

Computer Science Engineering

Semester - I						
S.No	C. Code	Course	L	T	P	C
1	MA108T	<u>Calculus</u>	3	1.5	0	9
2	EE101T	<u>Introduction to Electrical Systems and Electronics</u>	3	0	0	6
3	CH101T	<u>Fundamental Concepts & Applications of Chemistry</u>	3	0	0	6
4	ME101L	<u>Hands on Engineering Lab</u>	0	0	3	3
5	CS101C	<u>Computer Programming</u>	3	0	3	9
6	HS101T	<u>Design thinking and Creativity</u>	1	0	0	PP/NP
7	NO107/NO105	CCA (NSO/NSS/NCA/NCC)	0	0	2	2
	First Semester Total Credits					35

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1	Title of the course (L-T-P-C)	Calculus (3-1.5-0-9)
2	Pre-requisite courses(s)	-
3	Course content	Review of limits, continuity, differentiability. Mean value theorem, Taylors Theorem, Maxima and Minima. Riemann integrals, Fundamental theorem of Calculus, Improper integrals, applications to area, volume. Convergence of sequences and series, power series. Partial Derivatives, gradient and directional derivatives, chain rule, maxima and minima, Lagrange multipliers. Double and Triple integration, Jacobians and change of variables formula. Parametrization of curves and surfaces, vector fields, line and surface integrals. Divergence and curl, Theorems of Green, Gauss, and Stokes.
4	Texts/References	1. B.V. Limaye and S. Ghorpade, A Course in Calculus and Real Analysis, Springer UTM (2004) 2. B.V. Limaye and S. Ghorpade, A Course in Multivariable Calculus and Analysis, Springer UTM (2010) 3. James Stewart, Calculus (5th Edition), Thomson (2003). 4. T. M. Apostol, Calculus, Volumes 1 and 2 (2nd Edition), Wiley Eastern (1980). 5. Marsden and Tromba, Vector calculus (First Indian Edition), Springer (2012)

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1	Title of the course (L-T-P-C)	Fundamental Concepts & Applications of Chemistry (3-0-0-6)
2	Pre-requisite courses(s)	--
3	Course content	Organic and Inorganic (Inorganic): a. Harness the power of periodic table Periodic properties: trends in size, electron affinity, ionization potential and electronegativity • Role of chemical elements in water contamination • Hardness of water • Desalination of brackish and sea water • Role of silicon in semiconducting applications • metal atom (Cu,Au, Pt, Pd etc.) based nanoparticles b. Coordination complexes Transition metal chemistry: inorganic complexes, bonding theories, magnetism, bonding aspects and structural distortion (Organic): a. M.O. theory and π-conjugated compounds Molecular orbitals of common functional groups, Qualitative Huckel MOs of conjugated polyenes and benzene. Aromaticity. Configuration, molecular chirality and isomerism, Conformation of alkanes and cycloalkanes b. Polymers Types and classification of polymers • polymerization techniques • Structure-property relationships of polymers *Conducting polymers Physical Chemistry: a. Quantum chemistry Schrodinger equation, Origin of quantization, Born interpretation of wave function, Hydrogen atom: solution to $\square$-part, atomic orbitals, many electron atoms and spin orbitals. Chemical bonding: MO theory: LCAO molecular orbitals, Structure, bonding, and energy levels of diatomic molecules. Concept of sp, sp^2 and sp^3 hybridization; Bonding and shape of many atom molecules; Intermolecular Forces; Potential energy Surfaces-Rates of reactions; Steady state approximation and its applications; Concept of pre-equilibrium; Equilibrium and related thermodynamic quantities b. Electrochemistry Electrochemical cells and Galvanic cells • EMF of a cell Single electrode potential • Nernst equation • Electrochemical series • Types of electrodes • Reference electrodes • Batteries • Modern batteries • Fuel cells • corrosion
4	Texts/References	1. J. D. Lee, "Concise Inorganic chemistry" 5th Edition. Wiley India. Ed. 2. J. E. Huheey, E. A. Keiter, R. L. Keiter, O. K. Medhi, "Inorganic Chemistry: Principles of structure and reactivity" 4th Edition, Person. 3. P. Atkins, J. de Paula, "physical chemistry" 5th Edition, Oxford. 4. J. Clayden, N. Greeves, S. Warren, "Organic chemistry" 2th Edition, Oxford.

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		5. George Odian, Principles of polymerization, 4th edition, Wiley student edition, Wiley India Pvt Ltd. 6. F. W. Billmeyer, Textbook of Polymer Science, 3rd edition, Wiley student edition, Wiley India Pvt Ltd. 7. A. K. De, Environmental Chemistry, 8th edition, New Age International publishers. 8. B. K. Sharma, Environmental Chemistry, 16th edition, Krishna Prakashan Media Pvt Ltd. 9. A. R. West, Solid State Chemistry and Its Applications, Wiley student edition, Wiley India Pvt Ltd. 10. T. Pradeep, Nano: The essentials, McGraw-Hill Education publishers. 11. Geoffrey A Ozin and André Arsenault, Nanochemistry: A Chemical Approach to Nanomaterials, 2nd edition, RSC publishing.
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1	Title of the course (L-T-P-C)	Introduction to Electrical Systems and Electronics (3-0-1-6)
2	Pre-requisite courses(s)	Exposure to Calculus
3	Course content	From Physics to Electrical Engineering (a) Lumped matter discipline (b) Batteries, resistors, current sources and basic laws (c) I-V characteristics and modeling physical systems Basic Circuit Analysis Methods (a) KCL and KVL, voltage and current dividers (b) Parallel and serial resistive circuits (c) More complicated circuits (d) Dependent sources, and the node method (e) Superposition principle (f) Thevenin and Norton method of solving linear circuits (g) Circuits involving diode. Analysis of Non-linear Circuits (a) Toy example of non-linear circuit and its analysis (b) Incremental analysis (c) Introduction to MOSFET Amplifiers (d) Large and small signal analysis of MOSFETs (e) MOSFET as a switch Introduction to the Digital World (a) Voltage level and static discipline (b) Boolean logic and combinational gates (c) MOSFET devices and the S Model (d) MOSFET as a switch; revisited (e) The SR model of MOSFETs (f) Non-linearities: A snapshot Capacitors and Inductors (a) Behavior of capacitors, inductors and its linearity (b) Basic RC and RLC circuits (c) Modeling MOSFET anomalies using capacitors (d) RLC circuit and its analysis (e) Sinusoidal steady state analysis (f) Introduction to passive filters Operational Amplifier Abstraction (a) Introduction to Operational Amplifier (b) Analysis of Operational amplifier circuits (c) Op-Amp as active filters (d) Introduction to active filter design Transformers and Motors (a) AC Power circuit analysis (b) Polyphase circuits (c) Introduction to transformers (d) Introduction to motors

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4	Texts/References	1. Anant Agarwal and Jefferey H. Lang, “Foundations of Analog and Digital Electronics Circuits,” Morgan Kaufmann publishers, 2005 2. William H. Hayt, Jr., Jack E. Kemmerly and Steven M. Durbin, “Engineering Circuit Analysis,” Tata McGraw-Hill 3. Theodore Wildi, “Electrical Machines, Drives and Power Systems,” Pearson, 6-th edition. 4. V. Del. Toro, “Electrical Engineering Fundamentals,” Pearson publications, 2nd edition.
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1	Title of the course (L-T-P-C)	Computer Programming (3-0-3-9)
2	Pre-requisite courses(s)	Nil
3	Course content	This course provides an introduction to problem solving with computers using a modern language such as Java or C/C++. Topics covered will include: Utilization: Developer fundamentals such as editor, integrated programming environment, Unix shell, modules, libraries. Programming features: Machine representation, primitive types, arrays and records, objects, expressions, control statements, iteration, procedures, functions, and basic i/o. Applications: Sample problems in engineering, science, text processing, and numerical methods.
4	Texts/References	1. An Introduction to Programming through C++, 1st edition, by Abhiram G. Ranade, McGraw Hill Education, 2014. 2. C++ Program Design: An introduction to Programming and Object-Oriented Design, 3rd Edition, by Cohoon and Davidson, Tata McGraw Hill, 2003. Other references 1. Thinking in C++ 2nd Edition, by Bruce Eckel (available online). 2. How to Solve It by Computer, by G. Dromey, Prentice-Hall, Inc., Upper Saddle River, NJ, 1982. 3. How to Solve It (2nd ed.), by Polya, G., Doubleday and co, 1957. 4. Let Us C, by Yashwant Kanetkar, Allied Publishers, 1998. 5. The Java Tutorial, Sun Microsystems, Addison-Wesley, 1999.

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1	Title of the course (L-T-P-C)	Design thinking and Creativity (1-0-0-0)
2	Pre-requisite courses(s)	Nil
3	Course content	1. Problem Exploration- Students move around and find problems that need solutions. 2. They analyse the problem (not solution) and evolve a problem space. The problem space is converted into a story board and presented in a poster session. 3. Feedback at the poster session is used to refine the problem definition(s). 4. Solution Exploration: Creative solutions (solution space) are now explored and presented using story boards. 5. The solutions are converted into “embodiments”.
4	Texts/References	1. “Stuff Matters” Prof. Mark Miodownik, Penguin 2. “Design and Technology” by James Garratt, Cambridge University Press. 3. How it works in the home: Walt Disney:9780894340482- Amazon.com. 4. How it works in the city (Walt Disney available on Amazon.com) 5. Change by design – Tim Brown There are some additional books in this “How it Works” series.

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1	Title of the course (L-T-P-C)	Hands on Engineering Lab (0-0-3-3)
2	Pre-requisite courses(s)	--
3	Course content	List of Experiments (Mechanical Workshop) • To make a Square-fit from the given mild steel pieces (Fitting) • To make a V-fit from the given mild steel pieces (Fitting) • To make a rectangular tray as per required dimensions (Sheet Metal) • To build a transition piece (Sheet Metal) • To make a Butt joint using the given two M.S pieces (Arc welding) • To make a lap joint using the given two M.S pieces (Arc welding) • To build a pipe-line using fittings for given flow circuit (Plumbing) List of Experiments (Electrical Workshop) • To control one lamp by a one switch with provision for plug socket with switch control (Electrical wiring) • To do stair case wiring (i.e. control of one lamp by two switches fixed at two different places) (Electrical wiring) • Measurement of hot and cold resistance of filament • Improvement of Power Factor • Calibration of Energy meter • Measurement of Power using three ammeter/voltmeter method List of Experiments (Electronics) • Understanding breadboard, One-way traffic • Introduction to Arduino and Buzzer • Using Arduino speed measurement of motor/ glowing of LED • Control of water level using Arduino • Line follower using Arduino
4	Texts/References	Elements of Workshop Technology Vol. 1 (2015), S. K. Hajra Choudhary, A. K. Hajra Choudhary and Nirjhar Roy, Media Promoters and Publishers Pvt. Ltd. W. A. J. Chapman, Workshop Technology, Vol. 1 (2006), Vol 2 (2007), and (1995), CBS Publishers.