Syllabus of B. Tech. Mechanical – Smart Manufacturing for 1st and 2nd Semesters

(According to 22nd, 23rd and 31st Senate meeting minutes)

Course Title	Calculus	Course No *(will be assigned)*				
Specialization	Mathematics	Structure (LTPC)	3	0	0	3
Offered for	UG& DD	Status	Core ■		Elective ☐	
Faculty		Type	New ☐		Modification ☐	
Pre-requisite		To take effect from	August 2014			
Submission date	21/07/2014	Date of approval by Senate				
Objectives	The course will introduce the student to basic concepts in Calculus such as convergence, differentiation & integration and its applications.					
Contents of the course	Limit and Continuity of functions defined on intervals, Intermediate Value Theorem, Differentiability, Rolle's Theorem, Mean Value Theorem, Taylor's Formula (5) Sequences and series (7) Definite integral as the limit of sum – Mean value theorem – Fundamental theorem of integral calculus and its applications (9) Functions of several variables – Limit and Continuity, Geometric representation of partial and total increments Partial derivatives – Derivatives of composite functions (8) Directional derivatives – Gradient, Lagrangemultipliers – Optimization problems (7) Multiple integrals – Evaluation of line and surface integrals (6)					
Textbook	1. Thomas. G.B, and Finney R.L, Calculus, Pearson Education, 2007.					
References	1. Piskunov. N, Differential and Integral Calculus, Vol. I & II, Mir. Publishers, 1981. 2. Kreyszig. E, Advanced Engineering Mathematics, Wiley Eastern 2007. 3. J Hass, M D Weir, F R Giordano, Thomas Calculus, 11th Edition, Pearson.					

Course Title	Differential Equations	Course No *(will be assigned)*				
Specialization	Mathematics	Structure (LTPC)	3	0	0	3
Offered for	UG & DD	Status	Core ▬		Elective	
Faculty		Type	New		Modification ▬	
Pre-requisite		To take effect from	August 2014			
Submission date	21/07/2014	Date of approval by Senate				

Objectives	To provide an exposure to the theory of ODEs & PDEs and the solution techniques.
Contents of the course	Linear ordinary differential equations with constant coefficients, method of variation of parameters – Linear systems of ordinary differential equations (10) Power series solution of ordinary differential equations and Singular points Bessel and Legendre differential equations; properties of Bessel functions and Legendre Polynomials (12) Fourier series (6) Laplace transforms elementary properties of Laplace transforms, inversion by partial fractions, convolution theorem and its applications to ordinary differential equations (6) Introduction to partial differential equations, wave equation, heat equation, diffusion equation (8)
Textbooks	1. Simmons. G.F, Differential Equations, Tata McGraw Hill, 2003. 2. Kreyszig. E, Advanced Engineering Mathematics, Wiley, 2007.
References	1. William. E. Boyce and R. C. Diprima, Elementary Differential Equations and Boundary Value Problems, John Wiley, 8 Edn, 2004. 2. Sneddon. I, Elements of Partial Differential Equations, Tata McGraw Hill, 1972. 3. Ross. L.S, Differential Equations, Wiley, 2007. 4. Trench, W, Elementary Differential Equations, http://digitalcommons.trinity.edu/mono

Course Title	Engineering Mechanics	Course No *(will be assigned)*				
Specialization	Physics	Structure (LTPC)	3	0	0	3
Offered for	UG & DD	Status	Core ■		Elective □	
Faculty		Type	New ■		Modification □	
Pre-requisite		To take effect from				
Submission date	March 2014	Date of approval by Senate				
Objectives	In this course, students will learn a basic knowledge of forces, moments on the components of a structure of engineering problems. They will also learn to analyze: forces and moments on a static rigid body, moments on/between multiple static rigid bodies and internal forces/moments in a static rigid body. This course will help the student to develop the ability visualize physical configurations in terms of real materials constraints which govern the behavior of machine and structures.					
Contents of the course	Equivalent force systems; free-body diagrams; degrees of freedom; equilibrium equations; analysis of determinate trusses and frames; properties of surfaces - friction; (10) Particle Dynamics: equations of motion; work-energy and impulse-momentum principles;. Generalized coordinates; Lagrangian mechanics. (12) Rigid body dynamics: plane kinematics and kinetics of rigid bodies including work-energy and impulse-momentum principles; single degree of freedom rigid body systems (10) Stresses and strains (including thermal starin); principal stresses and strains; generalized Hooke's Law; free vibration of single degree-of freedom systems. (10)					
Textbook	1. F. Beer. R. Johnston, Vector mechanics for engineers: statics and dynamics. Tata McGraw-Hill, 2010.					
References	1. Meriam. J. L and Kraige. L. G, Engineering Mechanics, Vol. I – Statics, Vol 2: Dynamics, 2007. 2. H. Goldstein , Classical Mechanics, Pearson Education, 2011. 3. Kittle. C, Mechanics – Berkley Physics Course, Vol. 1, Tata McGraw Hill, 2008.					

Course Title	Engineering Electromagnetics	Course No *(will be assigned)*				
Specialization	All Branches of UG	Structure (LTPC)	3	0	0	3
Offered for	UG	Status	Core ■		Elective ☐	
Faculty	Tapas Sil	Type	New ■		Modification ☐	
Pre-requisite	-----	To take effect from				
Submission date	21/07/2014	Date of approval by Senate				

Objectives

The objective of this course is to give an idea how the electromagnetic wave behaves. This also provides an understanding of theories of electrostatics, magnetism and electrodynamics with their applications. It will enhance the problem solving capacity of the student.

Contents of the course

Vectors - an introduction; Unit vectors in spherical and cylindrical polar co-ordinates; Concept of vector fields; Gradient of a scalar field; flux, divergence of a vector, Gauss's theorem, Continuity equation; Curl –rotational and irrotational vector fields, Stoke's theorem. (12)

Electrostatics:
Electrostatic potential and field due to discrete and continuous charge distributions, boundary condition, Energy for a charge distribution, Conductors and capacitors, Laplaces equation Image problem , Dielectric polarization, electric displacement vector, dielectric susceptibility , energy in dielectric systems. (10)

Magnetostatics:
Lorentz Force law Biot-Savart's law and Ampere's law in magnetostatics, Divergence and curl of B, Magnetic induction due to configurations of current-carrying conductors, Magnetization and bound currents, Energy density in a magnetic field Magnetic permeability and susceptibility. (10)

Electrodynamics:
Electromotive force, Time-varying fields, Faradays' law of electromagnetic induction,
Self and mutual inductance, displacement current, Maxwell's equations in free space. Boundary condition, propagation in linear medium. Plane electromagnetic waves—reflection and refraction, electromagnetic energy density, Poynting vector. (10)

Textbook

1. W. H. Hayt and J. A. Buck, Engineering Electromagnetics, Tata McFraw Hill Education Pvt. Ltd, 2006.

References

1. Grifiths. D. J, Introduction to Electrodynamics, Prentice Hall, 2007.
2. Purcell. E.M, Electricity and Magnetism Berkley Physics Course, V2, Tata McGraw Hill, 20 08.
3. Feynman. R.P, Leighton. R.B, Sands. M, The Feynman Lectures on Physics, Narosa Publish ing House, Vol. II, 2008. Hill, 2008.
4. G. B. Arfken, H. J. Weber and F. E. Harris, Mathematical Methods for Physicists, Academic Press, 2013.

Course Title	Computational Engineering	Course No *(will be assigned)*				
Specialization	Computer Engineering	Structure (LTPC)	3	0	0	3
Offered for	UG & DD	Status	Core ■		Elective □	
Faculty		Type	New □		Modification ■	
Pre-requisite		To take effect from	August 2014			
Submission date	March 2014	Date of approval by Senate				
Objective	The course introduces students to computer systems and organization and a higher level language (C) to communicate with the system. The student would be equipped with basic skillset required to interact with the system / create applications supporting a command line interface.					
Contents of the course	Introduction to computers & breadth scope in engineering – Computer organization basics – Problem solving strategies – Higher level languages – Program design and development – Phases of program development - Basic programming constructs in C – Data types in C – Input output statements – Operators, control structures in C - Sequential, Selection, Repetition (12) Functions in C –Function declaration, definition – Built and user defined functions –Storage classes and scope –Recursive functions – Arrays in C – multidimensional arrays-String manipulations – Library support (14) Introduction to pointers – References – Pointer Arithmetic – Formatted input output – User defined data types – File processing in C - Sequential & Random - Dynamic Memory Allocation – Command Line Arguments – Usable CLI based applications - Non linear equations– Bisection, Newton raphson methods. (16)					
Textbook	1. Deitel P J and Deitel H M, C : How To Program, Prentice Hall, 7th Edn, 2012.					
References	1. Kernighan, Ritchie D, The C Programming Language, Prentice Hall, 2 Edn. 2. Chapra S.C and Canale R.P, Numerical Methods for Engineers, McGraw Hill, 2006.					

Course Title	Basic Electrical and Electronics Engineering	Course No *(will be assigned)*					
Specialization		Structure (LTPC)	3	0	0	3	
Offered for	UG/DD	Status	Core ■		Elective □		
Faculty		Type	New ■		Modification □		
Pre-requisite		To take effect from					
Submission date	21/07/2014	Date of approval by Senate					

Objectives	Learn how to develop and employ circuit models for elementary electronic components and circuit analysis, network theorems, role of power flow and energy storage in electronic circuits;step and sinusoidal-steady-state response, AC signal powers, three phase circuits and loads, and brief introduction to diodes and BJTs.
Contents of the course	Electrical circuit elements: voltage and current sources, R,C,L,M,I,V, linear, non linear, active and passive elements, inductor current and capacitor voltage continuity, Kirchhoff's laws, Elements in series and parallel, superposition in linear circuits, controlled sources, energy and power in elements, energy in mutual inductor and constraint on mutual inductance (7) Network analysis: Nodal analysis with independent and dependent sources, modified nodal analysis, mesh analysis, notion of network graphs, nodes, trees, twigs, links, co-tree, independent sets of branch currents and voltages (6) Network theorems: voltage shift theorem, zero current theorem, Tellegen's theorem, reciprocity, substitution theorem, Thevenin's and Norton's theorems, pushing a voltage source through a node, splitting a current source, compensation theorem, maximum power transfer (8) RC and RL circuits: natural, step and sinusoidal steady state responses, series and parallel RLC circuits, natural, step and sinusoidal steady state responses (5) AC signal measures: complex, apparent, active and reactive power, power factor (2) Introduction to three phase supply: three phase circuits, star-delta transformations, balanced and unbalanced three phase load, power measurement, two wattmeter method (5) Semiconductor diodes and application: PN diodes, rectifiers and filters, clipping and clamping circuits, voltage multiplier circuits (5) Bipolar Junction Transistors: DC characteristics, CE, CB, CC configurations, biasing, load line (4)
Textbook	1. Hayt. W. W, Kemmerly. J.E, and Durbin. S.M, Engineering Circuits Analysis, Tata McGraw Hill, 2008. 2. Boylestad R. &Nashelsky L., Electronic Devices & Circuit Theory, Pearson Education, 2009
References	1. Hughes Edward, Electrical & Electronic Technology, Pearson Education, 2007. 2. Hambley. A, Electrical Engineering Principles and Applications: International Version, Pearson Education, 4 Edn, 2007. 3. Alexander.C. K. & Mathew. N. O. Sadiku, Fundamentals of Electrical circuits, Tata McGraw Hill, 2008.

Course Title	Science and Engineering of Materials	Course No *(will be assigned)*				
Specialization		Structure (LTPC)	3	0	0	3
Offered for	UG & DD	Status	Core ■		Elective □	
Faculty		Type	New ■		Modification □	
Pre-requisite		To take effect from	August 2014			
Submission date	March 2014	Date of approval by Senate				
Objectives	The objective of this course is to provide a basic conceptual understanding of crystal structure and its relevance in classification of different materials based on their properties. The engineering of structure of different materials and development of natural and man-made materials with their applications would also be discussed.					
Contents of the course	Crystal structure, defects, crystallographic planes, directions, slip, deformation mechanical behaviour, and strengthening mechanisms. (10) Electrical, electronic, magnetic properties of materials, property management and case studies alloys, steel, aluminum alloys. (6) Polymeric structures, polymerization, structure property relationships, processing property relationships,. (6) Natural and manmade composites, processing, properties, applications (6) Ceramics, manufacturing and properties, applications (4) Environmental degradation of engineering materials (4) Introduction to Nano, Bio, Smart and Functional materials. (4)					
Textbook	1. Callister's Materials Science and Engineering, 2nd ED, Adapted by R Balasubramaniam, 2010, ISBN-13: 978-8126521432, Wiley India Ltd. 2. V Raghavan, "Materials Science and Engineering: A First Course, 5th Ed, 2004, PHI India					
References	1. Donald R. Askeland K Balani, "The Science and Engineering of Materials," 2012, Cengage Learning					

Course Title	Concepts in Engineering Design	Course No *(will be assigned)*				
Specialization	Design	Structure (LTPC)	3	0	0	3
Offered for	UG & DD	Status	Core ■		Elective □	
Faculty		Type	New □		Modification ■	
Pre-requisite		To take effect from				
Submission date	March 2014	Date of approval by Senate				
Objectives	The purpose of this course is to introduce to the undergraduate student the fundamental principles of Engineering Design which is very important and relevant in the context of todays engineering professionals. The course will be generic to all engineering disciplines and will not require specialized preparation or prerequisites in any of the individual engineering disciplines. Case studies from field situations and real products will be used to illustrate these principles.					
Contents of the course	Design Conceptualization and Philosophy, Original, Adaptive, Variant and Re-Design, Evolution of Concept, Need for Systematic design Past methods of and design Product life cycle, Innovation, Types of innovation Needs and opportunities, Vision and Mission of a concept, Type of needs, Technology S - curve, Need analysis, market analysis and competitive analysis, Kano Diagrams, SWOT analysis Conceptualization techniques – Idea generation – ideation, brainstorming, Trigger session Brain writing, Mind maps, SCAMPER, TRIZ, Biommicry, Shape mimicry, Familiarity Matrix Concepts screening, Concept testing - exploratory tests, Assessment tests , Validation tests Comparison tests – Case studies Organization of design concept and design methods, Engineering Design - Descriptive and prescriptive model, Design decisions and development of design Group work and case studies					
Textbook	1. Otto. K and Wood, K, Product Design, Pearson Education, 2001. 2. Pahl. G and Beitz. G, Engineering Design, Springer, 1996					
References	1. Ullman. D. G, The Mechanical Design Process, McGraw- Hill, 1997.					

Course Title	English for Communication	Course No *(will be assigned)*				
Specialization	Humanities	Structure (LTPC)	2	0	0	2
Offered for	UG and DD	Status	Core ■		Elective □	
Faculty		Type	New ■		Modification □	
Pre-requisite		To take effect from				
Submission date	March 2014	Date of approval by Senate				
Objectives	Read a given text at a reasonable speed - Comprehend and critically read the text - Understand and use lexis accurately and appropriately - Listen to various types of spoken discourses understand, analyse and apply the same Listen and comprehend lectures and speeches - Speak coherently and fluently on a given topic Speak with confidence and present point of view - Write fluently and coherently on a given topic - Write various types of tasks short and long - Use lexis appropriate to the task while writing - Use accurate grammatical structures while speaking and writing - Give Power Point presentations. Use idioms appropriately.					
Contents of the course	Listening – Listening comprehension. Listen to various types of spoken discourses understand, analyse and apply the same. Listen and comprehend lectures and speeches. (3) Speaking – Organization, articulation and correctness. Speak with confidence and present a point of view. Speak coherently and fluently on a given topic. (8) Reading – Comprehend and critically read the text. Read a given text at a reasonable speed (5) Writing – Memos, letters, reports, reviews and writing fluently and coherently on a given topic. Write various types of tasks; short and long. (7) Presentation Skills – Oral presentation using Power Point. Study Skills – Dictionary, thesaurus & reference Structure of English – Remedial grammar/ Grammar for Communication (5)					
Textbook	1. Shreesh Choudhry, Devaki Reddy , Technical English, Macmillan Publishers,2009.					
References	1. Martin Hewings , Advanced English Grammar, Cambridge University Press,2007. 2. V. Saraswathi, Leena Anil, Manjula Rajan , Grammar for Communication,2012. 3. Thomson and Martinet , Practical English Grammar, Oxford University Press, 1986. 4. 4. Leech, Geoffrey & Jan Svartvik, A Communicative Grammar of English, Longman,2003					

Course Title	Design History	Course No *(will be assigned)*				
Specialization	Design	Structure (LTPC)	2	0	0	2
Offered for	UG & DD	Status	Core ■		Elective □	
Faculty		Type	New □		Modification ■	
Pre-requisite		To take effect from				
Submission date	March 2014	Date of approval by Senate				
Objectives	This course will help students to (a) understand the evolution and application of the concept of Design in everyday life of people (b) appreciate its role in national and international economic and social systems, and (c) analyze the emerging designs from a societal perspective.					
Contents of the course	Definition of Design; Origin of designers; Historical context of design and designers. Designers and designed products: Art, design and technology - Select International and Indian designers. Industrial Revolution: Mass production, Birth of Modern architecture, International Style, The modern home. Craft and Design: Type forms; William Morris and Arts and Craft Movement; Shantiniketan. Design movements: Art Nuoveau; Art Deco, Werkbund; Bauhaus; De Stijl. Changing values: Information Revolution: Impact of technology, industrialization and globalization on design: kitsch, pastiche, 'retro'; Shopping malls. Design Studies: Materials and techniques; Chinese ceramics; Typology; Content analysis : Anthropology / sociology; Nationalist and global trends in Design; Nationalist Design; Global trends and global identity; Nostalgia, Heritage and Design;					
Textbook	1. Conway Hazel, Design History – A Students' Handbook, Routledge: London, 1987.					
References	1. Raizman David, History of Modern Design, Graphics and Products since the Industrial Revolution. Laurence King Publishing :London, 2003 2. Walker John. A, Design History and History of Design. Pluto Press: London, 2003. 3. Woodham Jonathan M, Twentieth Century Design, Oxford University Press: Oxford, 2003.					

Course Title	Earth, Environment & Design	Course No *(will be assigned)*				
Specialization	Interdisciplinary	Structure (LTPC)	2	0	0	2
Offered for	UG	Status	Core ■		Elective □	
Faculty		Type	New ■		Modification □	
Pre-requisite		To take effect from	August 2014			
Submission date	March 2014	Date of approval by Senate				
Objectives	The course aims to provide an understanding of systems and processes in aquatic and terrestrial environments, and to explore changes in the atmosphere, lithosphere, hydrosphere, biosphere, and the evolution of organisms, since the origin of life on earth.					
Contents of the course	Introduction to environment and ecology – Ecosystems – Principles concepts, components and function Atmospheric, aquatic and terrestrial ecosystems – Biogeochemical cycles and limiting factor concepts –Impacts of natural and human activities on ecosystems Environmental policies, acts and standards – Sustainable development and environmental impact assessment – Institutional frame work and procedures for EIA Methods for impact identification-matrices – Networks and Check lists – Environmental settings, indices and indicators Prediction and assessment of the impacts on air, water, land, noise and biological environments – Assessment of impacts of the cultural, socioeconomic and ecosensitive environments Mitigation measures, economic evaluation – Public participation and design making –Preparation of Environmental statement					
Textbook	1. Rubin. E. S, Introduction to Engineering and the Environment, McGraw Hill, 2000. 2. Masters. G. M., Introduction to Environmental Engineering & Science, Prentice Hall,1997.					
References	1. Henry. J. G, and Heike, G. W, Environmental Science & Engineering, Prentice Hall International, 1996. 2. Dhameja. S. K, Environmental Engineering and Management, S. K. Kataria and Sons, 1999. 3. Shyam Divan and Armin Rosancranz, Environmental Law and Policy in India, Cases, Materials and Statutes, Oxford University Press, 2001.					

Course Title	Professional Ethics for Engineers	Course No *(will be assigned)*				
Specialization	Management	Structure (LTPC)	2	0	0	2
Offered for	UG & DD	Status	Core ■		Elective □	
Faculty		Type	New □		Modification ■	
Pre-requisite		To take effect from	August 2014			
Submission date	March 2014	Date of approval by Senate				
Objectives	In this course, students will be aware on Human Values and Ethics in Professional life. They will understand social responsibility of a professional person especially of an engineer. They will learn the techniques and logical steps to solve ethical issues and dilemmas.					
Contents of the course	Professionalism and Ethics: Profession and occupation, Qualities of a professional practitioner, Variety of ethics and moral issues, moral dilemmas; Kohlberg's theory - Gilligan's theory of moral development - consensus and controversy. Values- concept of intrinsic good, instrumental good and universal good. Kant's theory of good action and formula for universal law of action. Codes of ethics for engineers: need and scope of a code of ethics; Ethics and Law (10) Understanding Ethical Problems: ethical theories – utilitarianism, cost-benefit analysis, Duty ethics - Right ethics and virtue ethics. Applications for various case studies. Ethical Problem Solving Techniques: issues-factual, conceptual and moral; Bribery and acceptance of gifts; Line drawing and flow charting methods for solving conflict problem. (09) Risk, Safety and Accidents: Safety and risk, types of risk, types of accidents and how to avoid accidents. Rights and Responsibilities of an Engineer: Professional responsibility, professional right and whistle blowing. Ethical Issues in Engineering Practice: environmental ethics, computer ethics, ethics and research. (09)					
Textbook	1. Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, 2004					
References	1. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Wadsworth Thompson Leatning, United States, 2000. 2. Velasquez. M. G, Business Ethics and Cases, 5 Edn, Prentice Hall, 2002. 3. Sekha. R.C, Ethical Choices in Business Response, Sage Publication, 2002. 4. Mike Martin and Roland Schinzinger, Ethics in Engineering, McGraw Hill, 1996.					

Course Title	Engineering Skills Practice	Course No *(will be assigned)*				
Specialization	Interdisciplinary	Structure (LTPC)	0	0	3	2
Offered for	UG & DD	Status	Core ■		Elective □	
Faculty		Type	New □		Modification ■	
Pre-requisite	----	To take effect from	August 2014			
Submission date	March 2014	Date of approval by Senate				
Objectives	The objective of this course is to give an exposure on the basic practices followed in the domain of mechanical, electrical, electronics and communication engineering. The exercises will train the students to acquire skills which are very essential for the engineers through hands-on sessions.					
Contents of the course	Experiments will be framed to train the students in following common engineering practices: Basic manufacturing processes: Fitting – Drilling & tapping – Material joining processes – PCB making – Assembling and testing – Electrical wiring. Familiarization of electronic components by Nomenclature, meters, power supplies, function generators and Oscilloscope – Bread board assembling of simple circuits: IR transmitter and receiver – LED emergency lamp – Communication study: amplitude modulation and demodulation – PCB: designing and making of simple circuits – Soldering and testing of electronic components and circuits –Various types of Domestic wiring practice: Fluorescent lamp connection, Staircase wiring – Estimation and costing of domestic and industrial wiring – power consumption by Incandescent, CFL and LED lamps.					
Textbook	1. Uppal S. L., "Electrical Wiring & Estimating", 5Edn, Khanna Publishers, 2003. 2. Chapman. W. A. J., Workshop Technology, Part 1 & 2, Taylor & Francis.					
References	1. Clyde F. Coombs, "Printed circuits hand book", 6Edn, McGraw Hill, 2007. 2. John H. Watt, Terrell Croft, "American Electricians' Handbook: A Reference Book for the Practical Electrical Man", Tata McGraw Hill, 2002.					

Course Title	Engineering Electromagnetics Practice	Course No *(will be assigned)*				
Specialization	All Branches of UG	Structure (LTPC)	0	0	3	2
Offered for	UG	Status	Core ■		Elective ☐	
Faculty	Tapas Sil	Type	New ■		Modification ☐	
Pre-requisite	---	To take effect from				
Submission date	21/07/2014	Date of approval by Senate				
Objectives	The objective of this course is to give an hand on experience how the electromagnetic wave behaves in different situations. The students will be able to relate the knowledge they have got in the theory class with their experience. This course will enhance their skill of handling instruments and the presentation of the results obtained from the experiments.					
Contents of the course	Electrical and magnetic properties of materials based on the concept of electrical polarization, magnetization of materials will be studied in various experiments. Experiments based on theconcept ofphenomena such as interference, diffraction etc. related to electromagnetic waves will be done here and these methods will be applied to measure some unknown physical quantities such as wavelength of a light, diameter of a very thin wire, very small aperture for light etc.					
Textbook	1. IIITD&M Laboratory manual for Electromagnetic Wave Practice					
References	1. W. H. Hayt and J. A. Buck, Engineering Electromagnetics, Tata McFraw Hill Education Pvt. Ltd, 2006.					

Course Title	Computational Engineering Practice	Course No *(will be assigned)*				
Specialization	Computer Engineering	Structure (LTPC)	0	0	3	2
Offered for	UG & DD	Status	Core ■		Elective □	
Faculty		Type	New □		Modification ■	
Pre-requisite		To take effect from	Jan 2014			
Submission date	March 2014	Date of approval by Senate				
Objective	The practice course would supplement the concepts presented in COM 102 course with assignments on application use and creation using the various programming constructs supported in C language. Programming assignments employing the various constructs are used to address real life situations such as a telephone directory creation / search, student grading, etc. A demo session to highlight the usability aspect relating to software / application development shall also be included.					
Contents of the course *(With approximate break up of hours)*	Learning operating system commands - editors – compilation - Assignments on using the operating system and open office suite - Programs involving output statements, input statements and expression evaluation - Assignments covering If-then-else statement iterative statements - Programs using arrays and functions based approach – Recursion sorting (bubble Sort) on a set of integers and a set of strings and linear search over a set of integers and a set of strings - structures and files in C - Implementation of a grading system computation of e^x, sin(x) and cos(x) - Bisection and Newton Raphson methods in C.					
Textbook	1. Deitel P J and Deitel H M, C : How To Program, Prentice Hall, 7th Edn, 2012.					
References	1. Kernighan, Ritchie D, The C Programming Language, Prentice Hall, 2 Edn 2. Chapra S.C and Canale R.P, Numerical Methods for Engineers, McGraw Hill, 2006.					

Course Title	Measurements and Data Analysis Practice	Course No *(will be assigned)*				
Specialization	Interdisciplinary	Structure (LTPC)	0	0	3	2
Offered for	UG & DD	Status	Core ■		Elective □	
Faculty		Type	New ■		Modification □	
Pre-requisite		To take effect from				
Submission date	March 2014	Date of approval by Senate				
Objectives	To introduce the students to different measurements techniques/instruments of data acquisition and statistical methods of data analysis. At the end of the course, the student should be able to plan/design, conduct, analyze and report the results of an experiment.					
Contents of the course	Role of Experiments and measurements: Evaluation of different measurement techniques in measurement of various physical/chemical/mechanical/electrical/thermal/environmental parameters Reporting Methodology: Collection, consolidation and reporting of the data Probability and Statistics: Presentation, analysis and interpretation of the data Uncertainty/Error Analysis: Performance evaluation and determination Signal Characterization, data acquisition and Analysis: Study of vivid waveforms and digitization process					
Textbook	1. Patrick F. Dunn, "Measurement and Data Analysis for Engineering and Science", First Edition, McGraw-Hill Book Company, 2005					
References	1. Julius S. Bendat, Allan G. Piersol, "Random Data: Analysis and Measurement Procedures", 4th Edition, Wiley, 2010 2. Anthony J. Wheeler, Ahmad Reza Ganji, "Introduction to Engineering Experimentation" 3rd Edition, Prentice Hall, 2010					

Course Title	Materials and Mechanics Practice	Course No *(will be assigned)*				
Specialization	Physics	Structure (LTPC)	0	0	3	2
Offered for	UG & DD	Status	Core ☑		Elective ☐	
Faculty		Type	New ☑		Modification ☐	
Pre-requisite		To take effect from				
Submission date	March 2014	Date of approval by Senate				
Objectives	The objective of this course is to give an hand on experience with mechanical properties of an object. The students will be able to relate the knowledge they have got in the theory class with their experience. This course will enhance their skill of handling instruments and how to present the result.					
Contents of the course	Experiments here will give hand on experience of concepts of small oscillations, friction, elasticity and strength of material. Experiments will be done to measure various properties of different mechanical objects such as object such rigidity modulus, Young's modulus, radius of gyration etc. Study of material properties such as microstructure, hardness, response to tensile load and long-term constant loading etc. will also be done in various experiments.					
Textbook	1. IIITD&M Laboratory manual for Mechanics and Materials Practice					
References	1. F. Beer. R. Johnston, Vector mechanics for engineers: statics and dynamics. Tata McGraw-Hill, 2010. 2. Callister's Materials Science and Engineering, 2nd ED, Adapted by R Balasubramaniam, 2010,Wiley India Ltd.					

Course Title	Industrial Design Sketching	Course No *(will be assigned)*				
Specialization	Interdisciplinary	Structure (LTPC)	0	0	3	2
Offered for	UG & DD	Status	Core ■		Elective □	
Faculty		Type	New □		Modification ■	
Pre-requisite		To take effect from				
Submission date	March 2014	Date of approval by Senate				
Objectives	Develop necessary artistic skills required for the engineer to make communications with the industrial designers. Train the students to make realistic sketches of concept design using the commercial concept sketching software and hardware. This course will cover the concepts in perspective projections, shading, texturing, and concepts of light, shadow, reflection and colors.					
Contents of the course	• Role and importance of sketching in industrial design (2) • Principles of perspective drawing (8) • Perspective drawing of planar and curved shapes (12) • Shading and texturing (8) • Representation of shadow and reflections (8) • Colors in Industrial design and coloring (4) • Introduction to 3D forms and form development (4)					
Textbooks	1. Thomas C Wang, Pencil Sketching, John Wiley, 2002. 2. Itten Johannes, Design and Form, John Wiley, 1975.					
References	1. Kasprin Ron, Design Media – Techniques for Water Colour, Pen and Ink Pastel and colored markers, John Wiley,1999.					

Course Title	Engineering Graphics	Course No (will be assigned)				
Specialization	Interdisciplinary	Structure (LTPC)	1	0	3	3
Offered for	UG & DD	Status	Core ■		Elective □	
Faculty		Type	New □		Modification ■	
Pre-requisite		To take effect from	Aug 2014			
Submission date	March 2014	Date of approval by AAC				
Objectives	To impart the basic engineering problem solving skills and to teach the fundamentals in technical drawing. Train the students to make orthographic projections and isometric projects of objects using drawing instruments and commercial drafting software.					
Contents of the course *(With approximate break up of hours)*	• Introduction to IS code of drawing (1hr) • Construction of basic shapes (4 hrs) • Dimensioning principles (1hr) • Conventional representations (1 hr) • Orthographic projection of points, lines, planes, right regular solids and objects (17 hrs) • Section of solids and objects (4 hrs) • Isometric projection of objects (6 hrs) • Intersection of solids (4 hrs) • Development of surfaces (4 hrs)					
Textbook	1. Narayana. K.L, and Kannaiah. P, Engineering Drawing, Charaotar Publ House, 1998. 2. Bhatt. N.D, Engineering Drawing, New Age International, 2007.					
References	1. Gopalakrishnan. K.R, Engineering Drawing, Subash Stores, 2002. 2. Natarajan. K.V, A text book of Engineering Drawing, Classic Prints, 2000.					

Course Title	Design Realization	Course No *(will be assigned)*				
Specialization	Design	Structure (LTPC)	0	0	3	2
Offered for	UG & DD	Status	Core ▬		Elective ☐	
Faculty		Type	New ▬		Modification ☐	
Pre-requisite		To take effect from	August 2014			
Submission date	March 2014	Date of approval by Senate				
Objectives	In Product Realization Lab, students practice conceptualization, making of simple product and realize them.					
Contents of the Course	The students are exposed to tools and equipments to machine external appearance of products of simple shapes. Wood carving, Plastic welding and cutting, engraving, sheet metal works, wire cutting are some of the process that the students will learn and use for product realization. The students will also be exposed high end machines to realize the product during demo sessions. Few sessions will be allocated to re-design an existing simple products in terms of shape, size functionality etc.					