Civil, Computer, Electrical & Mechanical Engineering Department

1st Semester

Teaching Scheme

Division A

Course Code	Course Name	Lecture hours	Tutorial hours	Practical hours	Credit
MA 181001	Mathematics (Calculus)	3	2	0	5
PH 181001	Physics-I	2	1	0	3
HS 181001 / HS 181002	Indian English Literature & Language / Functional English & Comprehension	3	0	2	4
CE 181001 / EE 181001 / ME 181001/ CS 221001	I to I civil/computer/Elec/Mech	2	0	0	2
PH 181101	Physics Laboratory	0	0	3	1.5
CH 181001	Chemistry	3	1	0	4
GE 181001	Engineering Graphics	2	0	3	3.5
CH 181101	Chemistry Laboratory	0	0	3	1.5
	Total	**15**	**4**	**11**	**24.5**

Division B

Course Code	Course Name	Lecture hours	Tutorial hours	Practical hours	Credit
MA 181001	Mathematics (Calculus)	3	2	0	5
PH 181001	Physics-I	2	1	0	3
HS 181001 / HS 181002	Indian English Literature & Language / Functional English & Comprehension	3	0	2	4
CE 181001 / EE 181001 / ME 181001/ CS 221001	I to I civil/computer//Elec/Mech	2	0	0	2
PH 181101	Physics Laboratory	0	0	3	1.5
CS 181001	Computer Science	2	1	3	4.5
GE 181002	Manufacturing Science and Workshop	2	0	3	3.5
	Total	**14**	**4**	**11**	**23.5**

Civil, Computer, Electrical & Mechanical Engineering Department

2nd Semester

Teaching Scheme

Division A

Course Code	Course Name	Lecture hours	Tutorial hours	Practical hours	Credit
MA 181002	Mathematics (ODE+Linear Algebra with V. calculus)	4	2	0	6
PH 181002	Physics-II	3	2	0	5
EE 181002	Basic Electrical And Electronics Engineering	2	1	2	4
CS 181001	Computer Science	2	1	3	4.5
GE 181002	Manufacturing Science and Workshop	2	0	3	3.5
	Total	**13**	**6**	**8**	**23**

Division B

Course Code	Course Name	Lecture hours	Tutorial hours	Practical hours	Credit
MA 181002	Mathematics (ODE+Linear Algebra with V. calculus)	4	2	0	6
PH 181002	Physics-II	3	2	0	5
EE 181002	Basic Electrical And Electronics Engineering	2	1	2	4
CH 181001	Chemistry	3	1	0	4
GE 181001	Engineering Graphics	2	0	3	3.5
CH 181101	Chemistry Laboratory	0	0	3	1.5
	Total	**14**	**6**	**8**	**24**

Mathematics Curriculum for Semester - I

I	Course Code	**MA 181001**			
II	Course Title	**Mathematics I : Calculus**			
III	Credit Structure	L	T	P	C
		3	2	0	5
IV	Course Content	1. Limit, Continuity, Limit at infinity, infinite limits, asymptotes, limit of sequences, Continuity and differentiability, IVT 2. Linear Approximation and differentials, Maximum and Minimum Values, The Mean Value Theorems, Increasing and decreasing functions, concavity and curve sketching ,Indeterminate Forms and L'Hospital's Rule, Taylor's theorem 3. Area, Riemann sums, the definite integral, the fundamental theorem of calculus 4. Application of Definite integrals-Areas between Curves, Volumes 5. Volumes by Cylindrical Shells, Work, Average Value of a Function, Arc Length, Area of a Surface of Revolution, Improper Integrals. 6. Three-Dimensional Coordinate Systems, Equations of Lines and Planes, Cylinders and Quadric Surfaces, Cylindrical Coordinates, Spherical Coordinates 7. Functions of Several Variables, Limits and Continuity, Partial Derivatives, Tangent Planes and Linear Approximations, The Chain Rule, Directional Derivatives and the Gradient Vector 8. Vector functions, Vector Functions and Space Curves, Derivatives and Integrals of Vector Functions, Arc Length and Curvature, Motion in Space: Velocity and Acceleration 9. Vector fields, Gradient, Curl and Divergence 10. Extreme values and saddle points of functions of several variables, Constrained optimization, Lagrange Multiplier Method.			
V	Text/References	1. Thomas, G.B., and Finney, R.L., Calculus and Analytic Geometry, 9th Edition, ISE Reprint, Addison-Wesley, 1998. 2. Stewart, J., Calculus, 5th Edition, Thomson, 2003. 3. Marsden, J.E., Tromba, A.J., and Weinstein, A., Basic multivariable calculus, Springer India, 2004. 4. Apostol, T.M., Calculus, Volumes 1 and 2, 2nd Edition, Wiley Eastern, 1980. 5. Hughes-Hallett et al, Calculus - Single and Multivariable (3rd Edition), John- Wiley and Sons 2003			

Mathematics Curriculum for Semester II

I	Course Code	**MA 181002**			
II	Course Title	**Mathematics II: Linear Algebra with vector calculus and ODE**			
III	Credit Structure	L	T	P	C
		4	2	0	6
IV	Prerequisites	MA 1001			
V	Course Content	**Linear Algebra with Vector Calculus:** Double Integrals over Rectangles, Iterated Integrals, Double Integrals over General Regions, changing the order of integration, Change of Variables in Multiple Integrals, Double Integrals in Polar Coordinates, Applications of Double Integrals Triple Integrals, Triple Integrals in Cylindrical Coordinates, Triple Integrals in Spherical Coordinates, Applications Line Integrals, The Fundamental Theorem for Line Integrals, conservative vector fields and path independence, Green's Theorem Parametric Surfaces and Their Areas, Surface Integrals, Stokes' Theorem, The divergence theorem Vectors in , Systems of Linear equations, Matrices and Gauss elimination, Elementary matrices, Determinants and rank of a matrix Eigenvalues and eigenvectors, Characteristic polynomials, Eigenvalues of special matrices, Multiplicity, Diagonalizability Abstract vector spaces, Subspaces, Linear independence, dependence, basis and dimension Linear transformations, Matrix of a linear transformation, Change of basis and similarity, Rank-nullity theorem Inner product spaces, Gram-Schmidt process, Orthonormal Bases, Diagonalization, Spectral theorem, Quadratic forms **ODE:** Exact equations, Integrating factors and Bernoulli's equation Orthogonal trajectories; Lipschitz condition, Picards theorem, Reduction of order Linear ODEs with constant coefficients, Cauchy-Euler equations Wronskians, Abel-Liouville formula, Method of undetermined coefficients, Method of variation of parameters Laplace transforms, Shifting theorems, Convolution theorem			
V	Text/References	1. Anton, H., Elementary linear algebra with applications, 8th edition, John Wiley & Sons, 1995. 2. David Poole, Linear Algebra:A modern Introduction, Cengage Learning, 4th edition 3. Apostol, T.M., Calculus, Volume 2, 2nd Edition, Wiley Eastern, 1980. 4. Boyce, W.E., and DiPrima, R., Elementary Differential Equations, 9th Edition, John Wiley & Sons, 2005. 5. Kreyszig, E., Advanced Engineering Mathematics, (9th Edition), Wiley India 6. Strang, G., Linear algebra and its applications, 4th Edition, Thomson, 2006.			

Physics Curriculum for Semester I

I	Course Code	**PH 181001**			
II	Course Title	**Physics - I**			
III	Credit Structure	L	T	P	C
		2	1	0	3
IV	Prerequisite(If any for the student)	Nil			
V	Course Content	Special Theory of Relativity: Problems with classical physics, Inertial and non-inertial frames of reference, Postulates of special theory of relativity, Galilean and Lorentz transformation, Length contraction and Time dilation, Relativistic addition of velocities, Energy momentum relationships. Quantum Mechanics: Black-body radiation, Photoelectric effect and Compton effect, Wave nature of matter, Davisson-Germer experiment, Group and Phase velocities, Heisenberg's uncertainty principle, Schrodinger equation, Wave function and Normalization, Probability density and probability, Operators, Expectation values, Eigenvalues and Eigenfunctions, Particle in infinite and finite square wells, Particle in one, two and three dimensional box, Degenerate states, Potential barrier, Tunneling through a barrier, Eigenvalue and Eigenfunction of 1D simple harmonic oscillator without complete derivation.			
VI	Text/References	1. C. Richtmyer and Kennard, Introduction to Modern Physics, 6th Edition, McGraw-Hill, 1969. 2. R. Eisberg and R. Resnick, Quantum Physics, 2nd Edition, John Wiley 2002. 3. H.S. Mani and G.K. Mehta, Introduction to Modern Physics, 1st Edition, East-west Press Pvt. Ltd.-New Delhi, 2000. 4. A. Beiser, Concepts of Modern Physics, 6th Edition, Tata McGraw Hill Education Pvt. Ltd., 2009. 5. R. P. Feynman, R.B. Leighton, and M. Sands, The Feynman Lectures on Physics -Vol III, Narosa Publishing House, 2010. 6. R.A. Serway, C.J. Moses and C.A. Moyer, Modern Physics, 3rd Edition, Thomson Learning, Inc. 2005.			

Physics Curriculum for Semester II

I	Course Code	**PH 181002**			
II	Course Title	**Physics- II**			
III	Credit Structure	L	T	P	C
		3	2	0	5
IV	Prerequisite(If any for the student)	Nil			
V	Course Content	Vector Calculus: Gradient, Divergence, Curl and Laplacian, Line, Surface and Volume integrals, Gauss-divergence and Stokes theorems, Spherical polar and Cylindrical coordinate systems. Electrostatics: Electric field and Gauss's law, Electrostatic potential, Multipole expansion, Electrostatic energy, Conductors, Uniqueness theorem, Laplace's solution, Image method, Electrostatic boundary conditions, Electrostatic Fields in matter, Capacitors. Magnetostatics: Lorentz force law, Continuity equation, The Biot- Savart's law, Ampere's law, Magnetic vector potential, Magnetism in materials, Magnetostatic boundary conditions. Electrodynamics: Electromotive force, Faraday's law and Lenz's law, Inductance, Displacement current, Maxwell's equations, Electromagnetic (EM) waves in vacuum and media.			
VI	Text/References	1. D. J. Griffiths, Introduction to Electrodynamics, 3rd Edition, PHI Learning, 2009. 2. J. R. Reitz, F. J. Milford, R.W. Christy: Foundations of Electromagnetic Theory, 4th Edition, Pearson Addison Wesley, 2009. 3. A. Mahajan, A. Rangwala, Electricity and Magnetism, 1st Edition, Tata McGraw Hill, 1988. 4. E. M. Purcell, Berkeley Physics Course, Electricity and Magnetism, Volume 2, 2nd Edition, Tata McGraw Hill, 2007. 5. R. P. Feynman, R.B. Leighton, and M. Sands, The Feynman Lectures on Physics -Vol II, Narosa Publishing House, 2010.			

Physics Practical Curriculum for Semester I

I	Course Code	**PH 181101**			
II	Course Title	**Physics Laboratory**			
III	Credit Structure	L	T	P	C
		0	0	3	1.5
IV	Prerequisite(If any for the student)	Nil			
V	Course Content	1. Compound Pendulum: Determine the acceleration due to gravity and the radius of gyration of the given compound pendulum. 2. Young's Modulus by Koenig's Method: Determine Young's modulus of the material of a rectangular bar by Koenig's method. 3. Thermal Conductivity by Lee's Disc: Measure the thermal conductivity of a poor conductor by electrically heated Lee's disc apparatus. 4. Kundt's Tube: Measure the velocity of sound in air using Kundt's tube apparatus and calculate the "g" of air at room temperature. 5. Helmoltz Coil: Verify the principle of superposition and to examine the uniformity of the magnetic field produced by Helmholtz coils. 6. Fresnel's Biprism: Determine the wavelength of light using Fresnel's bi- prism. 7. Hydrogen Spectrum: Measure the wavelengths of visible spectral lines in Balmer series of atomic hydrogen and to determine the value of Rydberg's constant. 8. Grating Spectrometer: Determine the wavelengths of spectral lines of mercury and the angular dispersive power of a diffraction grating. 9. Single Slit Diffraction: Study the diffraction at a single slit and verify Heisenberg's uncertainty principle. 10. Four Probe Method: Study the resistivity of the semiconductor by Four Probe Method at different temperatures and determine the band gap. 11. Photoelectric Effect: Determine the value of Planck's constant using photoelectric effect. 12. Hall Effect: Determine the carrier concentration and type of carrier using Hall effect.			
VI	Text/References	1. Practical Physics, G. L. Swuires, 4th Edition, Cambridge University Press,2012. 2. Physics, Vols 1 & 2, D. Holliday, R. Resnick and K. S.Krane, John Wiley and Sons, 5th Edition, 2002. 3. Optics, Ajoy Ghatak, 5th Edition, Tata McGraw Hill, 2012. 4. Introduction to Geometrical and Physical Optics, B. K. Mathur, Gopal Printing, 1967. 5. Introduction to Solid State Physics, C. Kittle 8th Edition, Wiley Publications,2004.			

Chemistry Curriculum for Semester I & II

I	Course Code	**CH 181001**			
II	Course Title	**Chemistry**			
III	Credit Structure	L	T	P	C
		3	1	0	4
IV	Prerequisite(If any for the student)	Nil			
V	Course Content	Chemical Kinetics: Rate laws, Rate constant and equation, order and molecularity, Complex reactions, Arrhenius equation, collision theory, Reaction cross section, Harpoon mechanism, Organic reaction mechanism Catalysis: Homogeneous and Heterogeneous Catalysis, Adsorption, Biocatalysis, Important Industrial applications (at least two), Catalytic converter Basics of Spectroscopy: Rotational, Vibrational and Electronic spectroscopy Basics of Electrochemistry, Fuel Cell, Corrosion and its prevention Water and its treatment Polymer: Classification, Molecular weight and MWD, Thermal and mechanical properties, Compounding of polymer, Commodity plastic and engineering plastic			
VI	Text/References	1. Elements of Physical Chemistry, P.W. Atkins & De Paula, Oxford, 2017. 2. Heterogeneous Catalysis, D. K. Chakravarty & B. Vishwanathan, New Age International, 2011. 3. Polymer Science - V. R. Gowarikar, N. V. Viswanathan & Jayadev Sreedhar, New Age International, 2006 (reprint). 4. Organic Chemistry, R. T. Morrison & R. N. Boyd, Pearson Education India, 2010. 5. Fundamentals of molecular spectroscopy, C. N. Banwell & E. M. McCash, McGraw Hill Education (India) Private Limited, 2013 6. Spectroscopy of Organic compounds, P. S. Kalsi, New Age International, 2007. 7. Applications Of Absorption Spectroscopy Of Organic Compounds, J. R. Dyre, Prentice Hall India Learning Private Limited, First Edition, 1978. 8. Heterogeneous Catalysis: Principles & Applications, G. C. Bond, Clarendon Press ; New York : Oxford University Press, 1987 9. Engineering Chemistry, Jain and Jain, Dhanpat Rai Publishing Company, 2015 10. A text book of Engineering Chemistry, Shashi Chawla, Dhanpat Rai & Co. (P) Limited, 2017 11. Chemical kinetics, K. J. Laidler, Pearson Education India, 2003.			

Chemistry Practical Curriculum for Semester I & II

I	Course Code	**CH 181101**			
II	Course Title	**Chemistry Laboratory**			
III	Credit Structure	L	T	P	C
		0	3	0	1.5
IV	Prerequisite (if any)	Nil			
V	Course Content	1. Complexometric Titration: To estimate hardness of a given water sample bycomplexometric method 2. Estimation of Acetamide: To estimate Acetamide present in a given solution by hydrolysis method 3. Organic preparation: To prepare acetanilide from aniline 4. Organic preparation: To prepare p-nitro acetanilide from acetanilide 5. Chemical Kinetics (Hydrolysis of an Ester): To determine the rate constant and order of reaction for acid catalyzed hydrolysis of methyl acetate 6. Potentiometric titration: To determine the normality of hydrochloric acid potentiometrically 7. Conductometric titration: To determine the strength of sodium hydroxide solution conductometrically 8. Conductometric titration: To determine the milk adulteration by conductivity measurements. 9. pH metric titration: To determine the strength of HCl solutions in mixture using pH meter 10. Iodometry: To Determine Dissolved Oxygen of a given Water Sample by Winklers Iodometric Method 11. Iodimetric Titration: To determine the strength of given ascorbic acid solution by titrating against standard 0.1 N iodine solution 12. Chemical Oxygen Demand: To determine the Chemical Oxygen Demand (COD) for a given polluted water sample			
VI	Text/References	1. D.P. Shoemaker, C.W. Garland and J.W. Nibler: Experiments in Physical Chemistry, McGraw Hill International Edition, 1996 2. V.D. Athawale and P. Mathur: Experimental Physical Chemistry, 1st Edition, New Age International Publication, New Delhi, 2001. 3. J.B. Yadav: Advanced Practical Physical Chemistry, Goel Pub., Meerut, 2003 4. S. M. Khopkar: Basic Concepts of Analytical Chemistry, 3rd Edition, New Age International Publication, New Delhi, 2008 5. P. Samnani: Experiments in Chemistry, Anmol Publication Pvt. Ltd. New Delhi, 2007			

Civil Infrastructure Curriculum for Semester I

I	Course Code	**CE 181001**			
II	Course Title	**Introduction to Civil Infrastructure**			
III	Credit Structure	L	T	P	C
		2	0	0	2
IV	Prerequisite (if any)	None			
V	Instructor(s)				
VI	Course Content	**Unit 1:** Introduction to Infrastructure scenario in India. Urban and Rural infrastructure in India. Bird-eye view to various specializations in Civil Engineering discipline and their practical relevance for the infrastructural development.Basics of infrastructure planning. **Unit 2:** Role of Civil Engineering in the following infrastructure sectors: a) Transportation infrastructure b) Hydraulic infrastructure c) Building infrastructure d) Water supply and wastewater infrastructure e) Energy infrastructure f) Smart Infrastructure **Unit 3:** Environmental and sustainability aspects for the design of infrastructure, New challenges for the future infrastructure development			
VII	Text/References	1. Irrigation and Hydraulic Structure S K Garg, 1st Edition, Khanna Publishers. 2. Environmental Engineering - N.N.Basak, 1st Edition, Mcgraw Higher Ed. 3. Highway Engineering S K Khanna and C E Justo, 10th Edition, Nem Chand Brothers. 4. Railway Engineering - Satish Chandra and Agrawal, Oxford University Press. 5. Building Planning and Drawing: SS Bhavikatti and M. V. Chitawa, I K International Publishing House Pvt. Ltd. 6. Reinforced Concrete Design by S. N. Sinha, Tata McGraw Hill. 7. Steel Structures-Design and Practice, N. Subramanian, Oxford University Press. 8. Textbook of Geotechnical Engineering by B M Das, Cengage Learning. 9. Building Materials, S. S. Bhavikatti, Vikas Publishing House. 10. Smart Civil Structures by You-Lin Xu and Jia He, CRC Press, Taylor and Francis. Open source information/literature available through World Wide Web, MOOCS, NPTEL, and Institution Library etc.			

Electrical Infrastructure Curriculum for Semester I

I	Course Code	**EE 181001**			
II	Course Title	**Introduction to Electrical Infrastructure**			
III	Credit Structure	L	T	P	C
		2	0	0	2
IV	Prerequisite(If any for the student)	Nil			
V	Course Content	Introduction to electrical infrastructure requirements in transportation systems, Electrical Energy Scenario, Basics of Electrical Drives, Basic characteristics of DC and 3-phase induction motors, Electrical Traction Systems (Railways, Metro-rails, Tramways), electric power generation, transmission and distribution systems, Information and Communication, environmental aspects, energy considerations, conventional power plants, Renewable energy infrastructure: Solar Parks, Wind Farms, Biogas plants etc., laws of illumination, factory and street lighting, hybrid electric vehicles and electric vehicles, emergency power systems, Central Emergency Power Stations (CEPS), Central Power Stations (CPS) and Central Energy Plant (CEP), Power Control and Monitoring Systems (PCMS).			
VI	Text/References	1. ”Utilization of Electric Power & Electric Traction” by J.B.Gupta, Katson Publishers. 2. ”Fundamentals of Internal Combustion Engines” by H.N. Gupta, PHI Publications. 3. Utilization of Electrical Power by Soni, Bhatnagar and Gupta			

Mechanical Infrastructure Curriculum for Semester I

<table>
<tr><td>I</td><td>Course Code</td><td colspan="4">ME 181001</td></tr>
<tr><td>II</td><td>Course Title</td><td colspan="4">Introduction to Mechanical Infrastructure</td></tr>
<tr><td rowspan="2">III</td><td rowspan="2">Credit Structure</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>2</td><td>0</td><td>0</td><td>2</td></tr>
<tr><td>IV</td><td>Prerequisite, if any</td><td colspan="4">Nil</td></tr>
<tr><td>V</td><td>Course Content</td><td colspan="4">Unit 1: History and overview
Overview of infrastructure requires all of engineering, Classification and different sectors of infrastructure, Developmental role of mechanical infrastructure, Some historically important people and their contributions in infrastructure (Marquis of Pombal, Isambard Kingdom Brunel, Mokshagundam Visvesvaraya, etc.).
Unit 2: Introduction to Transportation Infrastructure.
Railway Infrastructure:
Introduction to the railway industry, their impacts on the society and on the environment, types of coaches, engine and machines in railway engineering. Involvement in country GDP, Future need of country, creation and maintenance of railway infrastructure.
Airways Infrastructure:
Introduction to airway infrastructure, need and importance of air transport, basic working and control method of airplane, construction and working of jet engines, method to reduce cost of air transport, socio-economic impact of airways infrastructure, creation and maintenance of airway infrastructure.
Roadways infrastructure:
Introduction to roadways infrastructure, need and importance of road transport, basic working and control method of commercial and noncommercial vehicle, creation and maintenance of roadway infrastructure.
Water transport infrastructure:
Introduction to water transport infrastructure, need and importance of water transport, basic working and control method of commercial and non- commercial water vehicles, creation and maintenance of water transport infrastructure.
Unit 3: Introduction to Energy Infrastructure:
Introduction, types of energy, source of energy, conventional and non-conventional source of energy, working principle thermal, solar, hydroelectric, wind and nuclear power plant, recent advancement and challenge to meet the demand for aforesaid power plant, energy distribution, energy transport, its use for human comfort and maintenance of power plant.
Unit 4: Case Studies
Different case studies in the field of related infrastructures and one case study assignment for the students.
Unit 5: Field visits
Field visit to industrial establishment such as power plants, manufacturing and maintenance industry and submission of final report.</td></tr>
<tr><td>VI</td><td>Textbooks/References</td><td colspan="4">1. Donaldson, Dave. Railroads of the Raj: Estimating the impact of transportation infrastructure. No. w16487. National Bureau of Economic Research, 2010.
2. Banister, David. Transport and urban development. Routledge, 2003.
3. Nag, P. K. Power plant engineering. Tata McGraw-Hill Education, 2002.
4. Drbal, Larry, Kayla Westra, and Pat Boston, eds. Power plant engineering. Springer Science & Business Media, 2012.
5. Vasigh, Bijan, and Ken Fleming. Introduction to air transport economics: from theory to applications. Routledge, 2016.
6. Ashford, Norman, and Paul H. Wright. Airport engineering. New York: Wiley, 1979.</td></tr>
</table>

Engineering Graphics Curriculum for Semester I & II

I	Course Code	**GE 181001**			
II	Course Title	**Engineering Graphics**			
III	Credit Structure	L	T	P	C
		2	0	3	3.5
IV	Prerequisite (if any)	Nil			
V	Course Content	Introduction to the engineering design process and the importance of technical. Graphics/Drawings; Integrated design and 3D modelling, visualization - sketching & computer aided drawing, geometrics - geometry construction, shape description, multi-view drawings - orthographic projection, isometric views, axonometric projections, auxiliary & section views; Dimensioning; Assembly drawings.			
VI	Text/References	1. Ostrowsky, O., Engineering Drawing with CAD Applications, Elsevier Science & Technology, 1989 2. Banach, D. T., and Jones, T., Autodesk Inventor 2011 Essentials Plus, Cengage Learning, Inc, 2010 3. Jensen, C. H., Helsel, J. D., and Short, D. R., Engineering Drawing and Design, 7th edition, McGraw Hill, 2007			

Basic Electrical and Electronics Engineering Curriculum for Semester II

I	Course Code	**EE 181002**			
II	Course Title	**Basic Electrical And Electronics Engineering**			
III	Credit Structure	L	T	P	C
		2	1	2	4
IV	Prerequisite (if any for the students)	No			
V	Course Content	Elements in an Electrical circuit: R, L, C, Voltage and current sources (independent and dependent/controlled sources with examples). DC circuits, KCL, KVL, Network theorems, Mesh and nodal analysis. Step response in RL, RC, RLC circuits. Basics of semiconductor physics,P-N junction,diode characteristic,diode circuits - clippers.Characteristics of BJTs.Common Emitter,Common collector configurations of BJTs,biasing of BJTs and its small signal modeling.Basics of operational amplifiers.			
VI	Text/References	1 R. J. Smith and R. C. Dorf, Circuits, Devices and Systems, Wiley, 5th edition, 1992. 2 E. Hughes, Electrical Technology, Pearson, 7th edition. 3 Bobrow, Fundamentals of Electrical Engineering, Oxford Univ Press. 4 Hayt, W. H., Kemmerly, J. E., Durbin, S. M., Engineering Circuit Analysis, sixth edition, Tata Mc-Graw Hill, 2006. 5 R. Prasad, Fundamentals of Electrical Engineering Book, Prentice Hall India Learning Private Limited; Third edition (2014)			

Computer Science Curriculum for Semester I & II

<table>
<tr><td>I</td><td>Course Code</td><td colspan="4">CS 181001</td></tr>
<tr><td>II</td><td>Title of Course</td><td colspan="4">Computer Science</td></tr>
<tr><td rowspan="2">III</td><td rowspan="2">Credit Structure</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>2</td><td>1</td><td>3</td><td>4.5</td></tr>
<tr><td>IV</td><td>Prerequisite(for the student)</td><td colspan="4">Concept of algorithm</td></tr>
<tr><td>V</td><td>Course Content</td><td colspan="4">1. Introduction to the state of the art in computing focusing on hardware and its architecture, operating systems, memory management. Numeric information representation in computers : 2s complement representation of integers and IEEE 754 standard for representing floating point numbers. ASCII and Unicode systems for representing character data.
2. Computers, algoritms and programming. A programmers view of a computer system. Lower Level and higher level programming languages, general characteristics of programming languages and classification of programming constructs.
3. Scalar and non-scalar data, variables, types and objects. Arithmetic, relational, logical and assignment operators. Strings, string operations and slicing.
4. Data structures, supported operations. Mutable and immutable types. Lists, tuples, dictionaries and sets. Iterables and iterative traversal of sequential structures.
5. Conditional and iterative control structures. Nested controls. Break and continue statements.
6. Library modules and their use. User defined functions and modular programming. Developing function libraries. Recursive functions.
7. Algorithms and their implementation. Introduction to algorithmic complexity and computational complexity. Euclids algorithm, prime number programs.
8. Classes and objects. Object oriented programming. Inheritance.
9. Scientific and engineering computation examples. Numpy and Scipy libraries. Computations with multi-dimensional arrays.
10. Reading and writing files. Matplotlib library for plotting graphs, and displaying images. Handling CSV files with Pandas library.</td></tr>
<tr><td>VI</td><td>Text Books and web resources</td><td colspan="4">1. John V Guttag, Introduction to Computation and Programming Using Python, 2 Edition, Prentice Hall India & MIT Press, 2014.
2. Mark Lutz . Learning Python: Powerful Object-Oriented Programming: 5th Edition, OReilly/SPD, 2013
3. https://docs.python.org/3/ Python 3.6 online documentation.
4. https://docs.python.org/3/tutorial/index.html Python online tutorial
5. Python tutorials with Jupyter notebooks</td></tr>
<tr><td>VII</td><td>MOOCs</td><td colspan="4">1. www.edx.org, Introduction to Computer Science and Programming Using Python, Free online course offered by Eric Grimson, John Guttag from MIT.
2. www.coursera.org Programming for Everybody (Getting Started with Python), Charles Severance, University of Michigan</td></tr>
<tr><td>VIII</td><td>Software Resources</td><td colspan="4">Jupyter notebooks</td></tr>
</table>

Manufacturing Science and Workshop Curriculum for Semester I & II

I	Course Code	**GE 181002**			
II	Course Title	**Manufacturing Science and Workshop**			
III	Credit Structure	L	T	P	C
		2	0	3	3.5
IV	Prerequisite, if any	NIL			
V	Course Content	**Introduction to manufacturing processes:** Brief history of manufacturing, product design and concurrent engineering, Selection of materials, significance of material properties with respect to selection of manufacturing processes. **Safety:** Importance of safety and general Safety considerations in manufacturing. **Traditional Manufacturing process:** ***Fitting Tools & Equipment,*** practice in filing, making 'V' Joints, Square, Dovetail joints and key making plumbing. **Carpentry Tools and Equipment-** Planning practice, Making Half Lap, Dovetail, Mortise & Tenon joints. **Principles of heat treating;** annealing, normalizing, hardening and tempering. **Casting Process:** Basic concepts of castings, patternmaking, types of Pattern, Pattern allowances, Moulding sand, Types and properties of Moulding sand, cores, elements of gating system, Defects in casting system, special types of casting processes. **Metal Forming Process:** Basic concepts of plastic deformation. Hot & cold working. Common bulk deformation processes (Rolling,Forging, Extrusion and Drawing). Common sheet metal forming processes. **Machining Process :** Mechanics of cutting, cutting forces and power, cutting tool materials and cutting fluids, Tools geometry, Tool life: wear and failure ***Traditional machining process:*** Turning process, Lathe and lathe operations, Boring and Boring Machine, Drilling and Drilling machines, Milling and Milling Machines, Planing and shaping, Broaching and Broaching machines, Grinding & other Finishing processes. **Welding & Other Joining Processes:** Fundamentals & classification of Joining processes, Welding- Gas arc & resistance welding, Brazing and soldering, Adhesive bonding, Mechanical fastening. **Manufacturing of Polymer and Powder Products:** Classification of polymers, Introduction to extrusion, injection molding, blow molding, compression and transfer molding. Powders & Green compacts from powders including slip casting of ceramics. Sintering. **Modern Trends in Manufacturing:** ***Non-Traditional machining process:*** Need of Non-Traditional machining process, Working principle, advantages and disadvantages of ECM (Electro chemical machining), EDM (Electrical-discharge machining), LBM (Laser Beam Machining), EBM (Electron Beam Machining). ***Non Traditional Forming Process:*** Working principle, advantages and disadvantages of Explosive Forming process ***Non-Traditional Joining process*** Working principle, advantages and disadvantages of LBW (Laser Beam welding process) ***Fabrication of Microelectronic devices:*** Semiconductors and silicon, crystal growing and wafer preparation, film deposition, Lithography, etching, Diffusion and ion implantation, Printed Circuit Boards. ***Additive manufacturing:***Introduction to the Basic Principles of Advanced/Additive Manufacturing. Advantages, disadvantages and its application. ***Automation of manufacturing process and operations:*** Automation, Numerical control: Advantages and Disadvantages of NC system, comparison between conventional and NC machines, Adaptive control. Industrial Robots: structure of robot and its application in manufacturing. Computer-aided manufacturing, Computer integrated manufacturing systems			

VI	Text/References	1. Schey, J. A., Introduction to Manufacturing Process, 3rd Edition, McGrawHill, 2000. 2. Serope Kalpakjian, Steven R. Schmid, Manufacturing Engineering and Technology, 7th Edition, Pearson, 2018. 3. B. S. Nagendra Parashar, R. K. Mittal, Elements of Manufacturing Processes, PHI, 2016. 4. Singh, D. K., Fundamentals Of Manufacturing Engineering, Ane Books Pvt Ltd, new Delhi, 2nd Ed., 2009. 5. Hajra Choudhary, S. K., Elements of Workshop Technology, Media Promotors & Publishers Pvt Ltd, 12th Edition, 2002.

Indian English Literature & Language for Semester I

<table>
<tr><td>I</td><td>Course Code</td><td colspan="4">HS 181001</td></tr>
<tr><td>II</td><td>Course Title</td><td colspan="4">Indian English Literature & Language</td></tr>
<tr><td rowspan="2">III</td><td rowspan="2">Credit Structure</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>3</td><td>0</td><td>2</td><td>4</td></tr>
<tr><td>IV</td><td>Course Coordinator</td><td colspan="4">Dr. Meera Vasani</td></tr>
<tr><td>V</td><td>Course Objective</td><td colspan="4">To have in depth practice of extensive reading and writing</td></tr>
<tr><td>VI</td><td>Course Contents</td><td colspan="4">Literature Units: (Can be revised every year)
• The Last Tonga Ride (Ruskin Bond)
• I have Three Visions for India (A P J Abdul Kalam)
• The shroud (Munshi Premchand)
• First Selfie in Space (Sujata Reddy)
• My Birth Place (Nirad C. Chaudhuri)
• A Wrong Man in Workers Paradise (Rabindranath Tagore)
• Toasted English (R. K. Narayan)
• Crime and Punishment (R. K Narayan)
• Grammar of Anarchy (B R Ambedkar)
• Punishment in Kindergarten (Kamala Das)
Grammar:
• Idioms & Phrases, Synonyms, Antonyms, One word substitution, Technical Vocabulary, Homophones, Direct-Indirect, Punctuation
Writing:
• Report Writing
• Letter Writing
• Precis
• Note-making
• Paragraph Writing
• Statement of Purpose</td></tr>
<tr><td>VII</td><td>Text/References</td><td colspan="4">1. T. Vijay Kumar, K. Durga Bhavani, YL Srinivas (Ed); English in Use; Macmilan Education
2. J Kumar Singh, F Bharateeya, D Trivedi (Ed); College Collage; Macmillan Education
3. H. Raviya, A. Pandya, et.al (Ed); Mosaic; Macmillan
4. Spectrum- A textbook for college students; Macmillan education
5. Thomas L. Means, Ed. D.; English and Communication for colleges; Cengage
6. M. Hemamalini; Technical English; Wiley
7. Grammar books for practice</td></tr>
</table>

Functional English & Comprehension for Semester I

<table>
<tr><td>I</td><td>Course Code</td><td colspan="4">HS 181002</td></tr>
<tr><td>II</td><td>Course Title</td><td colspan="4">Functional English & Comprehension</td></tr>
<tr><td rowspan="2">III</td><td rowspan="2">Credit Structure</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>3</td><td>0</td><td>2</td><td>4</td></tr>
<tr><td>IV</td><td>Prerequisites (if any)</td><td colspan="4">Basic knowledge of English.</td></tr>
<tr><td>IV</td><td>Course Coordinator</td><td colspan="4">Dr. Meera Vasani</td></tr>
<tr><td>V</td><td>Course Objective</td><td colspan="4">• To understand the use of basic grammar.
• To comprehend the concepts written in the second language.
• Make them more towards the correct usage of grammar in both verbal and written communication.
• Introduce them with the phonetics so as to lead them to the correct pronunciation of words.</td></tr>
<tr><td>VI</td><td>Course Contents</td><td colspan="4">Part I. Grammar Topics :
• Articles; Tenses; Prepositions; Modals; Moods of Verb; Concord
• Active Passive; Direct-Indirect; Punctuation
• Idioms and phrases; phrasal verbs; Synonyms; Antonyms; words often confused; homophones;.
• Common errors;
• Jumbled Sentences;
• Comprehensions
Part II. Writing Section:
• Email writing
• Sentence Completion
• Paragraph Completion
• Notice writing
• Note Making
• Message writing
• Letter Writing
Lab Activities: Grammar exercises; Comprehension exercises; general etiquettes; greetings; self-introduction; basic conversation;</td></tr>
<tr><td>VII</td><td>Text/References</td><td colspan="4">1. Competitive English; Edi. Pradyumansinh Raj; Azhar Siddiqui, Shaili Kaviya ad.; Macmillan Publisher India Pvt. Ltd.; latest edition.
2. Technical English: Vocabulary and Grammar. By Nick Brieger & Alison Pohl. Publication Details: Cengage Learning, 2014.
3. Grammar Books with exercises</td></tr>
</table>

B.Tech. in Computer Engineering
Semester 1 Curriculum
Course name: Introduction to Information and Communication Technology Infrastructure

<table>
<tr><td>I</td><td>Course Code</td><td>CS 221001</td></tr>
<tr><td>II</td><td>Course Title</td><td>Introduction to Information and Communication Technology Infrastructure</td></tr>
<tr><td>III</td><td>Credit Structure</td><td>
<table>
<tr><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>2</td><td>0</td><td>0</td><td>2</td></tr>
</table>
</td></tr>
<tr><td>IV</td><td>Prerequisite</td><td>None</td></tr>
<tr><td>V</td><td>Learning Outcome</td><td>after completing this course, the students will be able to
• understand the hardware and software components of a computer system;
• appreciate the role of operating systems and programming languages in solving problems using computer systems;
• appreciate the use of communication infrastructure and cloud computing infrastructure for large scale system design;</td></tr>
<tr><td>VI</td><td>Course Content</td><td><u>Computing Infrastructure:</u>
Computer Hardware: CPU, memory, peripheral devices for input/output, and their interfacing; Storage devices: RAID models for data access scalability and reliability (~6 hrs)

Operating systems as resource manager, services provided by operating systems, types of operating systems: multi programming, multi user, multi tasking; Case study of Unix/Linux operating system (~6 hrs);

Programming languages: types of programming languages - machine language, assembly language, and high level languages (~4 hrs);

Problem solving using computer systems: solution design using recursion, greedy, divide-and-conquer, and data driven approach; Software types: free, open source, proprietary/licensed (~4 Hrs).

<u>Communication infrastructure:</u> Communication hardware: wired/wireless links, interconnecting devices such as switches, router; Communication protocols (~4 hrs).

<u>Cloud Infrastructure:</u> pubic and private cloud; applications of Infrastructure-as-a-service (IaaS), Platform-as-a-service (PaaS), and Software-as-a-service (SaaS); Case study of a cloud service (~4 Hrs).</td></tr>
<tr><td>VII</td><td>Text/ References</td><td>1. Computer systems – a programmer’s perspective by Randal E Bryant and David R O’Hallaron, Pearson India Publisher
2. Computer organization and design by David Patterson and John Hennessy, Elsevier publisher
3. Systems Programming by D M Dhamdhere, Tata McGraw Hill publisher
4. Introduction to Algorithms by Thomas Cormen, Charles Leiserson, Ronald Rivest, and Clifford Stein, MIT press
5. How to solve it by Computer by R G Domey, Prentice hall publisher
6. Computer networking - a top-down approach by James Kurose and Keith Ross, Pearson publisher
7. Cloud computing Bible by Barrie Sosinsky, Wiley publishing</td></tr>
</table>