



SCHEME OF STUDIES & EXAMINATIONS

Department: Civil Engineering – 4th Semester

Sr. No	Course No.	Course Title	Teaching Schedule			Marks of class work	Examination Marks		Total	Credit	Duration of Exam
			L	T	P		Theory	practical			
1	MGT 201 B	ENGINEERING ECONOMICS	4	-	-	25	75	-	100	4	3
2	CE 202 B	STRUCTURAL ANALYSIS – I	3	2	-	25	75	-	100	5	3
3	CE 204 B	OPEN CHANNEL FLOW	3	1	-	25	75	-	100	4	3
4	CE 206 B	GEOMATICS ENGINEERING	3	1	-	25	75	-	100	4	3
5	CE 208 B	ENGINEERING GEOLOGY	3	1	-	25	75	-	100	4	3
6	CE 210 B	CONCRETE TECHNOLOGY	3	-	-	25	75	-	100	3	3
7	CE 212 B	STRUCTURAL ANALYSIS – I LAB	-	-	2	20	-	30	50	1	3
8	CE 214 B	OPEN CHANNEL FLOW LAB	-	-	2	20	-	30	50	1	3
9	CE 216 B	GEOMATICS ENGINEERING LAB	-	-	2	20	-	30	50	1	3
10	CE 218 B	ENGINEERING GEOLOGY LAB	-	-	2	20	-	30	50	1	3
11	CE 220 B	CONCRETE TECHNOLOGY LAB	-	-	2	20	-	30	50	1	3
12	GPCE 202 B	GENERAL PROFICIENCY & ETHICS	1	-	-	75	-	-	75	2	3
Total			20	5	10	325	450	150	925	31	

Note:

1. The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
2. Electronics gadgets including Cellular phones are not allowed in the examination.
3. Each student has to undergo Survey Camp of 2 weeks to be conducted by the Department during summer vacation and its evaluation shall be carried out in the V Semester.
4. The Environmental studies (GES-201 B) is compulsory & qualifying courses.
5. All the branches are to be divided into group 'A' and 'B' as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.



SYLLABUS: B Tech (CE)

Department: Civil Engineering – 4th Semester

Subject: Structural Analysis I

Subject Code: CE-202B

Detailed Content

Unit No.1 Analysis of determinate Trusses, Analysis of Dams, chimneys and Retaining Walls

- Topic No.1 : Introduction, determination of forces in member of trusses by method of joints
- Topic No.2 : Method of sections, Deflection of Joints of plane frames by castigliano's first theorem
- Topic No.3 : Unit load method
- Topic No.4 : Introduction, limit of eccentricity for no tension in the section
- Topic No.5 : Core of the section, middle third rule, wind pressure on chimneys

Unit No.2 Deflection of Beams, Thin cylinder and Spheres

- Topic No.6 : Review of Double Integration Method and Macaulay's Method
- Topic No.7 : Moment area theorem, conjugate beam method, unit method and strain energy method
- Topic No.8 : Maxwell's reciprocal theorem
- Topic No.9 : Introduction, stresses and strains in thin cylinders and spherical shell
- Topic No.10: Volumetric change, wire wound thin cylinders
- Topic No.11: Thin vessels subjected to internal pressure

Unit No.3 Rolling Loads, Influence Lines

- Topic No.12: Introduction to rolling loads and influence lines
- Topic No.13: Determination of shear force, bending moment at a section and absolute shear force and bending moment due to single point load
- Topic No.14: Uniformly distributed load, several point loads.
- Topic No.15: Construction of Influence lines for reaction
- Topic No.16: Shear forces and bending moment for simply supported, overhanging and compound beams
- Topic No.17: Influence lines for girders with floor beams
- Topic No.18: Influence lines for forces in members of frames

Unit No.4 Arches, Cables and suspension Bridges

- Topic No.19: Introduction, Analysis of three hinged, two hinged and fixed arches
- Topic No.20: Spandrel braced arches, Influence lines for horizontal thrust
- Topic No.21: Shear force and bending moment for three hinged and two hinged arches
- Topic No.22: Introduction, shape of a loaded cable
- Topic No.23: Cable carrying point loads and UDL, cables with ends at different level
- Topic No.24: Cable subjected to temperature stresses
- Topic No.25: Suspension bridge with two hinged and three hinged stiffening girders, influence lines

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	2	-	5	25	75	3 hours	100

Text Books

1. Elementary Structural Analysis, Norris & Wilbur, McGraw Hill Publisher,
2. Basic Structural Analysis, C.S. Reddy, Tata McGraw Hill Publication.
3. C K WANG, " Intermediate Structural Analysis" McGraw Hill Publisher

REFERENCE BOOKS:

1. Structural Analysis (A unified approach), D.S. Parkash Rao, University Press.
2. Theory of structures, Punmia and Jain, Luxmi Publications.
3. Structural Analysis Thandvamoorthy TS Oxford University Press
4. Structural Analysis Devdas Menon Narosa Publishing House



SYLLABUS: B Tech (CE)

Department: Civil Engineering – 4th Semester

Subject: Open Channel Flow

Subject Code: CE-204B

Detailed Content

Unit No.1 Flow in Open Channels, Flow Measurement

- Topic No.1 : Difference between pipe flow and channel flow, Types of channels
- Topic No.2 : Classification of flows, Sub Critical and Supercritical Flows
- Topic No.3 : Velocity distribution and Uniform flow formulae
- Topic No.4 : Flow over notches and weirs ,Pitot tube floats and current meters for velocity measurement
- Topic No.5 : Flow over Spillways, Sluice gates, free overfall

Unit No.2 Unsteady flow and Hydraulic jump, Concepts of Specific energy and specific Force

- Topic No.6 : Froude number and types of hydraulic jump
- Topic No.7 : Applications Jumps in channels. Unsteady flow equation
- Topic No.8 : Pre jump and post jump depths
- Topic No.9 : length of Hydraulic Jump and energy dissipation, Surges
- Topic No.10: Specific energy and specific curve
- Topic No.11: Momentum Equation in open channels
- Topic No.12: Specific force & specific force curve Critical depth and its computation

Unit No.3 Gradually Varied Flow, Design of Channels

- Topic No.13: Channel transitions, Non-uniform flow in open channels
- Topic No.14: Dynamic equation for GVF
- Topic No.15: Water surface profiles in channels of different slopes GVF flow computations
- Topic No.16: Design of Channels
- Topic No.17: Most efficient channel sections

Unit No.4 Pumps and Turbines

- Topic No.18: Reciprocating pumps, their types
- Topic No.19: Work done by single and double acting pumps
- Topic No.20: Centrifugal pumps, components and parts and working
- Topic No.21: Types, heads of a pump-statics and manometric heads
- Topic No.22: Force executed by fluid jet on stationary and moving flat vanes
- Topic No.23: Turbinesclassifications of turbines based on head and specific speed
- Topic No.24: Component and working of Pelton wheel and Francis turbines
- Topic No.25: Cavitation and setting of turbines

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week		Internal Assessment		External Assessment (Examination)			
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

Text Books:

1. K.G. Ranga Raju, "Flow Through Open Channels", Tata McGraw Hill, New Delhi.
2. F. M. Hendersen, "Open Channel Flow", McMillan, New York.

Reference Books:

1. K. Subramanya, "Flow in Open Channels", Tata McGraw Hill, New Delhi.
2. R. H. French, "Open-Channel Hydraulics", McGraw Hill Publishing Company, New York.

Note:

1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.



SYLLABUS: B Tech (CE)

Department: Civil Engineering – 4th Semester

Subject: Geomatics Engineering (Theory)

Subject Code: CE-206B

Detailed Content

Unit No.1 Introduction to Geomatic Engineering, Remote Sensing

- Topic No.1 : GIS, GPS, DEM, DTED
- Topic No.2 : History of surveying and mapping, Importance
- Topic No.3 : Maps and maps Numbering systems
- Topic No.4 : Large scale mapping, small scale mapping
- Topic No.5 : Components of GIS, Application of GIS in civil engineering
- Topic No.6 : Fundamentals, EMS, RS System, Active and Passive radiation – Electromagnetic Radiation
- Topic No.7 : Nomenclature, Reflectance, Transmission and Absorption
- Topic No.8 : Thermal Emission – Plank’s formula, Stefan – Boltzman Law
- Topic No.9 : Wein’s Displacement Law; Emissivity – Kirchoff’s Law
- Topic No.10: Characteristics of Solar Radiant Energy
- Topic No.11: Application of remote sensing to various engineering fields

Unit No.2 Interaction of EMR with Atmosphere, Interaction of EMR with Earth Surface

- Topic No.12: Scattering, Refraction, Absorption
- Topic No.13: Transmission. Atmospheric Windows
- Topic No.14: Spectral Reflectance Curves. Interaction of earth surface with EM radiation in visible
- Topic No.15: NIR, TIR and Microwave regions
- Topic No.16: Idealised & Real sequence of remote sensing

Unit No.3 Sensors and Platforms, Data Processing

- Topic No.17: Platforms, Orbital characteristics
- Topic No.18: Storage and Retrieval of data. IRS satellite systems
- Topic No.19: Introduction, Stages of development, Sensors
- Topic No.20: Types of scanning system
- Topic No.21: Initial data statistics. Pre-processing
- Topic No.22: Atmospheric, Radiometric and Geometric corrections
- Topic No.23: Image Histogram, Classification of images

Unit No.4 Data analysis, Photogrammetry

- Topic No.24: Image Interpretation Elements, Keys and Aids
- Topic No.25: Basic Instrumentation. Visual analysis of data
- Topic No.26: Aerial and terrestrial, applications
- Topic No.27: types and geometry of aerial photograph
- Topic No.28: flight planning, relief displacement
- Topic No.29: Stereoscopy, photogrammetric mapping
- Topic No.30: Mosaics

Study Scheme				Evaluation Scheme			Total Marks
L	T	P	Credits	Internal Assessment	External Assessment (Examination)		
				Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

Text Books

1. Geomatic Engineering, Manoj K Arora, RC Badjatiya, Nem Chand & Bros.
2. Remote Sensing and Image Interpretation, by Lillisand, T.M. & Kiefer R.W., John Wiley and Sons.
3. Introduction to Remote Sensing, by Campbell, J.B. Taylor and Francis.
4. Principles of Geographic information systems, Burrough, P.A and MacDonnel, R.a , Oxford University press
5. Concepts and Techniques of GIS, C.P.Lo,Albert K.W.Yeung, PHI



SYLLABUS: B Tech (CE)

Department: Civil Engineering – 4th Semester

Subject: Engineering Geology (Theory)

Subject Code: CE-208B

Detailed Content

Unit No.1 Introduction, Rocks and Minerals

- Topic No.1 : Divisions of Geology, Importance of Engineering Geology
- Topic No.2 : Geology applied to civil engineering practices
- Topic No.3 : Weathering: Agents and effects, Geological works of rivers
- Topic No.4 : Wind, glaciers and oceans as agents of erosion
- Topic No.5 : Transportation and deposition
- Topic No.6 : Resulting features and engineering importance
- Topic No.7 : Classification of rocks for engineering purposes, Rock Quality Designation (RQD)
- Topic No.8 : Igneous, sedimentary and metamorphic rocks
- Topic No.9 : Their formation and structures, Identification and physical properties of minerals

Unit No.2 Structural Geology, Faults

- Topic No.10: Stratification, dip and strike, Unconformities
- Topic No.11: Causes and types of unconformities, Folds
- Topic No.12: Definition, parts of a fold, classification
- Topic No.13: Causes, relation to engineering operations
- Topic No.14: Definition, parts of a fault, classification, causes
- Topic No.15: Relation to engineering purposes. Joints: Definition, attitude

Unit No.3 Methods of geological explorations, Geological considerations in the Engineering projects

- Topic No.16: Gravity, electrical and seismic methods, remote sensing techniques
- Topic No.17: Geology of India. Introduction to GIS
- Topic No.18: Components, database structure,, software packages
- Topic No.19: Tunnels and its design considerations, highways, foundations
- Topic No.20: Dams and anchorage of dams, reservoirs

Unit No.4 Earthquakes, Earth movements

- Topic No.21: Definition, terminology, causes, earthquake waves
- Topic No.22: Intensity, vibration quantification and natural damping, recording of earthquakes
- Topic No.23: Seismic zones in India, factors to be considered and methods in earthquake proof construction
- Topic No.24: Landslides and land subsidence, elementary idea about classification
- Topic No.25: Factors causing landslides and land subsidence
- Topic No.26: Preventive measures for landslides viz retaining walls
- Topic No.27: Slope treatment, chemical stabilization and drainage control

Study Scheme				Evaluation Scheme			Total Marks
L	T	P	Credits	Internal Assessment	External Assessment (Examination)		
				Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

Text Books:

1. Engineering Geology by Parbin Singh, Kataria and Sons, Ludhiana/Delhi.
2. Geology for Engineers by D.S. Arora, Mohindra Capital Publishers, Chandigarh.

Reference Books:

1. Geology for Civil Engineers by Mcleans & Gribble; E & F Spon, London, U.K.
2. Engineering Geology by Richard E. Goodman, John Wiley and Sons, USA.
3. Engineering Behaviour of Rocks by I.W. Farmer; E & F Spon, London, U.K.
4. Rock Mechanics and Engineering by C. Jaeger, Cambridge Univ. Press, London, UK
5. Fundamentals of Rock Mechanics by Jaeger and Cook, Metheun, London, U.K.



SYLLABUS: B Tech (CE)

Department: Civil Engineering – 4th Semester

Subject: Concrete Technology

Subject Code: CE-210B

Detailed Content

Unit No.1 Constituents of Concrete

- Topic No.1 : Properties of Cement, Tests on cement
- Topic No.2 : Various types of cement & their applications, Bulking of Sand
- Topic No.3 : Properties of good sand and functions of sand in mortar and cement concrete, substitutes of sand
- Topic No.4 : Classification of Aggregates, Properties of aggregates
- Topic No.5 : Specific gravity, bulk density, porosity
- Topic No.6 : Adsorption & moisture content of aggregates, deleterious substance in aggregate
- Topic No.7 : Soundness of aggregate, Grading of coarse and fine aggregates
- Topic No.8 : Physical requirements of aggregates, and their tests, Admixtures

Unit No.2 Properties of Fresh and Hardened Concrete

- Topic No.9 : Properties & Tests of Cement Concrete, Workability, factors affecting workability
- Topic No.10: Measurement of workability by different tests; Strength of concrete and factors affecting it
- Topic No.11: Water Cement Ratio – Abram's law
- Topic No.12: Degree of Compaction and Age of Concrete. Development of Strength of Concrete
- Topic No.13: Methods of Curing, Influence of Temperature, Steam curing, Durability
- Topic No.14: Shrinkage & Creep of Concrete, Factors influencing Creep
- Topic No.15: Flexural Tests & Splitting Tests, Freeze and Thaw in Concrete

Unit No.3 Concrete Mix Design

- Topic No.16: Principles of Concrete Mix Design, Basic Considerations
- Topic No.17: Factors in the choice of mix design, outline of mix design procedure
- Topic No.18: Proportioning of Concrete mixes by various methods – BIS Method of Mix Design
- Topic No.19: American Concrete Institute, British Standard, Quality control and Acceptance Criterion
- Topic No.20: Grades of Concrete, stress strain curve, permissible stresses

Unit No.4 Durability of Concrete

- Topic No.21: Sulphate attack of concrete, Corrosion of rebar wrt chloride and sulphate attack
- Topic No.22: Alkali Silica Reaction, Freezing and Thawing
- Topic No.23: Carbonation of Concrete, Corrosion Measurement Techniques, Prevention of Corrosion
- Topic No.24: Special Circumstances of Concreting: Hot weather concreting
- Topic No.25: Cold weather concreting, Underwater concreting
- Topic No.26: Heavy Concrete, Lightweight Concrete

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	-	-	3	25	75	3 hours	100

Text Books:

1. Concrete Technology, by A. M. Neville & J.J. Brooks, Pearson.
2. Concrete Technology, by M. L. Gambhir, Tata McGraw Hill, New Delhi.
3. Concrete Technology, by M.S. Shetty, S. Chand & Co.

Reference Books:

1. Handbook of Mix Design, BIS, New Delhi.
2. Concrete Technology, by A.R. Santhakumar, Oxford University Press.
3. Concrete Microstructure and its Properties by P K Mehta and PJM Monterio
4. IS: 269 1989
5. IS:383 1970
6. IS:10262 2009



SYLLABUS: B Tech (CE)

Department: Civil Engineering – 4th Semester

Subject: Structural Analysis-I Lab

Subject Code: CE-212B

Detailed Content

List of Experiments:

1. To verify Betti's Law
2. To find the deflection of a pine connected truss.
3. To determine the flexural rigidity (EI) of a given beam.
4. To verify Moment-Area Theorems for slope and deflection of a beam.
5. To study the behavior of different types of struts.
6. To obtain experimentally the influence line for the horizontal thrust in a two hinged arch.
7. To determine the elastic displacement of curved members.
8. To determine the horizontal displacement of the roller end in a curved beam.
9. To make computer programs for theoretical verification of the above experiments.

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	50
-	-	2	1	20	30	3 hours	

Note:

1. Ten experiments are to be performed in the Semester.
2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the concerned institute as per the scope of the syllabus



SYLLABUS: B Tech (CE)

Department: Civil Engineering – 4th Semester

Subject: Open Channel Flow Lab

Subject Code: CE-214B

Detailed Content

List of Experiments:

1. To determine Manning's co-efficient of roughness for the rough bed of a given flume.
2. To measure the velocity distribution in a rectangular channel by Prandtl Pitot tube and to determine the energy correction factors
3. To study the flow through a horizontal contraction in a rectangular open channel.
4. To calibrate a current meter
5. To study the formation of hydraulic jump in a horizontal rectangular open channel (Measurement of Froude no. and energy loss)
6. To study the flow over a hump in a channel bed.
7. To study the pressure distribution along the spillway surface for different heads.
8. To calibrate a broad-crested weir and to study the pressure distribution along its surface.
9. To calibrate a venturi flume.
10. To study the flow under a sluice gate and formation of hydraulic jump at different Froude no.

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week		Internal Assessment		External Assessment (Examination)			
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
-	-	2	1	20	30	3 hours	50

Note:

Ten experiments are to be performed in the Semester taking atleast seven experiments from the above list. Remaining three experiments should be performed as designed & set by the concerned Institution as per the scope of the syllabus.



SYLLABUS: B Tech (CE)

Department: Civil Engineering – 4th Semester

Subject: Geomatics Engineering Lab

Subject Code: CE-216B

Detailed Content

List of Experiments:

1. Study of Aerial photographs.
2. Study and image interpretation of remote sensing data.
3. Introduction to CAD/GIS/Image Processing software
4. Study of digital image characteristics such as:
 - DN value,
 - Histogram,
 - Color image generation,
 - Simple Image enhancement,
 - On-screen digitization from images,
 - Area computation,
 - Geo-registration of images etc.

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
-	-	2	1	20	30	3 hours	50

Note:

The students will perform all above mentioned experiments. However, some more experiments may be performed as designed & set by the concerned Institution as per the scope of the syllabus.



SYLLABUS: B Tech (CE)

Department: Civil Engineering – 4th Semester

Subject: Engineering Geology Lab

Subject Code: CE-218B

Detailed Content

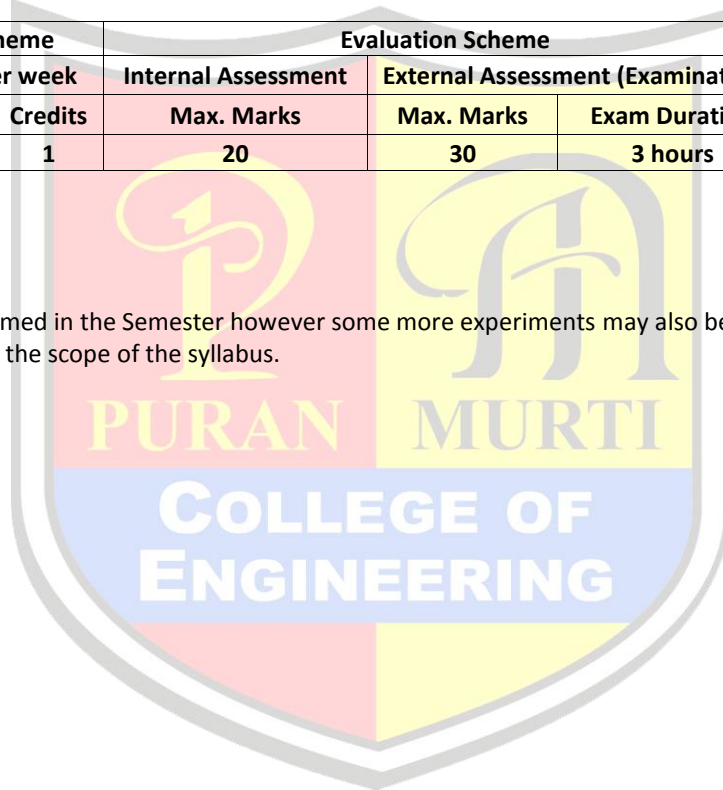
List of Experiments:

1. Study of minerals-hand specimens.
2. Study of rocks-hand specimens.
3. Field description of rocks for engineering practices.
4. Study of elements of symmetry and Crystal systems with crystal models.
5. Study of Geological Maps.
6. Dip and strike problems.
7. Study of optical properties of minerals.

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
-	-	2	1	20	30	3 hours	50

Note:

All experiments are to be performed in the Semester however some more experiments may also be performed as designed & set by the concerned Institution as per the scope of the syllabus.





SYLLABUS: B Tech (CE)

Department: Civil Engineering – 4th Semester

Subject: Concrete Technology Lab

Subject Code: CE-220B

Detailed Content

List of Experiments:

1. To determine standard consistency, initial and final setting times of cement
2. To determine compressive strength of cement
3. To determine the specific gravity of cement
4. To determine specific gravity of fine aggregate
5. To determine the specific gravity of coarse aggregate
6. To determine the grading of fine aggregate
7. To determine the grading of coarse aggregate
8. To determine the water absorption and moisture content of fine aggregate
9. To determine the water absorption and moisture content of coarse aggregate
10. To determine the compressive, tensile and flexural strengths of concrete
11. To design a mix grade of concrete as per Indian standard IS:10262 2009

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week		Credits	Internal Assessment	External Assessment (Examination)			
L	T		Max. Marks	Max. Marks	Exam Duration		
-	-	2	1	20	30	3 hours	50

Text Books

1. Material Testing Laboratory manual Kaushik S K, Kukreja CB Gupta VK and Kishore K. Standard Publishers Distributors
2. Concrete Laboratory Manual M. L. Gambhir

Note:

All experiments are to be performed in the Semester however some more experiments may also be performed as designed & set by the concerned Institution as per the scope of the syllabus.



SYLLABUS: B Tech (CE)

Department: Civil Engineering – 4th Semester

Subject: General Proficiency & Ethics

Subject Code: GPCE-202B

Detailed Content

The purpose of this course is to inculcate a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook. The student efforts will be evaluated on the basis of his/her performance /achievements in different walks of life.

A Faculty Counselor will be attached to a group of students which will remain associated with him /her during the entire period of the degree program in the University. Each faculty member will serve as a faculty counselor. They will act like a local guardian for the students associated with him / her and will help them in terms of career guidance, personal difficulties.

A. The student will present a written report before the committee with following in view:

The student will present before the committee his/her achievements during the current academic session in the form of a written report highlighting followings:

- i. Academic Performance
- ii. Extra Curricular Activities / Community Service, Hostel Activities **(8 Marks)**
- iii. III Technical Activities / Industrial, Educational tour **(8 Marks)**
- iv. IV Sports/games **(14 Marks)**
- v. V Moral values & Ethics **(15 Marks)**

B. A student will support his/her achievement and verbal & communicative skill through presentation before the committee. (30 Marks)

C. Moral values & Ethics

Syllabus - Process for Value Education, self-evaluation concept and process.

A minor test will be conducted during the semester and It will be the duty of the concerned teacher assigned to teach Moral values & Ethics to submit the awards to respective chairman of the department / Director/Principal.

The evaluation of this course will be made by the following Committee.

University Departments:

1. Chairperson of the Department Chairman
2. Senior Most Faculty Counselor Member
3. Vice- Chancellor's Nominee Member

Affiliated Colleges:

1. Director/Principal Chairman
2. Head of the Department/Sr. Faculty Member
3. External Examiner to be appointed by the University Member

Note:

Remuneration will be paid to the external examiner only (at par with the other practical examinations).