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

INTRODUCTION OF NEW COURSE

<table>
<tr><td rowspan="2">Course Title</td><td rowspan="2">Optimization Methods</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>B.Tech/M.Des/Ph.D</td><td>Status</td><td colspan="2">Core √</td><td colspan="2">Elective ☐</td></tr>
<tr><td>Faculty
(Not more than two)</td><td>DrShalu M A, Dr B Sivaselvan</td><td>Type</td><td colspan="2">New √</td><td colspan="2">Modification ☐</td></tr>
<tr><td>Pre-requisite</td><td>Linear Algebra, Calculus</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 impart knowledge of optimization methods required for design and operational decisions involving engineering systems.</td></tr>
<tr><td>Contents of the course
(With approximate break up of hours)</td><td colspan="6">Engineering applications of optimization (3 hours)
Multivariable optimization, method of Lagrange multipliers, Kuhn-Tucker conditions (5 hours)
Convex sets, convex functions, convex programming problems (4 hours)
Linear programming problems and simplex method (6 hours)
Primal and dual problems (2 hours)
Quadratic programming (4 hours)
Introduction to Genetic Algorithms, Traditional optimization methods, Motivation for Genetic Algorithms(2 Hours)
Mathematical Foundations, Operators – Reproduction, Crossover, Mutation, Fundamental Theorem, Schemata Analysis (5 Hours)
GA Implementation Issues, Advanced Operators – Dominance, Diploidy, Abeyance, Extended Schema Analysis (5 Hours)
Applications of Genetic Algorithms, GA based Classifier System, Tabu Search, and Swarm Optimization (4 Hours)</td></tr>
<tr><td>Text Books</td><td colspan="6">1. A Ravindran, D Philips, J Solberg. Operations Research, Principles and Practice, Wiley, 2nd Edn, 2007
2. D E Goldberg. Genetic Algorithms in Search, Optimization & Machine Learning, Addison Wesley, 2009</td></tr>
<tr><td>Reference Books</td><td colspan="6">1. H A Taha. Operations Research, Prentice Hall, 8th Edn, 2009
2. K Deb, Optimization for Engineering Design – Algorithms, Examples, PHI, 2004
3. S SRao, Engineering Optimization Theory & Practice, John Wiley, 2009</td></tr>
</table>

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

INTRODUCTION OF NEW COURSE

Course Title	Introduction to Product Design and Development	Course No	DES 507			
Specialization		Structure (LTPC)	3	0	0	3
Offered for	M.Des. / B.Tech. Elective	Status	Core✓		Elective✓	
Faculty		Type	New✓		Modification	
Pre-requisite		To take effect from	Aug 2011			
Submission date	Aug 2011	Date of approval by AAC				
Objectives	The course would provide the students with an overview of the product development process with focus on the front end of new product development. It would introduce them to the part of the product life-cycle from product planning to concept generation, concept selection and concept testing. The students would be introduced to the relevance and methods of innovation and creativity in product development					
Contents of the course	Modern product development-Need for systemic design - The design process- Types of design - Product planning - Technical and business concerns - Understanding customer needs - Usability engineering- User-centered design- Accessing and mining data- Cultural triangulation - Observation, interrogation -Focus group interviews - Establishing product function - Product benchmarking - Quality function deployment - Concept generation Role of Creativity and innovation -Types of innovation - Patents and IPR Tools for conceptualization - Methods of idea generation - Theory of inventive problem solving - Ergonomics in product design - Concept selection					
Text and References	1. Otto. K and Wood, K, Product Design, Pearson Education, 2001. 2. Henry Pertoki, Invention by design , Universities Press (India) 2000. 3. Ullman. D. G, The Mechanical Design Process, McGraw-Hill, 1997 4. Mike Baxter, Product Design: Practical Methods for the Systematic Development of New Products, CRC Press, 1995 5. George E.Dieter and Linda C.Schmidt, Engineering Design, McGraw-Hill, Fourth Edition,2009					

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INTRODUCTION OF NEW COURSE

<table>
<tr><td rowspan="2">Course Title</td><td rowspan="2">Advanced Mechanisms</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 provide methods for the analysis and design of mechanisms with illustrative examples. This course also provides ideas for students to employ the advantage of compliant mechanisms.</td></tr>
<tr><td>Contents of the course
(With approximate break up of hours)</td><td colspan="6">REVIEW OF MECHANISMS AND KINEMATICS (6 Lectures)
Introduction: kinematic links, pairs, chains, and mechanisms; motion: planar vs. spatial; four-bar linkage- relative motion;kinematic diagrams. Six-bar and eight-bar chains; degrees of Freedom; dyads, Grashof criteria, analysis versus synthesis
INTRODUCTION TO KINEMATIC SYNTHESIS (GRAPHICAL AND LINEAR ANALYTICAL METHODS) (20 Lectures)
Task of kinematic synthesis; type synthesis- the associated linkage concept, synthesis of compound-lever snips and yoke riveters; and tools of dimensional synthesis. Graphical synthesis: motion generation-two and three prescribed positions; path generation with and without prescribed timing for three prescribed positions. Review of complex numbers and complex number modeling in linkages Introduction to analytical synthesis: modeling linkages with dyads; dyads, vectors, and complex numbers; standard dyad form input parameters for motion generation, Number of prescribed positions vs. number of free choices: two, three, four, and five positions; three prescribed positions for motion, path, and function generation, Three-precision-point synthesis; ground-pivot specification.
HIGHER PAIR MECHANISMS (5 Lectures)
Analytical Synthesis
SPATIAL LINKAGES (8 Lectures)
Rigid body and spatial transformations; Spatial mechanisms-displacement, velocity and acceleration analyses; vector synthesis techniques for spatial mechanisms; application to robotics.
DESIGN OF COMPLIANT MECHANISMS (6 Lectures)
Flexibility and deflection, large-deflection analysis, pseudo-rigid body model, force-deflection relationships, compliant mechanism synthesis</td></tr>
<tr><td>Reference Books</td><td colspan="6">1. R.L. Norton , Design of Machinery, Fourth Edition, McGraw Hill, 2007
2. G. N. Sandor and A. G. Erdman, Advanced Mechanism Design: Analysis and Synthesis, Volume 2, Prentice-Hall, New York, 1984.
3. R. S. Hartenberg and J. Denavit,Kinematic Synthesis of Linkages" McGraw-Hill, New York, 1964
4. Larry L Howell Mechanisms, , John Wiley & Sons, Inc, 2001
5. Asok Kumar Mallik, Amitabha Ghosh and Gunter Dittrich, Kinematic Analysis and Synthesis of Mechanisms, CRC Press, 1994</td></tr>
</table>

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INTRODUCTION OF NEW COURSE

<table>
<tr><td rowspan="2">Course Title</td><td rowspan="2">Thermal Considerations in Design</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 provide knowledge in understanding the significance of thermal consideration in design such as Heat transfer analysis, Materials performance, Heating & cooling technology, Instrumentation & control.</td></tr>
<tr><td>Contents of the course
(With approximate break up of hours)</td><td colspan="6">Basics of fluid mechanics and heat transfer - Conduction Convection and radiation - Two phase heat transfer - Fins and extended surfaces
Thermal design and analysis: Thermal insulation - structural materials in thermal design – heat exchangers – thermal sensors – automatic temperature control
Effect of temperature in physical properties of material – Thermal stress & strain – Synergetic effect of temperature with mechanical failure modes – Effect of product shape, size & color in heat transfer</td></tr>
<tr><td>Text Books</td><td colspan="6">1. YunusCengel; Robert Turner, Fundamentals of Thermal-Fluid Sciences, McGraw-Hill Higher Education, 3rd edition 2008.
2. Ralph Remsburg, Thermal Design of Electronic Equipment, CRC Press, 2000.</td></tr>
<tr><td>Reference Books</td><td colspan="6">1. Eric C. Guyer, Handbook of Applied Thermal Design, CRC Press, 1999.</td></tr>
</table>

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INTRODUCTION OF NEW COURSE

Course Title	Design with Advanced Engineering Materials	Course No *(will be assigned)*				
Specialization	Mechanical Engineering	Structure (LTPC)	3	0	0	3
Offered for	PG/Ph.D	Status	Core ☐		Elective ☐	
Faculty	Prof.R.Gnanamoorthy	Type	New ■		Modification ☐	
Pre-requisite		To take effect from				
Submission date	June 2012	Date of approval by Senate				
Objectives	This main theory course aims to expand the knowledge and understanding of a design engineer in the product design aspects, manufacturing considerations etc while opting for new metals, polymer, composite, ceramics etc. The various behaviors of the materials in form of products will be dealt through case studies.					
Contents of the course *(With approximate break up of hours) 42 Hrs*	New engineering materials: metals, polymers, composites and ceramics (6 Hrs) Mechanical behavior and properties relevant for design engineers (6 Hrs) Tailoring properties, processing and structure to meet design criteria (6 Hrs) Selection of materials: materials aspects, cost and manufacturing considerations (6 Hrs) Polymer, metal and ceramics matrix composites based product design (6 Hrs) Surface modifications and its implications in design (7 Hrs) Case studies (5 Hrs)					
Textbook	1. G E Dieter, Engineering Design: Materials and Processing Approach, McGraw-Hill, 1999 2. M F Ashby, Materials Selection in Mechanical Design, Butterworth Heinemann Publishers Oxford, 1999					
References	1. M MFarag, Materials Design for Engineering Design, Prentice Hall, 1997. 2. Daniel Ga, Suong Van Hoa, Stephen W Tsai, Composite Materials: Design and Applications, CRC Press 2002, Paris					

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INTRODUCTION OF NEW COURSE

<table>
<tr><td rowspan="2">Course Title</td><td rowspan="2">Advanced Engineering Simulation Practice - I</td><td>Course No
(will be assigned)</td><td colspan="4"></td></tr>
<tr><td>Structure (LTPC)</td><td>1</td><td>0</td><td>3</td><td>3</td></tr>
<tr><td>Offered for</td><td>M.Des</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 offers practice, where the students can use the concept of computer simulation for solving design related problems.</td></tr>
<tr><td>Contents of the course
(With approximate break up of hours)</td><td colspan="6">Numerical simulation of product behavior under various physical conditions – Simulation of dynamic systems - Kinematic simulation of mechanism - Dynamic analysis of machines.
Exercise relevant to implementations of engineering concepts in product design.</td></tr>
<tr><td>Reference Books</td><td colspan="6">1. Chapra. S. C and canale R.P, Numerical Methods for Engineers, Tata McGraw Hill, 2006.
2. Sham Tickoo, Pro/Engineer Wildfire 4.0 for Engineers and Designers, Dreamtech Press, 2009.</td></tr>
</table>

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

INTRODUCTION OF NEW COURSE

Course Title	Product Conceptualization and Visualization	Course No *(will be assigned)*					
Specialization	Product Design	Structure (LTPC)	1	0	3	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 highlights the importance of sketching and models as a creative thinking tool, which helps to express, communicate and document ideas through sketches and models. The students will be exposed to method of clay modeling, foam modeling, carving etc. The students will learn the art of systematic design and conceptualize a novel product and communicate the product using models.						
Contents of the course *(With approximate break up of hours) 42 Hrs*	Difference between sketching in Art and Design. Method of Expressing, communicating and documenting technical ideas through sketches and free hand sketches with exercises to sensitize for scale and proportion. (6 Hrs) Importance of Clay, Foam, Wood modeling and modern 3D printing. Examples of renderings and coloured representations used by creative designers; story boarding. (4 Hrs) Aesthetics appreciation using Gestalt principles of examples in product graphics, Art, painting, sculpture. Overview of 3D CAD as a creative design visualizing medium – Visualization using Walk thorough, Exploded views, animations. (4 Hrs) Lab session: Conceptualizing a product Form for an everyday use product in the form of perspective sketches. Emphasis on aesthetics, visual quality, finish, texture and colour. Visualizing it in 3D CAD rendering software, creating presentation views, walkthroughs, and animations for presentations. Fabrication of a simulation/ mockup model of the improved housing/ component/ part using plastics sheets, wood, metal, board, plaster etc in workshop.						
Textbook	1. Alan Pipes, Drawing for Designers; Laurence King Publishing, London 2007. 2. Amye. Arntson; Graphic Design Basics; Thomson 2007. (International student edition) 3. Jon M.Duff& William A Ross; Engineering Design and Visualisation; CENGAGE Learning, India 2009						
References	1. Kevin Otto & Kristin Wood; Product Design: Techniques in Reverse Engineering and New Product development; Pearson, Low priced edition 2004. 2. Choudhury S.K Hazra, Elements of Workshop Technology Vol. 1/2, Asia Publishing House, 1986 3. John Bowers; Introduction to two dimensional design – understanding Form & Function, John Wiely& Sons. 1999.						

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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>
</table>

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DESIGN AND MANUFACTURING (IIITD&M) KANCHEEPURAM

INTRODUCTION OF NEW COURSE

Course Title	Design for X	Course No	DES 508				
Specialization	Manufacturing Engineering	Structure (LTPC)	3	0	0	3	
Offered for	Ph.D / M.Des / B.Tech	Status	Core✓		Elective✓		
Faculty		Type	New✓		Modification		
Pre-requisite	Design / Manufacturing	To take effect from	August 2011				
Submission date	Aug 2011	Date of approval by AAC					
Objectives	Design for 'X' focuses on various aspects namely assembly, installation, maintenance, validation, manufacture, quality, reuse, speed, cost, environment, test, ergonomics,LCA, maintability, reliability. It is possible to estimate the difficulty of these aspects by following design principlesand eliminate unnecessary issues to design robust products.						
Contents of the course *(With approximate break up of hours)*	DF 'X' Overview - Advantages of applying DF 'X', Process capabilities - Design for Manual Assembly - Design guidelines - Effect of part symmetry, Handling time- Manual Assembly Database - Quality- Design for Quality - SQC- Quality measures - Zero Defect Manufacturing Design for Environment - Design for environmental packaging- Environmentally friendly - Concepts in paper and packaging products - efficient use of materials and space - use of recycled and/or recyclable materials. Life cycle assessment (LCA) - Environmental impact of a product or process - comparison of different products on energy use - toxicity - acidification - CO2 emissions - ozone depletion - resource depletion - Sustainability - Green Manufacturing Ergonomics in Design - Needs of practicing human factors/ergonomics (HF/E)-usability of products, systems, tools, and environments - design and implementation. HF/E research and methods in design - development -prototyping - test and evaluation training- and manufacturing processes of a product or system. Electrical Connections and Wire Harness Assembly - Wire or Cable Harness Assembly- Wire or Cable Harness Assembly - Types of Electrical Connections - Types of Wires and Cables - Preparation and Assembly Times - Analysis Method Design for High-Speed Automatic Assembly and Robot Assembly - Design of Parts for High-Speed Feeding and Orienting - High-Speed Automatic Insertion - Product Design for Robot Assembly Printed Circuit Board Design for Manufacture and Assembly - Design Sequence for Printed Circuit Boards - Types of Printed Circuit Boards - Assembly of Printed Circuit Boards - Estimation of PCB Assembly Costs - PCB Manufacturability. Design for Injection molding - Injection molding materials, Molding cycle, Systems, molds, machine size, cycle time, Cost estimation, Insert molding.						
Text	1. Geoffrey Boothroyd, Peter Dewhurst, Winston Knight, "Product Design for Manufacture and Assembly", Marcel Dekker Inc, Newyork, 2010. 2. CorradoPoli, "Design for Manufacturing", Butterwoth-Heinmann, 2001.						
References	1. James G. Bralla, "Design for Manufacturing Handbook", McGraw Hill, 1998. 2. Paul Drake, "Dimensioning and Tolerancing Handbook", McGraw Hill, 1999.						

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

INTRODUCTION OF NEW COURSE

Course Title	Failure Analysis and Design	Course No *(will be assigned)*	MEC 509			
Specialization		Structure (LTPC)	3	0	0	3
Offered for	Ph.D / M.Des / B.Tech	Status	Core✓		Elective✓	
Faculty		Type	New✓		Modification	
Pre-requisite		To take effect from	Aug 2011			
Submission date	Aug 2011	Date of approval by AAC				
Objectives	Failure analysis and design provides ideas and methods to identify potential design weaknesses through systematic analysis. The course also focuses on the cause of the failure and its effect.					
Contents of the course	Failure Analysis and Design, Systematic approach to failure analysis; Material failure modes and their identification, Ductile and brittle fracture; Failure analysis tools & techniques; Failure theories, Failure due to static loads. Failure due to variable loading, Fatigue and fracture mechanics approach to product design, Life prediction. Surface failures - Wear, corrosion; impact loading; Environmental effects causing failures; Case Studies - Failure analysis of mechanical and electronic systems.					
Text and References	1. Charles Brooks, Ashok Choudhury, Charlie R Brooks, 'Failure Analysis of Engineering Materials', McGraw Hill, 2001. 2. Perry L. Martin, Electronic Failure Analysis Handbook, McGraw Hill, 2004. 3. Arthur J. McEvily, Metal Failures: Mechanisms, Analysis, Prevention, Wiley-Interscience; 2001 4. Jack A. Collins, 'Failure of Materials in Mechanical Design: Analysis, Prediction, Prevention,' Wiley-Interscience; 1993					

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INTRODUCTION OF NEW COURSE

<table>
<tr><td rowspan="2">Course Title</td><td rowspan="2">Advanced Engineering Simulation Practice - II</td><td>Course No
(will be assigned)</td><td colspan="4"></td></tr>
<tr><td>Structure (LTPC)</td><td>0</td><td>0</td><td>3</td><td>2</td></tr>
<tr><td>Offered for</td><td>M.Des</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 offers practice, where the students can use the concept of computer simulation for solving design related problems.</td></tr>
<tr><td>Contents of the course
(With approximate break up of hours)</td><td colspan="6">Simulation and analysis of mechanical system using sophisticated tools – Finite Element Analysis concepts – Analysis of products - Implementation of FEA results in Product design.</td></tr>
<tr><td>Reference Books</td><td colspan="6">1. Karris S. T, Introduction to Simulink with Engineering Application, Orchard Publications, 2006.
2. Logan. D. L, A First Course in the Finite Element Method, Thomson, 2007.</td></tr>
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INTRODUCTION OF NEW COURSE

<table>
<tr><td rowspan="2">Course Title</td><td rowspan="2">Product Design Practice and Prototyping</td><td>Course No
(will be assigned)</td><td colspan="4"></td></tr>
<tr><td>Structure (LTPC)</td><td>0</td><td>0</td><td>6</td><td>4</td></tr>
<tr><td>Offered for</td><td>M.Des.</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">The purpose of this practice course is to give an in-depth practical understanding of the entire process of new product development, which includes visual appearance of products, design for manufacture, design to meet market needs, and design for cost reduction.</td></tr>
<tr><td>Contents of the course
(With approximate break up of hours)</td><td colspan="6">Interdisciplinary team based product design practice oriented project.

Teams will chose a real world or industry sponsored problem / product/ situation to work upon. Students will plan the project, Conduct user requirement study, market opportunities and competitive product study, develop product specification, conduct IPR audits,Conceptualize, visualize & build a prototype/ mockup.Regular presentations of progress and evaluation by other teams.</td></tr>
<tr><td>Reference Books</td><td colspan="6">1. Clive Dym& Patrick Little; Engineering Design: a project based introduction, Johan Wiley & Sons.2004.
2. James Garratt; Design and Technology; Cambridge University Press 1998.
3. Richard Birmingham et al; Understanding Engineering Design, PHI Delhi 1998.</td></tr>
</table>

ANNEXURE II

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

COURSE REVISION

Course Title	Design for Quality & Reliability	Course No *(will be assigned)*	DES 601			
Specialization	Common for M.Des ESD & MSD	Structure (LTPC)	3	0	3	5
Offered for	M.Des / Ph.D	Status	Core ■		Elective ☐	
Faculty		Type	New ☐		Modification ■	
Pre-requisite		To take effect from				
Submission date		Date of approval by AAC				
Objectives	The design students require the knowledge of quality control and reliability. This course provides the integrated approach to reliability-based design and manufacturing of components and systems with quality.					
Contents of the course *(With approximate break up of hours)*	Central Limit Theorem for a family of reliability measures, modeling and reliability analysis of multi-state systems, Weibull data analysis for few or no failures, Markovian performance evaluation methods, software reliability and testing, Design for Reliability - Reliability Analysis- Reliability Testing- Probability Distributions- Performance Standards - Process Capability- Risk Assessment- Design of Experiments- Response Surface Models- Process Capability Modeling- Computation of variation- Probalistic Optimization- Robust Design- Tolerance Analysis- Design verification - Reliability Testing - Control charts. Availability and Maintainability./					
Text and References	Text Books 1. Betsterfield D.H. Quality Control, Prentice Hall Publication, 8th Edition, 2008. 2. K.C. Kapur, L.R. Lamberson, Reliability in Engineering Design, John Wiley & Sons, 1st Edition, 1977. Reference Books 1. A.Birolini, Reliability Engineering, Theory and Practice, Springer, 5th Edition, 2005. 2. Recent Advances in Reliability and Quality in Design, Hoang Pham, Springer Series in Reliability Engineering, ISBN: 978-1-84800-112-1, 2008. 3. Introduction to Statistical Quality Control, Douglas, C. Montgomery, John Wiley & Sons, NY, 2009.					