages with Dynamic Data – Serving web pages that respond to user Input – Email for Embedded Systems – Using FTP – Keeping Devices and Network secure

TEXT BOOK:

1. Frank Vahid, Givargis "Embedded Systems Design: A Unified Hardware / Software Introduction", Wiley Publications , Second Edition , ISBN : 978-8126508372
2. Jan Axelson, "Parallel Port Complete" , Penram publications , Third Edition , ISBN : 978-8187972020
3. Dogan Ibrahim, "Advanced PIC microcontroller projects in C", Elsevier 2008 , Second edition , ISBN : 978-0080999241
4. Jan Axelson, 'Embedded Ethernet and Internet Complete', Penram publications , ISBN : 978-8187972112.

REFERENCES:

1. Glaf P.Feiffer, Andrew Ayre and Christian Keyold, "Embedded networking with CAN and CAN open", Embedded System Academy 2005 , ISBN : 978-0929392783.
2. Robert Faludi, "Building Wireless Sensor Networks", O'Reilly, 2011 , Second Edition , ISBN : 978-9350232897.
3. Ernest O. Doebelin and Dhanesh N Manik, " Measurement Systems – Application and Design", 5th Edn, TMH, 2007 , ISBN : 978-0071006972.




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MIT Academy of Engineering (An Autonomous Institute)		COURSE SYLLABI (2016-2018)	
DEPARTMENT OF ELECTRONICS ENGG.		W.E.F. :	2017-18
SY MTECH		COURSE NAME :	Distributed Systems
		COURSE CODE :	EX632
		COURSE CREDIT :	3
RELEASE DATE :	1/06/2017	REVISION NO. :	0.0

TEACHING SCHEME :		EVALUATION SCHEME :					
LECTURE	PRACTICAL	THEORY			PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
		ITA	ETA	IA			
3	–	40	50	10	Nil	Nil	100

PRE-REQUISITE:
Nil

COURSE OBJECTIVES:
<ol style="list-style-type: none"> EX632.CEO.1: Familiarize the student with the computer architecture EX632.CEO.2: To introduce the student process synchronization and inter process communication. EX632.CEO.3: To acquire the required skill to distribute file systems.

COURSE OUTCOMES:
After completion of the course, students will be able to:
<ol style="list-style-type: none"> EX632.CO.1: Demonstrate experience in building large-scale distributed Applications. EX632.CO.2: Relate methods in distributed systems to support scalability and fault tolerance. EX632.CO.3: Design distributed applications.



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MIT Academy of Engineering (An Autonomous Institute)		COURSE SYLLABI (2016-2018)	
DEPARTMENT OF ELECTRONICS ENGG.		W.E.F. :	2017-18
SY MTECH		COURSE NAME :	Optimal Control
		COURSE CODE :	EX633
		COURSE CREDIT :	3
RELEASE DATE :	1/06/2017	REVISION NO. :	0.0

TEACHING SCHEME :		EVALUATION SCHEME :					
LECTURE	PRACTICAL	THEORY			PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
		ITA	ETA	IA			
3	-	40	50	10	Nil	Nil	100

PRE-REQUISITE:
Nil

COURSE OBJECTIVES:
<ol style="list-style-type: none"> EX633.CEO.1: To develop necessary foundation of Optimal control system EX633.CEO.2: To provide practical knowledge and understanding of different control algorithms .

COURSE OUTCOMES:
After completion of the course, students will be able to:
<ol style="list-style-type: none"> EX633.CO.1: Discuss the optimization concept EX633.CO.2: Develop code for different optimal control algorithms EX633.CO.3: Appreciate the applications of MPC.

THEORY:			
<table border="1"> <tr> <td>Unit I</td> <td>Fundamentals of Optimal control</td> <td>09 Hours</td> </tr> </table>	Unit I	Fundamentals of Optimal control	09 Hours
Unit I	Fundamentals of Optimal control	09 Hours	



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THEORY:		
Unit I	Distributed Systems	9 Hours
Computer architecture: CICS, RISC, Multi-core Computer networking: ISO/OSI Model Evolution of operating systems Introduction to distributed computing systems, DCS design goals, Transparencies, Fundamental issues Distributed Coordination		
Unit II	Distributed Coordination	7 Hours
Temporal ordering of events, Lamport's logical clocks, Vector clocks; Ordering of messages, Physical clocks, Global state detection Process synchronization		
Unit III	Process synchronization	6 Hours
Distributed mutual exclusion algorithms, Performance matrix Inter-process communication		
Unit IV	Inter-process communication	7 Hours
Message passing communication, Remote procedure call, Transaction communication, Group communication; Broadcast atomic protocols Distributed file systems		
Unit V	Distributed file systems	7 Hours
Deadlocks in distributed systems and Load scheduling and balancing techniques		

TEXT BOOK:		
1. G. Coulouris, J. Dollimore, "Distributed Systems Concepts and Design", Fourth Edition, Addison Wesley, ISBN 0321263545.		
2. M. Singhal, N.G. Shivarathri, "Advanced Operating Systems", McGraw Hill, ISBN-9780070472686.		
3. Randy Chow, T. Johnson "Distributed Operating Systems and Algorithms", Addison Wesley, ISBN-978-0201498387		
4. A.S. Tanenbaum, "Distributed Operating Systems", Prentice Hall, ISBN:0-13-219908-4		

REFERENCES:		
1. Tanenbaum, A. S. "Distributed Operating Systems", Third Edition, Prentice Hall 1995, ISBN : 978-131-439-340.		
2. Tanenbaum, A. S." Modern Operating Systems", Second Edition, Prentice Hall 2001, ISBN 0-13-031358-0		
3. Bacon, J., "Concurrent Systems", Second Edition, Addison Wesley 1998, ISBN 0-201-177-676.		
4. Silberschatz, A., Galvin, P. and Gagne, G., "Applied Operating Systems Concepts", First Edition, Wiley 2000, ISBN 978-471-3650841		




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 MIT Academy of Engineering (An Autonomous Institute)		COURSE SYLLABI (2016-2018)	
DEPARTMENT OF ELECTRONICS ENGG.		W.E.F. : 2017-18	
SY MTECH		COURSE NAME : Image Processing	
		COURSE CODE : EX641	
		COURSE CREDIT : 3	
RELEASE DATE : 1/06/2017		REVISION NO. : 0.0	

TEACHING SCHEME :					EVALUATION SCHEME :		
LECTURE	PRACTICAL	THEORY			PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
		ITA	ETA	IA			
3	Nil	40	50	10	Nil	Nil	100

PRE-REQUISITE:
Nil

COURSE OBJECTIVES:
<ol style="list-style-type: none"> 1. EX641.CEO.1: To learn basics of digital image processing, image transform and filtering. 2. EX641.CEO.2: To understand the concepts and techniques of image segmentation. 3. EX641.CEO.3: To study color image processing. 4. EX641.CEO.4: To use wavelets and Multi-resolution processing on images. 5. EX641.CEO.5: To study various image compression methods. 6. EX641.CEO.6: To learn the use of VLSI architectures for image processing.

COURSE OUTCOMES:
<p>The students after completion of the course will be able to</p> <ol style="list-style-type: none"> 1. EX641.CO.1: Illustrate basic image processing techniques. 2. EX641.CO.2: Pertain color image processing, image compression and wavelet transform in various applications of image processing. 3. EX641.CO.3: Apply image processing techniques for real life interdisciplinary applications.




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Control systems, convex sets, convex functions, linear algebra, matrix computations, MATLAB Optimization, Convex optimization, LQR.		
Unit II	Constraint optimization	09 Hours
Constrained optimization, KKT conditions, linear programming using Simplex method, quadratic programming using interior point methods and active set methods. Sequential quadratic programming.		
Unit III	Optimal control algorithms	09 Hours
Calculus of Variations, Pontryagin's maximum principle, concept of Lagrange multipliers. Least square, unconstrained optimization, Quasi Newton method, steepest descent method, conjugates gradient method, Exterior point method, Active set method, Interior point method		
Unit IV	Introduction to MPC	09 Hours
Introduction to Model predictive control, formulations of MPC, MPC and QP methods, explicit MPC, observer design, off-set free MPC. Case studies and applications of optimal control and MPC. MATLAB		

TEXT BOOK:

1. Kirk, Donald. Optimal Control Theory: An Introduction. New York, NY: Dover, 2004. Second Edition, ISBN: 9780486434841.

REFERENCES:

1. Bertsekas, Dimitri. Nonlinear Programming. Nashua, NH: Athena Scientific, 1999. ISBN: 9781886529007.
2. Bryson, Arthur. Dynamic Optimization. Upper Saddle River, NJ: Pearson Education, 1998. ISBN: 9780201361872.
3. Scales, L. E. Introduction to Non-Linear Optimization. New York, NY: Springer, 1985. ISBN: 9780387912523.




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THEORY:		
Unit I	Fundamentals of Image Processing	8 Hours
Steps in Digital Image Processing, Components of Image Processing System, Visual perception of eye, Representation of digital images, Basic relationship between pixel, mathematical tools used in digital image processing, Intensity Transformation and spatial filtering, Filtering in Frequency domain.		
Unit II	Image segmentation	6 Hours
Fundamentals, Point, Line and edge Detection, Thresholding. Self study: Region-based segmentation		
Unit III	Color Image Processing	6 Hours
Color Fundamentals, Color Models, Pseudocolor Image Processing, Basics of Full Color Image processing, Smoothing and Sharpening. Case Study: Identification and mapping of an object based on color and patterns. Self Study: Image segmentation based on color.		
Unit IV	Wavelet and Multi-resolution Processing	6 Hours
Basics, Multiresolution Expansion, Wave transform in one domain and two domain.		
Unit V	Image Compression	6 Hours
Fundamentals, some basic Compression methods-Huffman coding, Arithmetic Coding, LZW coding. Digital Image watermarking. Self Study: Predictive coding and Wavelet coding.		
Unit VI	VLSI architectures for Image Processing	4 Hours
Image Processing Algorithm for FPGA Xilinx Spartan-3E (XC3S500E), VLSI architecture for Image Segmentation, Edge Detection Algorithm and Image compression. Case study: Co-simulation model of different traffic signs carried out using Image processing and Xilinx System Generator tool.		

TEXT BOOK:

1. Gonzalez and Woods, "Digital Image Processing", Pearson Education, Third Edition, LPE, ISBN: 978-81-317-1934-3.
2. Anil K. Jain, "Fundamentals of Digital Image Processing", Pearson Education India, First Edition, ISBN: 978-93-325-5191-6.



REFERENCES:

1. Milan Sonka And Vaclav Hlavac, "Image Processing, Analysis, and Machine Vision", Fourth Edition, Cengage India 978-9386858146

RESEARCH PAPER:

1. Prachi Dewan, Rekha Vig, Neeraj Shukla and B. K. Das, "Novel VLSI Architectures for Image Segmentation and Edge Detection Algorithm", International Journal of Computer Applications, Vol. 149, No. 10, September, 2016.
2. Mohammad I. AIAI, Khaldoon M. Mhaidat, and Inad A. Aljarrah, "Implementing Image Processing Algorithms in FPGA Hardware" IEEE Jordan Conference on Applied Electrical Engineering and Computing Technologies, 2013.




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MIT Academy of Engineering (An Autonomous Institute)		COURSE SYLLABI (2016-2018)	
DEPARTMENT OF ELECTRONICS ENGG.		W.E.F. :	2017-18
SY MTECH		COURSE NAME :	ASIC Design
		COURSE CODE :	EX642
		COURSE CREDIT :	3
RELEASE DATE :	1/06/2017	REVISION NO. :	0.0

TEACHING SCHEME :		EVALUATION SCHEME :					
LECTURE	PRACTICAL	THEORY			PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
		ITA	ETA	IA			
3	Nil	40	50	10	Nil	Nil	100

PRE-REQUISITE:
Nil

COURSE OBJECTIVES:
<ol style="list-style-type: none"> EX642.CEO.1: To understand the fundamental in Digital domain. EX642.CEO.2: To show skill in Application specific Design. EX642.CEO.3: To get aware of design tools in IC technology.

COURSE OUTCOMES:
The students after completion of the course will be able to
<ol style="list-style-type: none"> EX642.CO.1: Explore the fundamentals of CMOS Technology & skills of designing analog and digital ASICs. EX642.CO.2: Demonstrate capabilities and limitations of CMOS logic and adjust designs to best use CMOS ASIC technologies. EX642.CO.3: Model Application Specific Digital Circuits using VHDL/Verilog.

THEORY:			
<table border="1"> <tr> <td>UNIT I</td> <td>ASIC design Flow and testing strategies</td> <td>18 Hours</td> </tr> </table>	UNIT I	ASIC design Flow and testing strategies	18 Hours
UNIT I	ASIC design Flow and testing strategies	18 Hours	



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Types of ASICs, VLSI Design flow, Programmable ASICs - Antifuse, SRAM, EPROM, EEPROM based ASICs. Programmable ASIC logic cells and I/O cells. Programmable interconnects. Latest Version - FPGAs and CPLDs and Soft-core processors. Trade off issues at System Level: Optimization with regard to speed, area and power, asynchronous and low power system design. ASIC physical design issues. Testing techniques used in ASIC :- ATPG(Automatic test pattern generation) Fundamentals – Combinational Circuit Test Generation, Redundancy Identification ATPG for Roths D-Algorithm, Scan test, Built in self test and JTAG. Logic and Fault Simulation, algorithms for True Value Simulation and Fault Simulation. ASIC Verification and its issues.

UNIT II

Partitioning, Floor Planning and Routing

18 Hours

Physical Design, System Partitioning, Estimating ASIC size, partitioning methods. Kernighan Lin Algorithm Floor planning tools, I/O and power planning, clock planning, Pin Assignment Problem formulation, Classification of pin assignment algorithms, General and channel Pin assignments, placement algorithms, iterative placement improvement, Time driven placement methods. Global Routing – Problem formulation, Classification of global routing algorithms, Maze routing algorithms, Detailed Routing– Problem formulation, Classification of routing algorithms, Single layer routing algorithms

TEXT BOOK:


1. Michael Smith, "Application Specific Integrated Circuits", . Pearson Education Asia, 1st Edition , ISBN- 978-0321602756
2. R.S. Soin, F. Maloberti and J. Franca, "Analogue-digital ASICs: circuit techniques, design tools and applications", IEE Publications, 1st Ed. Edition , ISBN : 978-0863412592

REFERENCES:

1. Charls Roth, "Digital System Design using VHDL", ,Tata McGraw Hill, Second .Edition , ISBN: 978-0534384623



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 MIT Academy of Engineering (An Autonomous Institute)		COURSE SYLLABI (2016-2018)	
DEPARTMENT OF ELECTRONICS ENGG.		W.E.F. : 2017-18	
SY MTECH		COURSE NAME : Project Work III	
		COURSE CODE : EX611	
		COURSE CREDIT : 10	
RELEASE DATE : 1/06/2017		REVISION NO. : 0.0	

TEACHING SCHEME :		EVALUATION SCHEME :					
LECTURE	PRACTICAL	THEORY			PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
		ITA	ETA	IA			
NII	20	---	---	150	NIL	50	200

Course Contents
<ul style="list-style-type: none"> • Literature survey • Motivation and Problem Statement • Goals and Objectives • Problem statement • Block Diagram • Proposed Algorithm • Expected Outcome and Result • Publication details of Review paper on Literature survey




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MIT Academy of Engineering (An Autonomous Institute)		COURSE SYLLABI (2016-2018)	
DEPARTMENT OF ELECTRONICS ENGG.		W.E.F.	: 2017-18
SY MTECH		COURSE NAME	: Project Work II
		COURSE CODE	: EX601
		COURSE CREDIT	: 4
RELEASE DATE	: 1/06/2017	REVISION NO.	: 0.0

TEACHING SCHEME :					EVALUATION SCHEME :		
LECTURE	PRACTICAL	THEORY			PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
		ITA	ETA	IA			
NII	8	—	—	50	NIL	50	100

Course Contents
<ul style="list-style-type: none"> • Literature survey • Motivation and Problem Statement • Goals and Objectives • Problem statement • Block Diagram • Proposed Algorithm • Expected Outcome and Result




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 MIT Academy of Engineering (An Autonomous Institute)		COURSE SYLLABI (2016-2018)	
DEPARTMENT OF ELECTRONICS ENGG.		W.E.F. : 2017-18	
SY MTECH		COURSE NAME : Project Work IV	
		COURSE CODE : EX621	
		COURSE CREDIT : 10	
RELEASE DATE : 1/06/2017		REVISION NO. : 0.0	

TEACHING SCHEME :		EVALUATION SCHEME :					
LECTURE	PRACTICAL	THEORY			PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
		ITA	ETA	IA			
NII	20	—	—	200	NIL	100	300

Course Contents
<ul style="list-style-type: none"> • Literature survey • Motivation and Problem Statement • Goals and Objectives • Problem statement • Block Diagram • Proposed Algorithm • Methodology • Implementation • Results • Result Analysis • Publication details of Review paper on Literature survey • Publication details of paper on Result analysis




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