

**INDIAN INSTITUTE OF INFORMATION TECHNOLOGY,
SRIRANGAM, TIRUCHIRAPPALLI – 620 024.**

(Established by MHRD, Government of India & Government of Tamil Nadu)

**UG CURRICULUM AND SYLLABI
SEMESTER II**

CURRICULUM

SEMESTER II

B.Tech (CSE/ECE/IT)

CURRICULUM
SEMESTER II (15 weeks)

SL. NO	COURSE CODE	COURSE TITLE	BRANCH	L	T	P	C
1.	MAIR12	Complex Analysis and Transforms	CSE/ECE/IT	3	1	0	4
2.	PHIR12	Solid State Physics	CSE/ECE/IT	3	0	0	3
3.	EEIR11	Basic Electrical and Electronics Engineering	CSE/IT	3	0	2	4
	CMIR11	Civil and Mechanical Engineering	ECE	3	0	0	3
	ECPC21	Digital Logic Design	CSE/ECE/IT	3	0	0	3
5.	CSPC21	Discrete Structures	CSE/ IT	3	1	0	4
	ECPC22	Electrical Circuits and Machines	ECE	3	0	2	4
6.	CSPC22	Object Oriented Programming Technology	CSE/ECE/IT	2	0	2	3
7.	EGIR11	Engineering Graphics	CSE/ECE/IT	2	0	2	3
8.	HSIR12	Environmental Science	CSE/ECE/IT	3	0	0	3
9.	HSIR13	Communication Skills II	CSE/ECE/IT	0	0	2	1
10.	HSIR14	Introduction to Professional Courses (Non-Credit)	CSE/ECE/IT	0	0	0	0
TOTAL CREDITS			CSE	28			
			ECE	27			
			IT	28			

SYLLABI
SEMESTER II
B.Tech (CSE/ECE/IT)

MAIR12 - COMPLEX ANALYSIS AND TRANSFORMS

L	T	P	C
3	1	0	4

Analytic Function: Review of complex numbers - Functions of a complex variable - Limit and continuity - Derivative - CR-equations - Analytic functions- Mapping by Elementary functions- Linear fractional transformations (Bilinear transformation)-Conformal Transformation.

Complex Analysis: Contour integrals - Cauchy Integral Formula -Taylor's and Laurent's expansions - Zeros and singularities of an analytic function - Residues - Residue theorem - Evaluation of definite integrals.

Laplace Transforms: Laplace Transform - Properties of Laplace transform – Sufficient condition for existence – Transform of elementary functions – Basic properties – Transforms of derivatives and integrals of functions - Multiplication by t^n -Transforms of unit step function and impulse functions – Transform of periodic functions - Inverse Laplace transform -Statement of Convolution theorem – Initial and final value theorems – Solution of linear ordinary differential equations of second order with constant coefficients using Laplace transformation techniques.

Fourier Transforms: Introduction - Fourier integrals - Fourier sine and cosine integrals-complex forms of Fourier integral - Fourier transform - Finite Fourier sine and cosine transforms - Properties of Fourier transform-convolution Theorem for Fourier transforms- Parseval's identity for Fourier-Transforms -Fourier transforms of the derivatives of a function.

Z-Transforms: Introduction -some standard Z-transforms - Linearity property- Damping Rule-Shifting u_n to the right and left - Multiplication by n - Two Basic Theorems -Some useful Z-transforms - Some Useful inverse Z-transforms-convolution theorems-convergence of Z-transforms- Evaluation of inverse Z-Transform -Application of Difference equations.

Text Books

1. Grewal B.S., Higher Engineering Mathematics, 42nd Edition, Khanna Publications, Delhi, 2011.
2. R.V.Churchill and J.W.Brown, Complex variables and applications, 7th Edition, McGraw-Hill, 2003.

References

1. Kreyszig. E, Advanced Engineering Mathematics, 10th Edition, John Wiley Sons, 2006.
2. Greenberg, M.D. Advanced Engineering Mathematics, 2nd Edition, Pearson Education, 2002.
3. Hsiung, C.Y. and Mao, G. Y. 'Linear Algebra', World Scientific Pub Co Inc., 1999.
4. J. M. Howie, Complex analysis, Springer-Verlag (2004).
5. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, Narosa Pub. House, 2008.
6. Strang's MIT Linear Algebra Course. Videos of lectures and more:
<http://ocw.mit.edu/courses/mathematics/18-06-linear-algebra-spring-2010>.
7. The Linear Algebra toolkit: http://www.math.odu.edu/_bogacki/lat.

PHIR12 - SOLID STATE PHYSICS

L	T	P	C
3	0	0	3

Overview of Band Theory of Solids and Thermal Properties of Solids: Bloch theorem – Kronig Penney model- Energy versus wave vector relationship – number of wave functions in a band – Velocity and effective mass of electron – Forces between atoms-Cohesion of atoms and cohesive energy-Calculation of cohesive energy - Lenard Jones Potential– Einstein’s theory of specific heat capacity of solids - Debye’s theory of specific heat capacity of solids.

Magnetism in Solids: Diamagnetism-Langevin’s Theory- Paramagnetism - Weiss Theory of Paramagnetism- Determination of susceptibilities of para and diamagnetic materials – Guoy’s method and Quincke’s method-Ferromagnetism-Domain Theory of Ferromagnetism - Hysteresis – types of magnetic materials soft and hard materials-Antiferromagnetism - Ferrites-Structure of ferrites – Applications.

Superconducting Materials: Superconductivity- Types of superconductors -Type I and Type II superconductors-BCS Theory - Meissner Effect - Isotopic effect - Magnetic field effect- Critical currents - Josephson device–High T_c superconductors – Thermal Properties - London equations Electrodynamics –Thermodynamics of superconductors – Quantum tunnelling - Applications of Superconductors.

Dielectrics, Ferroelectrics and Piezoelectrics: Microscopic concept of Polarisation— Langevin’s Theory of Polarisation in polar dielectrics- Internal field – Clausius - Mosotti equation - Debye’s equation- Lorentz-Lorentz formula –Static dielectric constants of solids and liquids - Complex dielectric constant and dielectric loss-dielectric breakdown-Absorption of energy and dielectric loss-Effects of dielectrics-Ferroelectricity- Piezoelectricity.

Solid State Devices: Semiconductors – Intrinsic semiconductors – electrons and holes – Fermi level – Temperature dependence of electron and hole concentrations – Doping impurity states n and p type semiconductors – conductivity- mobility – Hall effect – Hall coefficient. Semiconductor devices: p – n junction- majority and minority carriers –tunnelling diode, light emitting diode.

Text Books

1. Charles Kittel, Introduction to Solid State Physics, Wiley India, 2008.
2. R.K. Puri and V.K. Babbar, Solid State Physics and Electronics, S. Chand & Company Limited, 2004.
3. S. O. Pillai, Solid State Physics, 6th edition, New Age International, 2006.
4. Neeraj Mehta, Applied Physics for Engineers, Prentice-Hall of India, 2011.

References

1. R. Murugesan and Er. Kiruthiga Sivaprasath, Modern Physics, S. Chand & Company Pvt. Limited, 2010.
2. Dr. B. S. Saxena, R.C.Gupta and P.N. Saxena, Fundamentals of Solid State Physics, Pragati Prakashan Publisher, Meerut, 2010.
3. R. K. Gaur and S.L Gupta, Engineering Physics, Dhanpat Rai Publications (P) Ltd, 2013.
4. M. N. Avadhanulu and P. G. Kshirsagar, A Text Book of Engineering Physics, S. Chand and Company, New Delhi, 1992.
5. B.L. Thereja, Basic Electronics- Solid State Physics, S. Chand & Co. Ltd., Ram Nagar, New Delhi, Multicoloured Illustrative Edition, 2007.

EEIR11 - BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

L	T	P	C
3	0	2	4

DC Circuit Analysis: Basic Components of Electric Circuits, Charge, Current, Voltage and Power, Voltage and Current Sources, Ohms Law, Kirchoff's Current Law, Kirchoff's voltage law, The single Node – Pair Circuit, Series and Parallel Connected Independent Sources, Resistors in Series and Parallel, Voltage and Current Division, Nodal analysis, Mesh analysis.

Network Theorem and Sinusoidal Steady State Analysis: Useful Circuit Analysis techniques - Linearity and Superposition, Thevenin and Norton Equivalent Circuits, Maximum Power Transfer, Delta-Wye Conversion, Sinusoidal Steady – State analysis , Characteristics of Sinusoids, The Complex Forcing Function, The Phasor, Phasor relationship for R, L, and C, impedance and Admittance, Phasor Diagrams, AC Circuit Power Analysis, Instantaneous Power, Average Power, Apparent Power and Power Factor, Complex Power, Parallel Resonance, Series Resonance, Quality Factor.

Semiconductor Devices: PN-Junction Diode- Drift and Diffusion Current-Zener Diode-Zener Regulator- BJT- VI Characteristics - CE Configuration - Current Equation h - Parameter Model. JFET- VI Characteristics- Current Equation- Transconductance MOSFET- Types DMOS, EMOS – V-I Characteristics-Moll Current Equation.

Rectifiers, Amplifiers and Oscillators: FWR-Filter-Capacitance Input Filter-Choke Input Filter – CE Amplification with and without feedback – Analysis and Frequency Response – CS MOSFET Amplifier – Analysis.

Operation Amplifier: Introduction of Inverting Amplifier, Non Inverting Amplifier, Basic Application of Operation Amplifier: Subtractor, Summing Amplifier, Analog to Digital Converter, Digital to Analog Convertor, Low Pass Filter, First Order Low Pass Filter, First Order High Pass Filter, Integrator, Differentiator.

Text Books

1. Theraja.A.K and Theraja.B.L, A Textbook of Electrical Technology Vol-1&2, S. Chand Publishing, 2007.
2. David A. Bell, Electronic Devices and Circuit, Oxford Press, 2008.

References

1. William H.Kayt, Jr.Jack E. Kemmerly, Steven M.Durbin, Engineering Circuit Analysis, 6th Edition, Tata McGraw-Hill Edition, 2006.
2. David A.Bell, Electric Circuits, PHI, 2006.
3. A.P. Malvino, Electronic Principles, Tata Mcgraw Hill Publications, 1998.
4. Robert L. Boylestad & Louis Nashelsky, Electronic Devices & Circuit Theory, PHI, 1993.

List of Experiments:

1. Verification of Ohm's Law, Kirchoff's Law
2. Single -Phase R, L & C series & Parallel Circuits A-C Circuits
3. Thevenin's and Norton's Equivalent Circuits
4. DC Circuits (Equivalent Resistance and Series / Parallel Resistance Circuits)
5. Nodal and Mesh Analysis
6. PN junction diode Characteristics
7. Zener diode Characteristics
8. Transistor CE Characteristics
9. Rectifier without filters
10. UJT Characteristics
11. FET Characteristics
12. CE Amplifier, Class A Amplifier
13. RC Phase Shift Oscillator

CMIR11 - CIVIL AND MECHANICAL ENGINEERING

L	T	P	C
3	0	0	3

Properties and Uses of Construction Materials: Stones, Sand, bricks, cement, concrete and steel. Buildings: Site selection - Component of building - Foundation- Shallow and deep foundations - Brick and stone masonry, Slab, Flooring, Door and windows and Painting.

Modern Methods and Material Properties: Fundamentals-Classification - Chain Survey - Ranging - Compass Survey - Survey equipment- GPS- Total Station- Green Building- Definition-Principles of green Building - Material Properties - Stress – strain – types – Hook’s law – three moduli of elasticity – Poisson's ratio – relationship – factor of safety

Mechatronics: Definition of Mechatronics - Mechatronics in Manufacturing - Review of fundamentals of electronics - Data conversion devices – sensors – microsensors – transducers - signal processing devices – relays - contactors - timers -Microprocessors – controllers - PLCs - Automation - CNC- CIM - FMS.

Thermal Science: Introduction to Thermodynamics - Types of Systems - Thermodynamic Equilibrium – Properties – State - Process and Cycle - Zeroth Law - Energy Interactions - Heat and Work - First and Second Laws of Thermodynamics -Entropy -Basics of heat Transfer- Electronics Cooling Need and applications

Modern Automobiles and Refrigeration Systems: IC Engines: 2 - Stroke and 4 - Stroke Engines- S.I. Engine and C.I. Engine- Differences - Hybrid Vehicles - Battery operated vehicles- Automotive Electronics- Newer Refrigeration systems- Thermoelectric refrigeration- solar refrigeration.

Text Books

1. Bhavikatti S.S, Basic Civil Engineering, New Age International Private Limited Publishers, 2010.
2. Punmia B.C, Ashok Kumar Jain, Arun Kumar Jain, Surveying Vol-I, Laxmi Publications (P) Ltd , 2005.
3. M. L. Mathur, F. S. Mehta and R. P. Tiwari, Elements of Mechanical Engineering , Jain Brothers, New Delhi, Reprint 2012.

References

1. Prof. Dr. Michael Bauer, Peter Mösle and Dr. Michael Schwarz ,Green Building Guidebook for Sustainable Architecture, Springer, 2010.
2. Mili Majumdar, Energy-efficient buildings in India, Tata Energy Research Institute. 2002.
3. TERI, Sustainable Building Design Manual- Volume I & II, Tata Energy Research Institute.
4. G.J.Vanwylen and R.E.Sonntag, Fundamentals of Classical Thermodynamics, Wiley Eastern, New Delhi, 2008.

5. Yonus A Cengel and Michale A Boles, Thermodynamics: An Engineering Approach, McGraw Hill, 2002.
6. Yunus A Cengel, Heat Transfer: An Practical Approach, Tata McGraw Hill Higher education Publishers, 2003.
7. Hajra Choudhary.S.K, and HajraChoudhary.A.K, Elements of Workshop Technology Vols. I & II, Indian Book Distributing Company Calcutta, 2007.
8. Bolton.W, Mechatronics, 2nd Edition, Pearson education, 2003.
9. Smaili.A and Mrad.F , Mechatronics integrated technologies for intelligent machines, Oxford University Press, 2008.

L	T	P	C
3	0	0	3

Boolean Algebra and Logic Gates: Review of Number Systems – Arithmetic Operations – Binary Codes and Conversions– Boolean Algebra and Theorems – Boolean Functions – Simplification of Boolean Functions using Karnaugh Map, Quine-McCluskey Method – SOP and POS expressions - AND, OR, NAND, NOR, XOR and XNOR Logic Gates Implementations and Gate Level Minimizations.

Combinational Logic: Combinational Circuits – Analysis and Design Procedures – Circuits for Arithmetic Operations, Code Conversion – MSI Components: Adders, Subtractors, Comparators, Encoders, Decoders, Multiplexers and Demultiplexers – Introduction to HDL – HDL Models of Combinational Circuits – Analysis and Synthesis of Combinational Circuits – Applications – Case Studies.

Synchronous Sequential Logic: Sequential Circuits – Latches and Flip Flops – Analysis and Design Procedures – State Machine Design -State Reduction and State Assignment – Shift Registers – Counters – VHDL for Sequential Logic Circuits – Applications – Case Studies.

Asynchronous Sequential Logic: Analysis and Design of Asynchronous Sequential Circuits – Reduction of State and Flow Tables – Race-free State Assignment – Hazards – Asynchronous Design Problems – Analysis and Synthesis of Sequential Circuits – Applications – Case Studies.

Memory And Programmable Logic: RAM and ROM – Memory Decoding – Error Detection and Correction – Programmable Logic Array – Programmable Array Logic – Sequential Programmable Devices – Complex Programmable Logic Devices – Sequential Circuits with Programmable Logic Devices – Applications – Case Studies.

Text Book

1. M. Morris Mano and Michael D. Ciletti, Digital Design with An Introduction to the Verilog HDL, 5th Edition, Pearson Education, 2013.

References

1. John F. Wakerly, Digital Design Principles and Practices, 4th Edition, Pearson Education, 2006.
2. Charles H. Roth and Larry L.Kinney, Fundamentals of Logic Design, 6th Edition, Cengage Learning, 2014.
3. Donald D. Givone, Digital Principles and Design, Tata MCGraw Hill, 2003.
4. G.K. Kharate, Digital Electronics, Oxford University Press, 2010.
5. Parag K. Lala, Principles of Modern Digital Design, Wiley Publishers, 2007.
6. Stephen Brown and Zvonko Vranesic, Fundamentals of Digital Logic with VHDL Design, 3rd Edition, McGraw Hill Education, 2013.
7. Donald P. Leach, Albert Paul Malvino and Goutam Saha, Digital Principles and Applications, 6th Edition, Tata McGraw Hill, 2008.

CSPC21 - DISCRETE STRUCTURES

L	T	P	C
3	1	0	4

Logic: Statements and Notation- Connectives: Statement formulas and Truth Tables, Equivalence of formulas, Tautological Implications -Normal Forms-The Theory of Inference for the Statement Calculus-The Predicate Calculus-Inference theory of the Predicate Calculus.

Set Theory: Basic Concepts of Set theory: Inclusion and Equality of sets, The Power Sets, The Principle of Specification-Representation of Discrete Structures-Relations and Ordering: Relations, Properties of binary relations in a set, Equivalence relations, Partial Ordering-Functions-Recursion.

Algebraic Structures: Algebraic Systems: Examples and General Properties-Semi groups and Monoids: Homomorphism of semi groups and Monoids, Sub-Semigroups and Sub-Monoids -Grammars and Languages: Discussion of Grammars, Formal Definition of Language, Notions of Syntax Analysis-Polish Expressions and their Compilation: Polish Notation, Conversion of Infix Expressions to Polish Notation.

Groups and Lattices: Groups, Subgroups and Homomorphism, Cosets and Lagrange's Theorem, Normal Subgroups, Algebraic Systems with Two Binary Operations -The application of residue Arithmetic to computers-Group Codes: The Communication Model and Basic Notions of Error Correction, Generation of Codes by Using Parity Checks, Error Recovery in Group Codes-Lattices as Partially Ordered Sets: Properties of Lattices, Lattices as Algebraic system, Sub lattices, Direct Product, and Homomorphism-Overview of Boolean Algebra.

Graph Theory: Basic Concepts of Graph Theory: Paths, Reachability and Connectedness, Matrix Representation of Graphs, Trees - Storage Representation and Manipulation of Graphs: Trees Representation and Operations, List Structures and Graphs.

Text Book

1. Tremblay J.P and Manohar R, Discrete Mathematical Structures with Applications to Computer Science, McGraw Hill Education(India) Private Limited, 1997.

References

1. Uwe Schoning, Logic for Computer Scientists, Birkhauser, 2008.
2. Kenneth H. Rosen, Discrete Mathematics and its applications, Seventh Edition, Tata McGraw Hill, 2011.
3. J. E. Hopcroft, Rajeev Motwani, and J. D. Ullman, Introduction to Automata Theory, Languages, and Computation, Third Edition, Pearson, 2008.
4. M. Ben-Ari, Mathematical logic for computer science, Second Edition, Springer, 2003.
5. John Harrison, Handbook of Practical Logic and Automated Reasoning, Cambridge University Press, 2009.
6. Kenneth Slonneger and Barry Kurtz, Formal syntax and semantics of programming languages, Addison Wesley, 1995.
7. Sriram Pemmaraju and Steven Skiena, Computational Discrete Mathematics, Cambridge University Press, 2003.
8. M. Huth and M. Ryan, Logic in Computer Science – Modeling and Reasoning about systems, Second Edition, Cambridge University Press, 2004.

9. Norman L. Biggs, Discrete Mathematics, Second Edition, Oxford University Press, 2002
10. Juraj Hromkovic, Theoretical Computer Science, Springer, 1998.
11. Kenneth Kunen, Set Theory An Introduction To Independence Proofs, Elsevier Science B.V Publishers, 1980.

ECPC22 - ELECTRICAL CIRCUITS AND MACHINES

L	T	P	C
3	0	2	4

DC Circuit Analysis: Basic Components of Electric Circuits, Charge, Current, Voltage and Power, Voltage and Current Sources, Ohms Law, Kirchoff's Current Law, Kirchoff's voltage law, The single Node – Pair Circuit, Series and Parallel Connected Independent Sources, Resistors in Series and Parallel, Voltage and Current Division, Nodal analysis, Mesh analysis.

Network Theorem and Duality: Useful Circuit Analysis Techniques - Linearity and Superposition, Thevenin and Norton Equivalent Circuits, Maximum Power Transfer, Delta-Wye Conversion - Duals, Dual circuits.

Sinusoidal Steady State Analysis: Sinusoidal Steady – State analysis , Characteristics of Sinusoids, The Complex Forcing Function, The Phasor, Phasor relationship for R, L, and C, Impedance and Admittance, Nodal and Mesh Analysis, Phasor Diagrams, AC Circuit Power Analysis, Instantaneous Power, Average Power, Apparent Power and Power Factor, Complex Power, RLC Circuits, Frequency Response, Parallel Resonance, Series Resonance, Quality Factor.

DC Machines: Construction of DC Machines – Theory of operation of DC generators – Characteristics of DC generators- Operating principle of DC motors – Types of DC motors and their characteristics– Speed control of DC motors- Applications.

Induction Machines and Synchronous Machines: Principle of operation of three-phase induction motors – Construction –Types – Equivalent circuit –Construction of single-phase induction motors – Types of single phase induction motors– Double revolving field theory – starting methods - Principles of alternator – Construction details – Types – Equation of induced EMF – Voltage regulation. Methods of starting of synchronous motors – Torque equation – V curves – Synchronous motors.

Text Books

1. Theraja.A.K and Theraja.B.L, A Textbook of Electrical Technology Vol-1&2, S. Chand Publishing, 2007.
2. Del Toro, Electrical Engineering Fundamentals, Pearson Education, New Delhi, 2007.

References

1. William H.Kayt, Jr.Jack E. Kemmerly, Steven M.Durbin, Engineering Circuit Analysis, 6th Edition, Tata McGraw-Hill Edition, 2006.
2. David A.Bell, Electric Circuits, PHI, 2006.
3. I.J Nagarath and Kothari DP, Electrical Machines,Tata McGraw Hill ,1997.
4. John Bird, Electrical Circuit Theory and Technology, Elsevier, 1st Indian Edition, 2006.
5. David A. Bell, Electronic Instrumentation and Measurement, 2nd Edition, Prentice Hall of India, 2007.
6. Albert D.Helfrick and William D. Cooper, Modern Electronic Instrumentation and Measurement Techniques, Prentice Hall of India, 2007.

List of Experiments:

1. Periodic Waveforms, Average and RMS Values
2. Periodic Waveforms and Harmonics
3. Verification of Ohm's law, Kirchoff's Law
4. Single -Phase R, L & C series & Parallel Circuits A-C Circuits
5. DC Circuits (Equivalent Resistance and Series / Parallel Resistance Circuits)
6. Nodal and Mesh Analysis
7. Verification of principle of superposition with DC and AC sources
8. Verification of Thevenin, Norton and Maximum power transfer theorems in AC circuits
9. Voltage generation characteristics of a DC Generator
10. Speed-load control characteristics of a DC Motor
11. Performance of single phase Induction Motor
12. Performance Characteristics of 3-Phase Induction Motor
13. Characteristics of Synchronous Motors

CSPC22 - OBJECT ORIENTED PROGRAMMING TECHNOLOGY

L	T	P	C
2	0	2	3

Introduction: Object oriented programming concepts – Objects – Classes – Abstraction and encapsulation – inheritance – Abstract classes – Polymorphism– Function overloading , Operator overloading – Friend functions – Overloading through friend functions - Constant and volatile functions.

Constructors and Destructors: Constructors – Default constructor – Parameterized constructors – Constructor with dynamic allocation – Copy constructor – Destructors– Type conversion – Explicit constructor.

Templates and Exceptions: Function and Class templates - Exception handling.

Inheritance and RTTI: Inheritance - virtual base class – abstract class – Runtime polymorphism – virtual functions – pure virtual functions – RTTI – Dynamic casting – RTTI and templates – cross casting – down casting.

Streams, I/O and Files: Streams and Formatted I/O – I/O manipulators - File handling – ANSI String Objects –Standard Template Library (STL).

Text Books

1. Herbert Schildt, C++ Complete Reference, 4th Edition, McGraw Hill, 2002.
2. HM Deitel and PJ Deitel, C++ How to Program, 7th Edition, Prentice Hall, 2010.

References

1. Ira Pohl, Object Oriented Programming using C++, 2nd Edition, Pearson Education, 2004.
2. S. B. Lippman, Josee Lajoie, Barbara E. Moo, C++ Primer, 4th Edition, Pearson Education, 2005.
3. B. Stroustrup, The C++ Programming Language, 3rd edition, Pearson Education, 2004.
4. B. Trivedi, Programming with ANSI C++, Oxford University Press, 2007.
5. C++ Language Tutorial: <http://www.cplusplus.com/doc/tutorial>.
6. Wikiversity: Introduction to C++ : <https://en.wikiversity.org/wiki/C%2B%2B/Introduction>
7. Learn about C++ Programming: <http://cplusplus.about.com/od/learning1>.
8. STL Programs Web Link:
<http://www.tenouk.com/cpluspluscodesnippet/cplusplusstandardtemplibrarystlsindex.html>

List of Experiments

1. a) Develop a C++ program using classes and member functions to accept a paragraph, print each word in the paragraph with the number of vowels in each word.
b) A company produces pens. Three salesmen of the company are selling the pens in four different districts. Develop a C++ program using classes and member functions to read the quantity sold by each salesman in different districts and display the quantity sold by each sales man with district and the total quantity sold.
c) Develop a C++ program using classes and member functions to perform the arithmetic operations on matrices.
2. Design C++ classes with static members, methods with default arguments, friend functions. (For example, design matrix and vector classes with static allocation, and a friend function to do matrix-vector multiplication)
3. Implement complex number class with necessary operator overloading and type conversions such as integer to complex, double to complex, complex to double etc.
4. Write a C++ program to perform the string concatenation using dynamic memory allocation.
5. Implement Matrix class with dynamic memory allocation and necessary methods. Give proper constructor, destructor, copy constructor, and overloading of Assignment operator overloads the new and deletes operators to provide custom dynamic allocation of memory.
6. Develop templates of standard sorting algorithms such as bubble sort, insertion sort.
7. Exception handling - Divide by Zero, arrays out of bounds, memory exhaustion exception
 - a) Insertion and selection sort on (i) integer array (ii) strings
 - b) Linear Search and Binary search over (i) integer array (ii) strings
8. a) Define Point class and an Arc class. Define a Graph class which represents graph as a collection of Point objects and Arc objects. Write a method to find a minimum cost spanning tree in a graph.
b) Write a C++ program with two classes named as “one”, “two” to find the area of square and rectangle respectively, and inherit these values to another class named as “cuboid” with its own property “height” to find the area of the cuboid.
9. Develop with suitable hierarchy, classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to demonstrate dynamic polymorphism and RTTI.
10. Write a C++ program that randomly generates complex numbers (use previously designed Complex class) and writes them two per line in a file along with an operator (+, -, *, or /). The numbers are written to file in the format (a + ib). Write another program to read one line at a time from this file, perform the corresponding operation on the two complex numbers read, and write the result to another file (one per line).
11. a) Develop a simple C++ vector container program.
b) Implement C++ STL vector using various operators code.
c) Implement C++ STL vector using constructors.

EGIR11 - ENGINEERING GRAPHICS

L	T	P	C
2	0	2	3

Engineering Graphics and Engineering Curves : Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Plane scales, Diagonal scales,–Lettering and dimensioning Engineering Curves - Basic Geometrical constructions, Curves used in engineering practices - Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – Drawing of tangents and normal to the above curves – Construction of Diagonal and Vernier scales – Representation of Three Dimensional objects – Layout of views.

Projection of Points, Lines and Plane Surfaces: First angle projection–Projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and trapezoidal method and traces Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

Projection of Solids and Section of Solids: Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes by rotating object method and auxiliary plane method - Section of solids - True shape of section.

Development of Surfaces: Development of prisms, pyramids and cylindrical & conical surfaces. Development of lateral surfaces of solids with cylindrical cut outs, perpendicular to the axis.-Intresection of solids- prism, cylinder and cone - Axes perpendicular and offset - Axes inclined and intersecting - Axes inclined and offset. Free Hand Sketching - Orthographic projection of simple solids- Developing visualization skills through free hand sketching of multiple views from pictorial views of objects.

Isometric and Perspective Projections: Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- Perspective projection of prisms, pyramids and cylinders by visual ray method.

Text Books

1. Bhatt N.D, Engineering Drawing, Charotar Publishing house (P) Ltd, India, 2012.
2. Vargheese P.I, Engineering Graphics, 52nd Edition, Tata McGraw Hill Publishing Company Limited, New Delhi, 2013.

References

1. Basant Agarwal and Agarwal C.M, Engineering Drawing, Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
2. Gopalakrishna K.R, Engineering Drawing -Vol I&II combined, Subhas Stores, Bangalore, 2007.
3. Shah M.B. and Rana B.C, “Engineering Drawing”, Pearson, 2nd Edition, 2009.
4. Venugopal. K, Prabhu Raja.V, Engineering Graphics, New Age International(P) Limited, 2008.

5. Jolhe.D. A, Engineering Drawing, Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
6. Natarajan.K. V, A text book of Engineering Graphics, Dhanalakshmi Publishers, Chennai, 2006.
7. Bhattacharyya B. and Bera S.C, I.K. International Publishing House, 2009.
8. Trymbaka Murthy, S., Computer Aided Engineering Drawing, Pub.: I.K. International Publishing House, 2009.

L	T	P	C
3	0	0	3

Environment, Ecosystems and Biodiversity: The multidisciplinary nature of environmental studies, definition, scope and importance -need for public awareness- concept of an ecosystem - structure and function of an ecosystem - energy flow in the ecosystem - ecological succession - food chains, food webs and ecological pyramids - introduction, types, characteristic features, structure and function of the following ecosystem: (a) Forest ecosystem. (b) Grassland ecosystem. (c) Desert ecosystem. (d) Aquatic ecosystems - introduction to biodiversity – definition: genetic, species and ecosystem diversity - value of biodiversity- biodiversity at global, national and local levels - hot-spots of biodiversity. Environmental hydrology and hydraulic principles. Field study of local area to document environmental assets-river/ forest/ grassland/ hill/mountain. Field study of common plants, insects, birds. Field study of simple ecosystems-pond, river, hill slopes, etc.

Environment Pollution and Pollution Abatement: Types of pollution -definition and consequences - air pollution, water pollution , soil pollution , marine pollution, noise pollution, thermal pollution, nuclear hazards - adsorption – types – adsorption of solutes from solutions – role of adsorbents – activated carbon in pollution abatement of air and waste water - Advanced oxidation process (AOPs) to remove organic pollutants in waste water-principles and advantages - solid and hazardous waste management: causes, effects and control measures of municipal solid wastes - role of an individual in prevention of pollution. Recent trends in environmental science and pollution control. Role of Information and Communications Technology (ICT) for monitoring and controlling of environmental pollution at global, national and local levels. Field study of local polluted site-urban/rural/industrial/agricultural and preparation of report

Green Chemistry and Engineering: Principles of Green Chemistry and green engineering-Green Chemistry Methodologies- new methods for organic synthesis and applications - Quantitative/Optimization - Based Frameworks for the Design of Green Chemical Synthesis Pathways.Green Chemistry pollution prevention in material selection for unit operations. Recent trends in Green chemistry.Case studies of the Green Chemistry Methodologies used in academic institutes and industry.

Principles of Sampling and Analysis of Pollutants: Purpose of sampling, different types of samples - water, waste water, soil and air - collection methods - preserving samples - gaseous pollutant monitoring - analytical methods like spectroscopic and chromatographic techniques used for analysis of samples. Case studies of analysis of pollutants by government and private organization. Visit to an analytical lab and or air pollution treatment facility.

Human population and the Environment: Population growth, variation among nations-population explosion – Family Welfare programme - environment and human health - Human Rights - Value Education- HIV/ AIDS - woman and child welfare - role of Information Technology in environment and human health –ICT-applications of IT in global environment- Case studies of the application of ICT in hospitals in India and abroad.

Text Books

1. Benny Joseph, Environmental Science and Engineering, Tata McGraw-Hill, New Delhi, 2006.
2. Erach Bharucha, Environmental Studies for Undergraduate Courses, UGC, New Delhi and Bharati Vidyapeeth Institute of Environmental and Research, Pune, 2004.

References

1. Rajagopalan. R, Environmental Studies-From Crises to Cure, Oxford University Press, 2011.
2. M. L. Davis and S. J. Masen, Principles of Environmental Engineering and Science, McGraw Hill International Edition, 2004.
3. Bharucha, Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad, India, 2001.
4. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T., Environmental Encyclopaedia, Jaico Pub. House, Mumbai, 2001.
5. De A.K., Environmental Chemistry, Wiley Eastern Ltd. , New Delhi, 1994.
6. Rao M.N. & Dutta, A.K., Waste Water Treatment. Oxford & IBH Publ. Co. Pvt. Ltd., 1987.
7. Sharma, B.K., 2001, Environmental Chemistry, Goel Publ. House, Meerut.
8. Allen. D.T, Shonnard, D.R, Green Engineering: Environmentally Conscious Design of Chemical Processes. Prentice Hall PTR, 2002.
9. Mukesh Doble and Anil Kumar Kruthiventi, Green Chemistry and Engineering, Elsevier, Burlington, USA, 2007.
10. RL. Recsok and LD Shields, Modern Methods of Chemical Analysis, John Wiley & sons, Inc, 1990.
11. G.W Ewing, Instrumental Methods of Chemical Analysis, McGraw Hill Book Company, Inc. 2, 2001.

Field Work:

- (a) Visit to a local area to document environmental assets – river/ forest/ grassland/ hill/ mountain.
- (b) Visit to a local polluted site-Urban/ Rural/ Industrial/ Agricultural.
- (c) Study of common plants, insects, birds.
- (d) Study of simple ecosystems – pond, river, hill slopes, etc.

HSIR13 - COMMUNICATION SKILLS II

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Communication Skills - An Overview: Defining communication - Need for effective communicational skills - Nature of communication in social and professional setups - Process of communication - Communication nuances - Barriers to effective communication - Tips to overcome communication barriers.

Listening Skills: Listening versus hearing - Listening process - General versus Academic listening - Importance of Academic listening -Types of Academic listening (Active listening - Attentive listening - Biased listening - Comprehension listening - Critical listening - Discriminative listening - Informational listening - Selective listening - Therapeutic/ Empathetic listening) - Barriers to effective academic listening (Psychological and Physical) - Techniques and strategies to become an effective academic listener.

Speaking Skills: Importance of effective speaking skills - Principles of effective speaking - General speech versus Academic speech - Types of Speeches (Actuate - Conversational - Informative - Persuasive - Interactive - Partially interactive - non-interactive - Negotiation) - Barriers to effective speaking - Tips to become an effective speaker.

Reading Skills: Definition and benefits of reading - General reading versus Academic reading - Process of reading - Types of Academic reading (Intensive reading - Narrow reading - Informational reading - Critical reading - Analytical reading - Close reading) - Benefits of academic reading - Barriers to academic reading - Tips to become an effective reader.

Writing Skills: Characteristics of a good writer - Introduction to academic writing - General writing versus Academic writing - The writing process - Types of Academic writing (Expository writing - Persuasive Writing - Descriptive writing - Narrative writing - Instruction writing - Writing to compare and contrast - Analytical and critical writing - Definition writing - Summary writing - Developing hints - Business / Project proposal writing) - Barriers to effective academic writing - Tips to improve academic writing.

Text Books

1. Urmila Rai, English language communication skills, Himalaya Publishing House, 2010.
2. S. D. Sharma, A text book of professional communicational skills and ESP for Engineers and Professionals, Sarup & Sons, 2006.

References

1. Alan Barker, Improve your communication skills, Kopgan Page Limited, 2010.
2. Richard Ellis, Communication skills: Stepladders to success for the professional, Intellect, 2009.
3. Steven R. Brydon and Michael D. Scott, Between one and many: The art and science of public speaking, McGraw Hill, 2006.
4. Eric Palmer, Teaching the core skills of listening and speaking, ASCD (Association for Supervision and Curriculum Development), 2014.

HSIR14 - INTRODUCTION TO PROFESSIONAL COURSES (Non – Credit)

The professional courses consist of the guest lectures and special lectures given by various eminent experts from well reputed institutions, industries and R&D laboratories. The potential topics covered are state of the art technologies, recent trends in industry and evolving research arena.