DIGITAL LOGIC
BEG171CO

Year: I **Semester: II**

Teaching Schedule Hours/week			Examination Scheme						Total Marks	Remarks
			Final				Internal Assessments			
			Theory		Practical		Theory Marks	Practical Marks		
L	T	P	Duration	Marks	Duration	Marks				
3	0	3	3	80			20	50	150	

Objectives: To provide fundamental of digital electronics, digital computer design and application of digital

l. Binary Systems: **(4 Hrs)**

1.1 Digital Systems
1.2 Binary Numbers
1.3 Number base Conversion
1.4 Integrated Circuits

2. Boolean Algebra and Logic gates: **(5 Hrs)**

2.1 Basic Definition
2.2 Boolean algebra and functions
2.3 Logical Operator
2.4 Digital Logic Gates
2.5 IC Digital Logic families

3. Combination Logic: **(5 Hrs)**

3.1 Design procedure
3.2 Adders
3.3 Subtractions
3.4 Code Conversion
3.5 Analysis procedure
3.6 Multilevel NAND and NOR Circuits
3.7 Exclusive - OR and Equivalence

4.0 Combination Logic with MSI and LSI: **(5 Hrs)**

4.1 Binary parallel adder
4.2 Decimal Adder
4.3 Magnitude Comparator
4.4 Decoders
4-5 Multiplexers
4.6 Read Only Memory (ROM)
4.7 Programmable Logic Array (PLA)

5. Sequential Logic: **(6 Hrs)**

5.1 Flip -- Flops
5.2 Triggering of Flip-Flops
5.3 Analysis of Clocked Sequential Circuits
5.4 Designs with State Diagrams
5.5 Design Procedure with Examples

6. Resisters, Counters and the Memory Unit: **(6 Hrs)**

6.1 Registers
6.2 Shift Registers
6.3 Ripple Counters
6.4 Synchronous Counters
6.5 Design of Counter
6.6 Timing Sequences
6.7 The Memory Unit

7.0 Processor Logic Design: **(6 Hrs)**

7. 1 Processor Organization
7.2 Arithmetic Logic Unit
7.3 Design of Arithmetic Circuit
7.4 Design of Logic Circuit
7.5 Design of Arithmetic Logic Unit
7.6 Design of Shifter, Status Register

8. Digital Integrated Circuits: **(8 Hrs)**

8. 1 Bipolar Transistor Characteristics
8.2 RTL and DTL Circuits
8.3 Integrated - injection Logic (I^2L)
8.4 Transistor - Transistor Logic (TIL)
8.5 Emitter- Coupled logic (ECL)
8.6 Metal - Oxide Semiconductor (MOS)
8.7 Complementary MOS (CMOS)

Laboratory:

There shall be at least 12 class based on digital electronics:

Reference Books:

1. "An Engineering Approach to Digital Design,,, prentice Halt of India, New
2. A. P Malvino, Jerald A. Brown "Digital computer Electronics 1995

OBJECT ORIENTED PROGRAMMING
BEG176CO

Year: I **Semester: II**

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			Final				Internal Assessments			
			Theory		Practical		Theory Marks	Practical Marks		
L	T	P	Duration	Marks	Duration	Marks				
3	0	3	3	80			20	50	150	

1. Overview **(3 H**rs)

1.1 comparing Procedural programming& object oriented programming paradigm.
1.2 Characteristics of Object Oriented languages
1.2.1 Objects
1.2.2 Classes
1.2.3 Inheritance
1.2.4 Reusability
1.2.5 Creating new data type
1.2.6 Polymorphism and Overloading
1.3 Application & benefits of using OOP

2. C++ language basic syntax **(2 Hrs)**

2.1 Derived Type
2.2 Standard conversions and promotions
2.3 New and Delete operators 2.4 Arrays and pointer in C++
2.5 Const
2.6 Enumeration
2.7 Comments

3. Functions in C++ **(3 H**rs)

3.1 Function overloading
3.2 Default arguments
3.3 inline function

4. Classes and Objects **(7 Hrs)**

4.1 Introduction
4.2 class specification: data encapsulation (public, protected, private modifiers)
4.3 Class Objects
4.4 Accessing class members
4.5 Defining member function
4.5.1 Member function inside the Class Body
4.5.2 Member function Outside the Class Body
4.6 'this' pointer
4.7 Static of class member functions
4.8 Pointers within a class
4.9 Passing objects as arguments
4.10 Returning objects from functions
4.11 Friend function & Friend classes

5.0 Constructors and Destructors **(5 hrs)**

5.1 Functions of constructors and destructors
5.2 Syntax of constructors & constructors
5.3 Types of Constructors

6.0 Operator Overloading **(5 hrs)**

6.1 Introduction
6.2 Operator Overloading Restrictions
6.3 Overloading Unary and Binary Operators
6.4 Operator Overloading Using a friend function
6.5 Data Conversion
6.5.1 Conversion between basic types
6.5.2 Conversions between objects and basic types;
6.5.3 Conversion between objects of different classes

7.0 Inheritance **(5 hrs)**

7.1 Introduction
7.2 Types of Inheritance
7.3 Inheritance: Base classes & Derived classes
7.4 Type Casting: Base class printers to Derived class pointers
7.5 Using constructors and Destructors in Derived Classes
7.6 Benefits and cost of Inheritance

8.0 Virtual functions and Polymorphism **(5 hrs)**

8.1 Introduction
8.2 Virtual functions
8.3 Pure virtual functions and abstract classes
8.4 Using virtual functions
8.5 Early vs. Late Binding

9.0 Input Output **(5 hrs)**

9.1 Stream based input/output
9.2 Input /output class hierarchy
9.3 File Input/ Output

10. Advanced C+ topic **(5 hrs)**

10.1 Templates
10.1.1 Introduction to Templates
10.1.2 Function Templates
10.1.3 Class Templates
10.1.4 Standard Template Library
10.2 Namespaces
10.2.1 Introduction
10.2.2 Declaring a Namespace
10.3 Exceptions
10.3.1 Introduction to Exceptions
10.3.2 Exception Handling model
10.3.3 Exception Handling Construct: try, throw, and catch
10.4 Creating Header files

Laboratories:
There shall be 15 lab exercises covering features of Object-Oriented programming.
Reference Book:
1. E. Balagurusamy" Object Oriented Programming in C++ "Tata Mc Graw Hill 2nd Edition

MATHEMATICS-II

BEG102SH

Year: I **Semester: II**

Teaching Schedule Hours/week			Examination Scheme						Total Marks	Remarks
			Final				Internal Assessments			
			Theory		Practical		Theory Marks	Practical Marks		
L	T	P	Duration	Marks	Duration	Marks				
3	3	-	3	80	-	-	20	-	100	

Objectives: The basic objective of the course is to provide a sound knowledge of vectors, 3-D analytical geometry, Infinite series and ordinary differential equations.

1. **Analytic Geometry of 3-D:** Planes, Straight lines, Standard equation of sphere, cylinder and cone. **(12 Hrs)**

2. **Infinite Series:** Infinite series and sequences, convergence, ratio, root and integral tests, absolute convergence, power series, radius of convergence. **(16 hrs)**

3. **Plane Curves and Polar' Coordinates:** Plane curves, parametric equations, polar Coordinates, in the polar coordinates. **(4hrs)**

4. **Vector Calculus:** Differentiation and Integration of vectors, gradients, divergence and curl. **(8 Hrs)**

5. **Differential Equations:** First order differential equation, variable separation, homogeneous, linear and exact. Second order differential equations, linear equations with constant coefficient, homogeneous equation with constant coefficient, general solutions, initial value problems, non-homogeneous equations, solutions in series, Legendre, Bessel equations. **(15 Hrs)**

Reference Books:

1. Three-dimensional Geometry - Y. R. Sthapit & B. C. Bajracharya.
2. Algebra - G. D. Pant
3. A Text Book of Vector Analysis - M. B. Singh & B. C. Bajracharya.
4. Integral calculus and Differential Equations - G. D. pant & G. s . sth.
5. Calculus and Analytic Geometry - Thomas & Finney, Narosa Publication House, India.
6. Advanced Engineering Mathematics -- E" Kreyszig, 5th Edition, Wiley, New York.

ELECTRICAL ENGINEERING
BEG123EL

Year: I **Semester: II**

Teaching Schedule Hours/week			Examination Scheme						Total Marks	Remarks
			Final				Internal Assessments			
			Theory		Practical		Theory Marks	Practical Marks		
L	T	P	Duration	Marks	Duration	Marks				
3	1	2	3	80			20	25	125	

1 D C circuit analysis **11 hrs**

1.1 Concept of electric charges and current ohm's law its application and limitation
1.2 Electric circuit and Circuit Elements
1.3 Resistance inductance and their function behaviors constructional features, mathematical description
1.4 Introduction to voltage sources and current sources
1.5 Series and parallel connection of resistance
1.6 Series and parallel connection of sources effect of their internal resistance on the circuit characteristics
1.7 Star/delta transformations
1.8Power and energy in dc circuit

2. Circuit analysis **16 hrs**

2.1Kirchoffs laws-current law, voltage law, application, limitations Superposition theorem
Reciprocity theorem
2.3 Nodal analysis of electric circuit
2.3 Superposition theorem
2.4 Thevenin' theorem
2.5 Norton's theorem
2.6 Reciprocity theorem
2.7 Maximum power transfer theorem

3. A. C Circuit **10 hrs**

3.1 Faraday's law Electromagnetic induction generation of sinusoidal alternating emf, terminologies use in A.C Circuit
3.2 sinusoidal A.C emf, pharos representation of A.C j- operator and it use in A.C Circuit
3.3 R.L and C excited by A.C sources R-L R-C R-L-C series circuit, parallel A.C circuit Resonance in series and parallel R-L-C circuits construction of phases diagram (Vector Diagrams)
3.4 power and Power factor in A.C Circuit

4.0 Three phase A.C Circuit **8 hrs**

Generation of three phase A.C emf wave form representation, use connection of source and load line voltage and line current, phase voltage and phase current balance three phases current system, calculation of current , voltage., measurement of power, three phase four wire system.

Labs:

1. Basic electrical measurements and verification of ohms law.
2. series and parallel connection of resistance verification of Kirchoff s laws
3. Measurement of power in Dc
4. Measurement of power in single phase dc circuit using wattmeter
5. Measurement of rms value, average value, power factor by using oscilloscope
6. Measurement of power in three phase ac circuit
7. Series resonance and parallel resonance

Reference Books:

1. S n Tiwari and Gin saroon “A first course in electrical engineering”
2. B L theraja and A k theraja “A textbook of electrical engineering volume 1” S chand and co limited New delhi India
3. I J nagrath Basic electrical engineering
4. P s bhimbra Electrical machinery khanna publisher delhi

Applied Mechanics
BEG158CI

Year: I **Semester: I**

Teaching Schedule Hours/week			Examination Scheme						Total Marks	Remarks
			Final				Internal Assessments			
			Theory		Practical		Theory Marks	Practical Marks		
L	T	P	Duration	Marks	Duration	Marks				
3	1	-	3	80			20		100	

Course Objectives: To develop an understanding of mechanical equilibrium and of Newton's laws of motion by application to a wide range of problem of engineering interest.

1. **General principle and statics 1 Hrs**
   1.1. Concept of equilibrium of particles
   1.2. Fundamental quantities of length, time and mass
   1.3. SI system of units
   1.4. Significant figures for calculations
2. **Vectors 1 Hrs**
   2.1. Force and position vectors
   2.2. Vector operations: addition, subtraction cross product, cross product, scalar and triple product, unit vectors
3. **Equilibrium of parties 2 Hrs**
   3.1. Condition of equilibrium a body
   3.2. Free-body diagrams
   3.3. Coplanar force systems; transmissibility, force resultant
   3.4. Three-dimensional force system
4. **Force System Resultant 2 Hrs**
   4.1. Cross products
   4.2. Moment of a force - scalar and vector representation
   4.3. Moment of a couple - scalar and vector representation
   4.4. Reduction of systems of forces and moments to a single force and couple
   4.5. Resultant force and moment for a system of force
5. **Equilibrium of a Rigid Body 3 Hrs**
   5.1. Conditions for equilibrium
   5.2. Equilibrium in two dimensions; equations, two and three force members
   5.3. Equilibrium in three dimensions, equations, constraints for rigid bodies
6. **Friction 2 Hrs**
   6.1. Laws of friction, static and dynamic coefficients of friction, friction angle

6.2. Application to static problems

7. Planar Trusses, Frames and Mechanism 3 Hrs

7.1. Simple trusses

7.2. Types of frames; determinate and indeterminate

7.3. Degrees of freedom structure

7.4. Internal forces from equilibrium, examples for trusses, frames and mechanism

8. Beams 4 Hrs

8.1. Classification of beams, loads and support moment at a section.

8.2. Determining internal shear force, axial force and bending moment at a section

9. Fluids Statics 2 Hrs

9.1. Distribution of pressure on submerged surfaces Work done by external forces

9.2. Centre of pressure and resultant force

10. Centre of Gravity and Centroid 2 Hrs

10.1. Centers of gravity

10.2. Centroid of lines, areas and volume

10.3. Second moment of area

11. Moments of inertia 3 Hrs

11.1. Moments of inertia by in integration

11.2. Parallel axis theorem

11.3. Moments of inertia of composite area

12. Kinematics of a particle 3 Hrs

12.1. Rectilinear and curvilinear motion

12.2. Uniformly accelerated motion Projectile ,motion

12.3. projectile motion

12.4. Rectangular, normal and tangential components of acceleration

13. Kinetics of a Particle 3 Hrs

13.1. Newton's jaws and equations motion

13.2. Application using rectangular or normal and tangibles components

13.3. Principle of work and energy/ Work, power and efficiency

13.4. Linear impulse and momentum

13.5. Angular impulse and momentum

14. Planar Kinematics of a Rigid Early 4 Hrs

14.1. Translation, rotation and general plane motion

14.2. Relative velocity and acceleration analysis

14.3. Applications: rigid bodies, simple mechanism and linkage

15. Force Analysis for Rigid Bodies 4 Hrs

15.1. Equations of motion

15.2. Need for moment of inertia

15.3. Translation, pure rotation and general plane motion

15.4. Constrained motion in a plane

16. Principle of Work and Energy for Rigid bodies 3 Hrs

16.1. Kinetic energy

16.2. Potential energy gravitational force and elastic elements

16.3. Conservative and non-conservative system

16.4. Work by external forces; applied loads frictional force

17. Linear and Angular Impulse and Momentum for Rigid Bodies 3 Hrs

17.1. Conservative of linear and angular momentum

17.2. Impulse motion and eccentric impact

Reference book:

1.0 F.P Beer & E. R' Johnson. "Vector Mechanics for Engineers, Statics and Dynamics,Third Edition, McGraw-Hill

2. R' C' Hibbeler, "Engineering Mechanics for, Statics and Dynamics", Fifth Edition, MacMillan Publishers, New York.

CHEMISTRY
BEG104SH

Year: I **Semester: I**

Teaching Schedule Hours/week			Examination Scheme						Total Marks	Remarks
			Final				Internal Assessments			
			Theory		Practical		Theory Marks	Practical Marks		
L	T	P	Duration	Marks	Duration	Marks				
3	1	2	3	80			20	25	125	

Course Description: This course on Chemistry deals with some advanced topics practical that have we in Civil Engineering. The course syllabus has been divided into three part first part deals with physical chemistry. Second and third part respectively deals with inorganic and organic chemistry.

Catalogue Description: Atomic Structure, Chemical Bonding, Electro chemistry, Transition. Elements, Types of organic Reaction, stereo chemistry, polymers and polymerization.

Course objective: By the end of this course, students will be able to

- Enhance their knowledge in physical, inorganic and organic chemistry
- Acquire knowledge on Environmental Chemistry
- Know the types of organic reactions
- Understand Polymers and polymerization

1. **Atomic structure** **7 Hrs**
   - 1.1.Diffraction concept
   - 1.2.Schrodingers wave equation
   - 1.3.Quantum number
   - 1.4.Afubau principle
   - 1.5.Pauil's exclusion principle
   - 1.6.Stability of noble gases
2. **Chemical bonding** **6 Hrs**
   - 2.1.Electrovalent bond
   - 2.2.Metallic bond
   - 2.3.Crystal lattice
3. **Electro chemistry** **6 Hrs**
   - 3.1.Ostwald's dilution law
   - 3.2.Ph and ph scale
   - 3.3.Buffer and its functioning
   - 3.4.Electrolytic and galvanic cell
   - 3.5.Nernst equation
   - 3.6.Corrosion of metals

4. **Coordination complex 5 Hrs**
   4.1. Coronation compound
   4.2.Werner's coordination theory
   4.3.Nomenclature of coordination complex
   4.4.Electronic interpretation of coordination
   4.5.Valence bond theory
5. **Transition element 5 Hrs**
   5.1.Transition elements with periodic table
   5.2.Characteristic and properties of transition elements
   5.3.Complex formation and magnetic property and color compound
6. **Types of organic compound 6 Hrs**
   6.1.Substitution reaction
   6.2.Addition reaction
   6.3.Elimination reaction
   6.4.Rearrangement reaction
7. **Stereochemistry 3 Hrs**
   7.1.Optical and geometrical isomerism
   7.2.Racemic modification
8. **Organiometallic compound and explosives 3 Hrs**
   8.1.Preparation, prosperities and uses of Grignard reagent.
   8.2.Preparation , properties and action of explosive
9. **Polymer and polymerization 4 Hrs**
   9.1.Polymer and their type
   9.2.Synthetic and natural polymer
   9.3.Synthetic fibers

Laboratory Works:

1. To determine the alkalinity of the given sample of water (Two Labs).
2. To determine the total hardness of water sample.
3. To determine the permanent hardness of water sample.
4. To determine the amount of free chlorine in the given sample of water.
5. To determine the condition in which corrosion take place.
6 To measure the quantify of charge required to deposit one mole of copper.
7. To determine the iron from Mohr's copper.

References Books:

1. Selected topics in physical Chemistry- Motikaji Sthapit
2) Principles of physicals Chemistry_ Marron & prutto
3) Essentials of physical Chemistry_ Bahl & Tuli
4) Organic Chemistry - B. S. Bahl