INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITD&M) KANCHEEPURAM

<table>
<tr><td>Course Title</td><td>Additive Manufacturing</td><td>Course No</td><td colspan="3">To be allotted later on by the office</td></tr>
<tr><td>Specialization</td><td>MDM, MDS</td><td>Structure (IPC)</td><td>3</td><td>0</td><td>3</td></tr>
<tr><td>Offered for</td><td>B.Tech. and M.Des.</td><td>Status</td><td colspan="2">Core ☐</td><td>Elective ■</td></tr>
<tr><td>Pre-requisite</td><td>MEC215T</td><td>To take effect from</td><td colspan="3">January, 2016</td></tr>
<tr><td>Objectives</td><td colspan="5">The objective of the course is to impart fundamentals of additive manufacturing processes along with the various file formats, software tools, processes, techniques and applications.</td></tr>
<tr><td>Course Outcomes</td><td colspan="5">Students will be able to decide between the various trade-offs when selecting AM processes, devices and materials to suit particular engineering requirements. Students will have in-depth knowledge in latest trends and opportunities in AM, including distributed and direct digital manufacturing, mass customization, and how to commercialize their ideas.</td></tr>
<tr><td>Contents of the course

(With approximate break up of hours)</td><td colspan="5">Introduction to the Basic Principles of Additive Manufacturing, Additive Manufacturing Processes, Extrusion, Beam Deposition, (8 hours)

Jetting, Sheet Lamination, Direct-Write, Photopolymerization, , Sintering, Powder Bed Fusion (8 hours)

Design/Fabrication Processes: Data Sources, Software Tools, File Formats, Model Repair and Validation, Pre- & Post-processing, Designing for Additive Manufacturing, Multiple Materials, Hybrids, Composite Materials, current and future directions (11 hours)

Process & Material Selection, Direct Digital Manufacturing and Distributed Manufacturing, Related Technologies: Mold-making, Rapid Tooling, Scanning, (8 hours)

Applications of AM: Aerospace, Automotive, Biomedical Applications of AM (5 hours)

Product Development, Commercialization, Trends and Future Directions in Additive Manufacturing (4 hours)</td></tr>
<tr><td>Text and References</td><td colspan="5">Text Book:
Gibson, Rosen, Stucker, Additive Manufacturing Technologies: Rapid Prototyping to Direct Digital Manufacturing. Springer, 2009.

Reference Book:
Hopkinson, Hague, Dickens, Rapid Manufacturing: An Industrial Revolution for the Digital Age. Wiley, 2005.
Gibson, Advanced Manufacturing Technologies for Medical Applications. Wiley, 2005.</td></tr>
</table>

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY DESIGN AND MANUFACTURING (IIITDM) KANCHEEPURAM

Course Title	Network Algorithmics	Course No	To be allotted later on by the office		
Specialization	COE	Structure (IPC)	3	0	3
Offered for	PG/PhD	Status	Core ☐	Elective ▬	
Pre-requisite	Data Structures & Algorithms, Computer Networks	To take effect from			
Objectives	To make familiar with the set of techniques to overcome implementation bottlenecks at all network devices and to provide a set of principles and models to help overcome current and future networking bottlenecks.				
Course Outcomes	The student can able to implement an efficient algorithms and architectures for packet processing. Can able to design high Speed packet processing network systems such as bridges, switches, routers and firewalls.				
Contents of the course *(With approximate break up of hours)*	Introduction to Network Algorithmics (NA) – Bottlenecks and techniques (3hrs). Network Implementation Models – Protocols, Hardware, network device architectures and operating Systems (4hrs). Fifteen NA Implementation Principles and Actions (6hrs). Demultiplexing and Protocol Processing (6hrs). Exact-Match Lookups, Prefix-Match Lookups (6hrs). Packet Classifications and Routers as Distributed Systems (6hrs). High Speed Packet Classification Hardware Architectures – TCAM Razor, Bit Weaving, All-Match Redundancy Removal, Sequential Decomposition, and Topological Transformations. (11hrs)				
Text Book	1. George Varghese, "Network Algorithmics – An Interdisciplinary Approach to Designing Fast Networked Devices", Morgan Kaufman Publishers, 1st Edition, 2005, ISBN: 0-12-088477-1.				
Reference Books	1. Chad R. Meiners, Alex X. Liu, Eric Torng, Hardware Based Packet Classification for High Speed Internet Routers", Springer Publisher, 1st Edition, 2010. ISBN 978-1-4419-6699-5. 2. Deepankar Medhi, Karthikeyan Ramasamy, Jane Zupan, "Network Routing: Algorithms, Protocols, and Architectures", Morgan Kaufman Publishers, 1st Edition, 2007, ISBN-0120885883.				

<table>
<tr><td>Course Title</td><td>Wireless Communication</td><td>Course No</td><td colspan="3">To be filled by the office</td></tr>
<tr><td>Specialization</td><td>Electronics Engineering</td><td>Structure (IPC)</td><td>3</td><td>0</td><td>3</td></tr>
<tr><td>Offered for</td><td>DD</td><td>Status (Core / Elective)</td><td colspan="3">Core</td></tr>
<tr><td>Prerequisite</td><td>Analog and Digital Communications
Probability Theory</td><td>To take effect from</td><td colspan="3"></td></tr>
<tr><td>Course Objectives</td><td colspan="5">The primary goal of this course is to introduce wireless communications. This course introduces various channel models in wireless communications. Also, the performance of digital modulation schemes in wireless channels is studied. Various diversity schemes used to mitigate fading is also studied. Also frequency selective channel model and OFDM system is studied. This course is fundamental to understand various technologies like GSM, 3G, 4G/5G and wireless LANs.</td></tr>
<tr><td>Course Outcomes</td><td colspan="5">At the end of the course, the students are expected to
1. Analyze the effect of fading in wireless channels
2. Analyze bit/symbol error performance of wireless systems
3. Design diversity systems to mitigate fading
4. Design wireless technologies like WLANs etc</td></tr>
<tr><td>Contents of the course</td><td colspan="5">Path loss and shadowing: Radio wave propagation, transmit and receive signal models, free-space path loss, ray tracing, empirical path loss models, shadowing. (6)

Statistical Mutipath Channel Models: Time-varying channel impulse response, narrowband fading models, wideband fading models, discrete time models, space-time channel models (which include autocorrelation, cross correlation, PSD, envelope and power distributions, level crossing rate and average fade distribution, power delay profile, coherence bandwidth, coherence time, transforms for autocorrelation and scattering functions). (10)

Digital communication over wireless channels: AWGN, BPSK, M-PAM, M-PSK, M-QAM, FSK and CPFSK - error probability approximations for coherent detection, differential modulation, - error probability, fading, outage probability, ISI. (10)

Diversity: Receiver diversity, selection combining, threshold combining, maximal ratio combing, equal gain combining, transmit diversity, Alamouti code, (10)

Frequency Selective Channels: Channel model, OFDM. (6)</td></tr>
<tr><td>Textbooks</td><td colspan="5">1. A. Goldsmith, Wireless Communication, 1st edition, Cambridge University Press, 2009, ISBN: 9780521704168</td></tr>
<tr><td>References</td><td colspan="5">1. D. Tse and P. Viswanath, Fundamentals of Wireless Communication, 1st edition, Cambridge University Press, 2005, ISBN: 9780521845274.</td></tr>
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INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITD&M) KANCHEEPURAM

Course Title	Digital Image Processing	Course No *(will be assigned)*				
Specialization	Computer Engineering	Structure (LTPC)	3	1	0	4
Offered for	UG/PG/Ph.D	Status	Core ☐		Elective ■	
Faculty	Dr. V. Masilamani	Type	New ■		Modification ☐	
Pre-requisite	COT	To take effect from	Aug 2012			
Submission date	June 2012	Date of approval by AAC				

Objectives

As input data for many real world problems are available in the form of images (2D-signals), it would be apt to introduce the students to a course on digital image processing. This course is designed to give fundamentals of image processing and its application in various fields. The students will also be exposed to implementation of image processing algorithms to solve real world problems using SCILAB/MATLAB

Contents of the course *(With approximate break up of hours)*

Digital Image Fundamentals: elements of visual perception, image acquisition and display, image sampling and quantization, pixel relationship, arithmetic operations between images and super resolution (4)

Image Transformation and Enhancement: geometric transformation, intensity transformation, spatial domain filtering, DFT, DCT, KLT and frequency domain filtering (8)

Image and Video coding: run length coding, Huffman coding, compression using DCT, H.264/MPEG-4 advanced video coding (4) +++

Image Restoration and Reconstruction: models for image degradation and restoration process, Wieners' filter, principles of Computed Tomography (CT), Image reconstruction from projections using inverse Radon transform and binary image reconstruction using network flow (6)

Color Image Processing: color models, pseudo and full-color image processing, smoothing and sharpening in color images and segmentation based on color (4)

Morphological Image Processing: erosion and dilation, opening and closing, boundary extraction, hole filling, connected component extraction , thinning and thickening, and gray-scale morphology (6)

Image Segmentation: point, line and edge detection, Hough transform, thresholding using Otsu's method, region based segmentation, watershed segmentation algorithm and graph-cut based segmentation (7)

Representation, Description and Recognition of Objects: chain codes, polygonal approximation approaches, signatures, boundary segments, boundary descriptors, regional descriptors, recognition based on decision–theoretic methods, matching shape numbers and string matching (7)

Textbook

1. Rafael C. Gonzalez and Richard E. Woods, Digital Image Processing, Pearson Education, 3rd Edition, 2009.

References

2. William K Pratt, Digital Image Processing , John Willey, 4th edition, 2006.
3. A.K. Jain, Fundamentals of Digital Image Processing, Prentice Hall of India, 1995.
4. Rafael C. Gonzalez, Richard E. Woods and Steven L. Eddins, Digital Image Processing using MATLAB, Pearson Education, 2nd Edition, 2009.
5. B. Chanda, D. Dutta Majumder, Digital Image Processing and Analysis, Prentice Hall of India, 2008.

Course Title	Data Communication Networks	Course No	To be filled by the office		
Specialization	Electronics Engineering	Structure (IPC)	3	0	3
Offered for	DD	Status (Core / Elective)	Core		
Prerequisite	----	To take effect from			
Course Objectives	To introduce the basic terminology of networking. To study the various layers and their roles.				
Course Outcomes	The student is able to (i) understand a transmission of a data in a network (ii) acquire knowledge of various layers.				
Contents of the course	Overview of Data Communication and Networking: Introduction; Data communications: components, data representation (ASCII,ISO etc.), direction of data flow (simplex, half duplex, full duplex); network criteria, physical structure (type of connection, topology), categories of network (LAN, MAN,WAN); Internet: brief history, Protocols and standards; Reference models: OSI reference model, TCP/IP reference model, their comparative study. (4) Physical Layer: Overview of data(analog & digital), signal(analog & digital), transmission (analog & digital) & transmission media (guided & unguided); Circuit switching: time division & space division switch, TDM bus; Telephone Network; ATM, B-ISDN. (8) Data link Layer: Types of errors, framing(character and bit stuffing), error detection & correction methods; Flow control; Protocols: Stop & wait ARQ, Go-Back- N ARQ, Selective repeat ARQ, HDLC. (6) Medium Access sub layer: Point to Point Protocol, LCP, NCP, Token Ring; Reservation, Polling, Multiple access protocols: Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, CSMA/CA Traditional Ethernet, fast Ethernet (in brief). (6) Network layer: Internetworking & devices: Repeaters, Hubs, Bridges, Switches, Router, Gateway; Addressing: IP addressing, subnetting; Routing: techniques, static vs. dynamic routing, Unicast Routing Protocols: RIP, OSPF, BGP; Other Procols: ARP, IP, ICMP, IPV6. (8) Transport layer: Process to Process delivery; UDP; TCP; Congestion Control: Open Loop, Closed Loop choke packets; Quality of service: techniques to improve QoS: Leaky bucket algorithm, Token bucket algorithm. (4) Application Layer: Introduction to DNS, SMTP, SNMP, FTP, HTTP & WWW; Security: Cryptography (Public, Private Key based), Digital Signature, Firewalls. (6)				
Textbooks	1. B. A. Forouzan, Data Communications and Networking, 4th edition, TataMcGrawHill, 2012, ISBN: 0072967757 2. A. S. Tanenbaum, Computer Networks, 4th edition, Pearson, 2013, ISBN: 978-0132126953.				
References	1. W. Stallings, Data and Computer Communications, 5th edition, Pearson, 5th edition, 2013, ISBN: 978-0133506488.				

Course Title	Advanced Geometric Modelling and CAD	Course No				
Specialization	Mechanical Engineering	Structure (LTPC)	3	0	0	3
Offered for	PG/Ph.D.	Status	Core		Elective	
Faculty	Dr P Pandithevan	Type	New ■		Modification	
Pre-requisite	Numerical and mathematical techniques, Calculus, Matrix and vector algebra basics.	To take effect from	Jan 2013			
Submission date	Sep 2012	Date of approval by AAC				

Objectives	➢ To make the students to understand the mathematical basis for geometric modeling of curves and surfaces and their relationship with computer graphics. ➢ To teach advanced concepts of feature based modelling and parametric modelling. ➢ To teach the methods of representation of wireframe, surface, and solid modeling systems.
Contents of the course *(With approximate break up of hours)*	Computer graphics fundamentals: Introduction to geometric representation- Implicit, explicit, parametric equations; Transformations in 2D and 3D, projections (8 H) Parametric curves: Differential geometry of curves, Cubic Hermite curves - Algebraic and geometric form, Blending functions, subdivision, reparameterization and composite Hermite curves, continuity aspects, Bezier curves - control polygons and Bernstein basis, *de* Casteljau algorithm, continuity aspects, rational Beziers, B-spline curves - periodic, open and non-uniform knot vectors and corresponding curves, rational B-splines, NURBS curve (11 H) Parametric surfaces: Hermite surface - algebraic and geometric form, subdivision and reparameterization, continuity of surfaces, Bezier surface - control net representation, continuity aspects, rational Bezier surfaces, B-Spline surfaces - periodic, open and non-uniform knot vectors and corresponding surfaces, rational B-splines, NURBS surface (11 H)
Textbook	1. Zeid. I, *CAD/CAM Theory and Practice*, Tata McGraw Hill, 2006. 2. Rogers. D.F and Adams, J.A, *Mathematical Elements for Computer Graphics*, McGraw Hill, 2002.
References	1.1. Gerald E. Farin, *Curves and Surfaces for CAGD*, Morgan Kaufmann, 2002. 2. Rogers. D.F, *An Introduction to NURBS*, Morgan Kaufmann, 2001.

Course Title	Fiber Optics in Communication	Course No				
Specialization		Structure (LTPC)	3	0	0	3
Offered for	UG/PG/Ph.D.	Status	Core ☐		Elective ■	
Faculty	Naveen Kumar	Type	New ■		Modification ☐	
Pre-requisite		To take effect from	January 2013			
Submission date	Oct 2012	Date of approval by				
Objectives	1. To apprise the students about the phenomenon of guided wave propagation and its application in optical communication 2. To develop an understanding of fiber amplifiers and other design considerations in implementation of long haul fiber communication network					
Contents of the course *(With approximate break up of hours)*	**Basic Principles:** Classification of fibers, Numerical aperture, Loss mechanism, Single mode fiber, multimode fiber, ray paths, Pulse dispersion, Material dispersion, Waveguide dispersion. (14hrs) **Design Consideration in Fiber Optic Communication:** Analog and digital modulation, Noise in detection process, Bit error rate, System design, System budgeting, Attenuation and dispersion limit. (14 hrs) **Optical Amplification and Dispersion:** Dispersion shifting fiber, Dispersion compensating fiber,					
Textbook	1. R. Ramaswami and K. N. Sivarajan, and Galen Sasaki, "Optical Networks: A practical perspective", Optical Fiber Communications", Elsevier, 2009.					
References	1. Harry Dutton, "Understanding Optical Communications", IBM Redbook, 1998 2. Jurgen Franz, Optical Communications Components and Systems: Analysis, Design, Optimization, Application, Narosa Publishing House, 2000 3. Ajoy Ghatak, K.Thyagarajan, "Introduction to Fiber Optics", Cambridge University					

Course Title	Computational Fluid Dynamics	Course No *(will be assigned)*	MEC507			
Specialization	Mechanical Engineering	Structure (LTPC)	3	0	0	3
Offered for	PG/Ph.D.	Status	Core		Elective	
Pre-requisite		To take effect from				
Submission date		Date of approval by AAC				
Objectives	-					
Contents of the course *(With approximate break up of hours)*	Basics of computational fluid dynamics – governing equations of fluid mechanics and heat transfer – physical boundary conditions – elliptic, parabolic and hyperbolic equations. Finite difference formulation – stability analysis. Solution methodologies: direct and iterative methods, Thomas algorithm, relaxation method, alternating direction implicit method. Finite difference and finite volume formulation of steady/transient one-dimensional conduction equation. Finite volume formulation of steady one-dimensional convection and diffusion problems, central, upwind, hybrid and power-law schemes - discretization equations for two dimensional convection and diffusion. Numerical methods for the Navier-Stokes equation - Turbulence models: mixing length model, Two equation (k-epsilon) models – Grid generation.					
Textbook	1. Pradip Niyogi, Chakrabartty S.K., Laha M.K., Introduction to Computational Fluid Dynamics, Pearson Education, 2Ed. 2009. 2. Versteeg Henk Kaarle, Malalasekera Weeratunge, An Introduction to Computational Fluid Dynamics: The finite volume method, Pearson Education, 2007.					
References	1. Patankar, S.V., Numerical Heat Transfer and Fluid Flow, McGraw-Hill, 1980. 2. Muralidhar, K, Sundarajan .T., Computational Fluid Flow and Heat Transfer, Narosa Publishing House, New Delhi, 1995. 3. Anderson, J.D., Computational Fluid Dynamics – The Basics with Applications, McGraw-Hill, 1995.					

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITD&M) KANCHEEPURAM

INTRODUCTION OF NEW COURSE

Course Title	ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY	Course No *(will be assigned)*					
Specialization	Electronics Engineering	Structure (LTPC)	3	0	0	3	
Offered for	UG/PG/Ph.D	Status	Core ☐		Elective ■		
Faculty		Type	New ■		Modification ☐		
Pre-requisite		To take effect from	Jan 2011				
Submission date	November 2010	Date of approval by AAC					

Objectives	With the increasing proliferation of computing devices, limits on the electromagnetic emissions from these devices are necessary to minimize their potential for interfering with radio and wire communications. It is illegal to market a computing device unless its radiated and conducted emissions do not exceed the limits of the regulation in any country. So the digital product designer must learn to incorporate EMC design principles into his/her design in addition to the usual functional design principles. This course is expected to equip the students to design an electronic product which satisfies EMC regulations.
Contents of the course *(With approximate break up of hours)*	Electronic Equipment and System EMI Concepts- EMC Requirements for Electronic Systems, Equipment Emissions and Susceptibilities Common-Mode and Differential mode Coupling- Mechanisms Including Field to Cable, Ground Impedance, Ground Loop and Coupling Reduction Techniques, Other Coupling Mechanisms, Arcing at switches and its suppression Non ideal behavior of components- resistance, capacitance and inductance of wires, equivalent circuits, Resistors, capacitors, inductors, effect of component leads, digital circuit devices, effect of component variability The Importance of Grounding For Achieving EMC- The Reasons (I.E., Safety, Lightning Control, EMC, etc.), Grounding Schemes (Single Point, Multi-Point And Hybrid), Shield Grounding and Bonding. Importance of Shielding- Shielding Effectiveness, Shielding Considerations (Reflective and Absorptive) Shielding Design, Shielding Compromises Techniques Used in EMI Diagnostics and Fixes, EMC Specifications, Standards and Measurements, EMC Documentation Including a Historical Summary, The Rationale, and a Review of MIL-Stds, FCC and CISPR Requirements. Introduction to Electromagnetic Compatibility, Communications System EMI- Typical Modes of System Interactions Including Antennas, Transmitters and Receivers and Receiver Responses, Elements of Interference, including Antennas, Transmitters, Receivers and Propagation
Text and References	**Text Books:** 1. Clayton R. Paul ,Introduction to Electromagnetic Compatibility, John Wiley,2006, 2nd Edition. **References:** 1. Henry Ott, Electromagnetic Compatibility Engineering, John Wiley, 2009 2. Clayton, Electromagnetics for Engineers: With Applications to Digital Systems and Electromagnetic Interference,John Wiley, 2004. 3. David A. Weston, Electromagnetic Compatibility: Principles and Applications, Marcel Dekker Inc., 2001, 2nd Edition.

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DESIGN AND MANUFACTURING (IIITD&M) KANCHEEPURAM

INTRODUCTION OF NEW COURSE

<table>
<tr><td rowspan="2">Course Title</td><td rowspan="2">Life Cycle Management</td><td>Course No
(will be assigned)</td><td colspan="4"></td></tr>
<tr><td>Structure (LTPC)</td><td>3</td><td>0</td><td>0</td><td>3</td></tr>
<tr><td>Offered for</td><td>M.Des. / B.Tech. Elective</td><td>Status</td><td colspan="2">Core √</td><td colspan="2">Elective ☐</td></tr>
<tr><td>Faculty
(Not more than two)</td><td></td><td>Type</td><td colspan="2">New √</td><td colspan="2">Modification ☐</td></tr>
<tr><td>Pre-requisite</td><td></td><td>To take effect from</td><td colspan="4">July 2010</td></tr>
<tr><td>Submission date</td><td></td><td>Date of approval by AAC</td><td colspan="4"></td></tr>
<tr><td>Objectives</td><td colspan="6">To enable students to understand a new paradigm for product manufacturing, all the way across the product lifecycles in the a most effective way.</td></tr>
<tr><td>Contents of the course
(With approximate break up of hours)</td><td colspan="6">The life cycle management of system – management tasks, life cycle management constraints, life cycle costing.
Product Lifecycle Management: Constructing PLM: PLM Lifecycle Model – Plan, design, build, support, dispose; Threads of PLM: CAD, Engg. Data Management, Product Data Management, Computer Integrated Manufacturing; Characteristics of PLM: Singualrity, Correspondence, Cohesion, Traceability, Reflectiveness, Cued Availability.
Product End Life: Design for end of old product management - Problems of old products in emerging markets - Recovery and economic feasibility of materials such as plastics, rubber aluminum, steel, etc.
Tradeoffs: Applying life cycle thinking to define tradeoffs along the supply, manufacture-use and end of life chain-Effect on the customer-Expectation of the customer-Evaluate product cost versus operating cost, durability, environment and health.
Maintainability- Objectives of maintenance, types of maintenance, factors affecting maintainability, system down time, and maintainability trade-off.
Sustainability: What is sustainability-Use of renewable resources-View to design horizon.</td></tr>
<tr><td>Text Books</td><td colspan="6">1. AnttiSaaksvuori; AnselmiImmonen, Product Lifecycle Management, Springer, 3rd Edition, 2010.
2. Stephen M. Samuel; Eric D., Weeks and Mark A. Kelley, Team-center Engineering and Product Lifecycle Management Basics, Design Visionaries, Inc., 1st Edition, 2006.</td></tr>
<tr><td>Reference Books</td><td colspan="6">1. John Stark, Product Lifecycle Management: 21st century Paradigm for Product Realization, Springer, 1st Edition, 2004.
2. Product Lifecycle Management: Driving the Next Generation of Lean Thinking, Michael Grieves, McGraw-Hill, 2005.</td></tr>
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INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITD&M) KANCHEEPURAM

INTRODUCTION OF NEW COURSE

Course Title	Design of communication products	Course No *(will be assigned)*				
Specialization	Electronic Engineering	Structure (LTPC)	3	0	0	3
Offered for	UG/PG/Ph.D.	Status	Core ■		Elective ☐	
Faculty		Type	New ■		Modification ☐	
Pre-requisite		To take effect from	Aug 2012			
Submission date	June 2012	Date of approval by Senate				
Objectives	The course contents are designed for giving students hands on experience in designing communication products as per datasheet specification. The challenging course contents suggest the instructor for discussing the case studies of actual products and give suitable assignments to the students for designing the products after taking into thermal, mechanical, electronic design considerations.					
Contents of the course *(With approximate break up of hours)*	**Transceiver Design:** dB power, link budgets, system design tradeoffs, gains/losses, Signal-to-Noise, Probability of Error, Bit Error Rate, Eb/No, link margin, tracking noise and signal level through a complete system, effects and advantages of using spread spectrum techniques. (3 hrs) **Transmitter Design:** Various types and system designs of spread spectrum transmitters, PSK, MSK, QAM, OFDM, Other, Pseudo-Random code generator, multiple access TDMA/CDMA/FDMA, antenna sizing, transmit/receive, local oscillator, upconverters, sideband elimination, power amplifiersign, standing wave ratios. (4hrs) **Receiver Design:** Dynamic range, image rejection, limiters, minimum discernable signal, superheterodyne receivers, importance of low noise amplifiers, 3rd order intercept point for intermodulation products, two tone dynamic range, tangential sensitivity, phase noise, mixers, spurious signals, filters, A/D converters, aliasing and anti-aliasing filters, digital signal processors DSPs. (5 hrs) **Testing and Characterization of Transciever:** Signal translation, signal transport, selection of ADC, FPGA, DSP and relevant interface designs and trade-offs, SRAO, SPI, Ethernet. (4 hrs) **Case Study:** Hand held low/high power short/long range device, System specific need, thermal, mechanical, electronic design consideration, speed/power trade-off, interface, compliance engineering, system integration, acceptance test plan. (6 hrs) **Radio layered standards:** Wi-Fi, 2G, 3G, 4G and applications. (2 hrs) **Photonic Devices:** Criterion for choosing Laser diode, LED and Photo detector in fiber optic link, Design and fabrication of all fiber power splitters, filters, multiplexers, System budgeting, length (distance) of the link and issues related to amplifiers and dispersion compensators. (18 hrs)					
Textbook	1. Scott R. Bullock, "Transceiver and Systems Design for Digital Communications," 3rd Edition, Scitech Publishing. 2. Scott R. Bullock, "Broadband Communications and Home Networking," 2001 Scitech Publishing. 3. Cornell Drentea, "Modern Communications Receiver Design and Technology," 2010, Artech House. 4. A.K. Ghatak and K. Thyagrajan, Introduction to fiber optics," 2001, Cambridge University Press.					
References	5. Ilianm F. Egan, "Practical RF System Design," 2003, John Wiley and Sons. 6. K. D. wong, "Fundamentals of Wireless Communication Engineering Technologies (Information and Communication Technology Series," 2011Wiley Publication. 7. A. Goldsmith, "Wireless communications," 2005, Cambridge University Press.					

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY DESIGN AND MANUFACTURING (IIITD&M) KANCHEEPURAM

INTRODUCTION OF NEW COURSE

Course Title	Probabilistic Engineering Design	Course No *(will be assigned)*				
		Structure (LTPC)	3	0	0	3
Offered for	UG/PG/PhD	Status	Core ☐		Elective ■	
Faculty (Not more than two)	Dr Sreekumar M / Dr Shalu M A	Type	New ☐		Modification ■	
Pre-requisite	COT	To take effect from	Jan 2011			
Submission date		Date of approval by AAC				
Objectives	To impart knowledge on making reliable decisions with the consideration of uncertainty associated with design variables/parameters and simulation models.					
Contents of the course *(With approximate break up of hours)*	Probability: Review of basic probability,discrete and continuous distributions Monte Carlo Simulation Probabilistic Design Concepts: Failure Mode and Effect Analysis, Quality function deployment, Taguchi Method for design of experiments -Design for product life cycle. Robust and Optimum Design: Performance variation due to variation in design parameters, human properties and environmental conditions, optimum design concepts. Design for Reliability and Maintainability: Reliability, availability and maintainability; distribution of failure and repair times; determination of MTBF and MTTR, reliability models; system reliability determination; factor of safety and reliability, preventive maintenance and replacement, total productive maintenance. Reliability analysis of Mechanical, electrical and electronic Systems.					
Text and References	**References:** 1. Douglas. C. Montgomery, Applied Probability and Statistics for Engineers, John Willey, 2006. 2. J. Antony, Design of experiments for Engineers and Scientists, Butterworth-Heinemann, 2004. 3. James. N. Siddall, Probabilistic Engineering Design, CRC Press, 1983. 4. Dhillon, Engineering Maintainability - How to design for reliability and easy maintenance, PHI, 2008. 5. Charles E Ebling, An Introduction to Reliability and Maintainability Engineering, Tata- McGraw Hill, 2000					

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITD&M) KANCHEEPURAM

INTRODUCTION OF NEW COURSE

Course Title	Optoelectronics Devices	Course No *(will be assigned)*					
Specialization		Structure (LTPC)	3	0	0	3	
Offered for	UG/PG/Ph.D.	Status	Core ☐		Elective ■		
Faculty	Naveen Kumar	Type	New ■		Modification ☐		
Pre-requisite		To take effect from	January 2013				
Submission date	Oct 2012	Date of approval by Senate					

Objectives

1. To teach the physics behind various opto-electronics devices/components employed in optical fiber communication
2. To provide an intuitive understanding along with mathematical rigors needed in designing all-fiber components

Contents of the course *(With approximate break up of hours)*

Components and Devices: Planar light guides and effective index method, Coupled mode theory, Waveguide coupler and switches, Interferometers and signal routing and gratings. (14)

Electro optic Modulators: Electro optic effect in KDP and Lithium Niobate crystal, Electrooptic modulators and applications. (7)

Accousto optic Modulators: Accoustootic effect, Raman Nath diffraction, Coupled wave analysis, Basic equations of Bragg Diffraction, applications in periodic media, Raman Nath modulator and Bragg modulator. (11)

Lasers and Detectors: Communication requirements, Laser diode, LED, Principles of optical detection, PIN photodetector, Avalanche photodiodes. (10)

Textbook

1. K. Okamoto, "Fundamental of Optical Waveguides", Elsevier, 2006
2. R. Ramaswami and K. N. Sivarajan, and Galen Sasaki, "Optical Networks: A practical perspective", Optical Fiber Communications", Elsevier, 2009
3. Ajoy Ghatak, K.Thyagarajan, "Optical Electronics", Cambridge University Press, 2002

References

1. Jurgen Franz, Optical Communications Components and Systems: Analysis, Design, Optimization, Application, Narosa Publishing House, 2000
2. G. Keiser, Optical Fiber Communications", McGraw Hill , 2008

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY DESIGN AND MANUFACTURING (IIITD&M) KANCHEEPURAM

INTRODUCTION OF NEW COURSE

Course Title	Advanced Data Structures & Algorithms	Course No *(will be assigned)*				
Specialization	Computer Engineering	Structure (LTPC)	3	0	0	3
Offered for	UG/PG/Ph.D	Status	Core ☐		Elective ■	
Faculty	DrMasilamani V / DrSivaselvan B	Type	New ■		Modification ☐	
Pre-requisite		To take effect from	Jan 2011			
Submission date	November 2010	Date of approval by AAC				
Objectives	Data Structures & Algorithms play an important role in solving problems efficiently using computers. Application specific data structures & algorithms is the recent trend in computer science and the course is oriented towards imparting skill to design efficient data structures inorder to develop faster algorithms. The course aims to expose the student to the advances in the area of data structures and algorithm design & analysis.					
Contents of the course *(With approximate break up of hours)*	Review of Basic Data Structures - Trees - Graphs, Priority Queues - Leftist Trees, Binomial, Fibonacci Heaps , Dictionary Structures - Hash tables, Balanced BST, Static - Dynamic BST - Splay Trees, Red Black Trees, Finger search trees, B Trees Multidimensional - Spatial Data structures - Quad trees, Oct trees, Kinetic Data Structures Tries - Suffix trees, String searching - Application specific data structures - Image processing - Data Mining - Network Time Complexity - Amortized Analysis, Recurrence Relations Revisited, External Sorting, Tournament Trees, Order Statistics, Huffman Trees, FFT Algorithm, Matrix Chain Multiplication, Subset sum problem, Network Flow, NP Completeness					
Text and References	**References** 1. Sartaj Sahni, et.al, Handbook of Data Structures & Applications, CRC Press, 2005. 2. Thomas H Cormen, et.al, Introduction to Algorithms, MIT Press, 2nd/3rd Edition. 3. Aho, Hopcrof, Ullmann, Data Structures & Algorithms, Addison Wesley, 1983. 4. The course will also involve discussions on landmark papers in specific fields of data structures, algorithms and applications in engineering domain.					