



**SCHEME OF EXAMINATION  
&  
DETAILED SYLLABUS**

**BACHELOR OF ENGINEERING  
Civil Engineering  
B.E (C.E)  
First Year  
2016-17**



Bhopal-Chiklod Road, Near Bangrasia Chouraha,  
Vill-Mendua, Distt-Raisen(Madhya Pradesh), Ph:07480-295707  
e-mail-info@aisectuniversity.ac.in website: www.aisectuniversity.ac.in

# AISECT UNIVERSITY, Bhopal, (M.P.)

## Scheme of Examination

Department: Mathematics

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.		
			Theory			Practical			Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work				
TBMA-101	Mathematics	4(3-1-0)	50	20	30	-	-	100	3 hr	-	

### Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical/short notes. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

### COURSE OBJECTIVE:

The objective of this foundational course is to review mathematical concepts already learnt in higher secondary. This course will also introduce fundamentals of mathematical functions, derivatives and aspects of calculus to students.

### Syllabus

**UNIT-I:-** Recapitulation of Mathematics: Basics of Differentiation, Rolle's and Lagranges Theorem, Tangents and Normals, Indefinite Integral (Substitution, Integration using Trigonometric Identity & Integration by Parts & Definite Integral).

**UNIT-II:-** Ordinary Derivatives & Applications: Expansion of functions by Maclaurin's & Taylor's

Theorem (One Variable), Maxima and Minima of functions of two variables, Curvature (Radius, Center & Circle of Curvature for Cartesian Coordinates), Curve Tracing.

**UNIT-III:-** Partial Derivatives & Applications: Definition, Euler's Theorem for Homogeneous Functions, Differentiation of Implicit Functions, Total Differential Coefficient, Transformations of Independent Variables, Jacobians, Approximation of Errors.

**UNIT-IV:-** Integral Calculus: Definite Integrals as a Limit of Sum, Application in Summation of series, Beta and Gamma functions (Definitions, Relation between Beta and Gamma functions, Duplication formula, Applications of Beta & Gama Functions).

**UNIT-V:-** Applications of Integral Calculus: Multiple Integral (Double & Triple Integrals), Change of Variables, Change the Order of Integration, Applications of Multiple Integral in Area, Volume, Surfaces & Volume of Solid of Revolution about X-Axis & Y-Axis.

### **COURSE OUTCOMES**

- Apply mathematical concepts and principles to perform computations.
- Apply mathematics to solve problems.
- Create, use and analyze graphical representations of mathematical relationships.
- Communicate mathematical knowledge and understanding.
- Apply technology tools to solve problems

### **REFERENCES:**

1. Michael Greenberg, Advanced Engineering Mathematics, Second Edition, Pearson Education, 2002 (Indian Edition).
2. B.V. Rammana, Higher Engineering Mathematics, Tata McGraw Hill Publishing Company, 2007. Potter, Goldberg & Edward, Advanced Engineering Mathematics, Oxford University Press.
3. S. S. Shastry, Engineering Mathematics, PHI Learning
4. C.B. Gupta, Engineering Mathematics I & II, McGraw Hill India, 2015

---

**Chairman**  
**(Board of studies)**  
Seal

**Dean**  
**(Faculty)**

**(Registrar)**

# AISECT UNIVERSITY, Bhopal, (M.P.)

## Scheme of Examination

Department: Chemistry

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.		
			Theory			Practical			Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work				
TBCH-101	Chemistry	4(2-1-1)	50	20	30	25	25	150	3hr	2hr	

### Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical/short notes. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

### COURSE OBJECTIVE:

The objective of this foundational course is to develop general familiarity and understanding with the following areas in chemistry: inorganic, organic, physical chemistry, electrochemistry, photochemistry and Thermo chemistry. The course also intended to make students work effectively and safely in the laboratory working environment. Last portion of curriculum addresses critical thinking and numerically analyzing the chemical problems.

### Syllabus

**UNIT-I :- Molecular Structure & Bonding:** VSEPR Model, Valance-Bond Theory, Molecular Orbital Theory, Molecular Orbital of Polyatomic Molecules.

**Electrochemistry:** Arrhenius theory of electrolytic dissociation, Transport Number, Kohlrausch's Law, Solubility Product, Redox Reaction, Electrochemical & Concentration Cells.

**UNIT-II :- Chemical & Phase Equilibria:** Phase Diagram for single component system (Water), Phase diagram for Binary Eutectic System (Copper-Silver), Corrosion of metals in acids, Corrosion by Oxygen, Corrosion by Metal Contact.

**Reaction Dynamics:** Order, Molecularity, Rate Law, Methods of determining order of reaction (1<sup>st</sup> & 2<sup>nd</sup> Order).

**UNIT-III :- Polymers & Polymerization:** Monomers, Polymers, their classification, thermoplastics & thermosetting with examples, Bio-Polymerization, Bio-Degradable Polymerization, Preparation, Properties & Technical Applications of PVC, PVA, Teflon, Nylon6, & Nylon6:6, Polyester, Phenol-Formaldehyde, Urea-Formaldehyde, Natural & Synthetic Rubber, Vulcanization of Rubber.

**UNIT-IV :- Photochemistry:** Photo-excitation of organic molecules, Jablonski Diagram, Laws of Photochemistry and quantum yield, some examples of photochemical reactions, chemistry of vision and other applications of photochemistry.

**Thermo chemistry:** Fundamental concept of first law, work, heat, energy and enthalpies, relation between  $C_v$  &  $C_p$ . Second Law: Entropy, Free Energy, (The Helmholtz and Gibbs) and chemical potential.

**UNIT-V :-** Numerical problems based on water analysis and water softening process. Determination of hardness by complexometry, Alkalinity and its determination and their relevant numerical problems, testing of lubricating oils, viscosity and viscosity index, flash & fire point, cloud & pour point, Aniline Point, Carbon Residue, Steam-emulsion number, Neutralization number, Saponification number.

### **Course Outcomes:**

1. Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.
2. Substitute metals with conducting polymers and also produce cheaper biodegradable polymers to reduce environmental pollution.
3. Design economically and new methods of synthesis nano materials.
4. Apply their knowledge for protection of different metals from corrosion .
5. Have the knowledge of converting solar energy into most needy electrical energy efficiently and economically to reduce the environmental pollution.

### **LIST OF EXPERIMENTS**

As per suggested by the course coordinator.

## **REFERENCES**

1. Lee, J. D, Author, Concise Inorganic Chemistry, Oxford University Press Albery.
  2. R. A., Physical Chemistry, John Wiley and Sons.
  3. N. Krishnamurthy, P. Vallinayagam, Engineering Chemistry, PHI Learning Pvt. Ltd. Kuriacose J.C. and Rajaram J., Chemistry in Engineering and Technology, Tata McGraw Hill.
- 

**Chairman**  
**(Board of studies)**  
**Seal**

**Dean**  
**(Faculty)**

**(Registrar)**

# AISECT UNIVERSITY, Bhopal, (M.P.)

## Scheme of Examination

**Department: English**

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBEN-101	English	4(3-0-1)	50	20	30	25	25	150	3 hr	2hr

### Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical/short notes. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

### COURSE OBJECTIVE:

The objective of this foundational course is to develop the second language learners' ability to use the four fundamental language skills – listening, speaking, writing and reading. The objective of this laboratory is to practice English phonetics through audio & visual aids and computer software. It intends to enable student to speak English correctly with confidence.

### Syllabus

**UNIT-I:-** Grammar – Applied Grammar and usage, Parts of Speech, Articles, Tenses, Subject-Verb Agreement, Prepositions, Active and Passive Voice, Reported Speech: Direct and Indirect, Sentence Structure, Punctuations.

**UNIT-II:-** Vocabulary Development – Using Dictionaries and Thesaurus, Synonyms, Antonyms, Homophones, One Word Substitution, Affixation: Prefixes & Suffixes, Derivation from root words, Jargon, Scientific Jargon.

**UNIT-III:-** Developing Reading Skills – Reading Comprehension, Process, Active & Passive Reading, Reading Speed Strategies, Benefits of effective reading, note-making, note-taking, Reading comprehension of technical material and SQ3R reading technique.

**UNIT-IV:-** Developing Writing Skills – Planning, Drafting & Editing, Writing with style, right-words selection, writing effective sentences, developing logical paragraphs, art of condensation, précis, essay, technical definition and technical description.

**UNIT-V:-** Business Correspondence – Business Letters, Parts & Layouts of Business Letters, Writing Resume/ Application Calling/ Sending Quotations/ Orders/ Complaints and E-mails.

**Topics for the Laboratory:**

1. Basic Grammar & Vocabulary Practice (Synonyms, Antonyms, Analogies, Sentence Completion, Correctly Spelt Words, Idioms, Proverbs, Common Errors.
2. Phonetic Symbols, Pronunciations
3. Listening Skills – Including Listening Comprehension
4. Extempore and JAM (Just a Minute Session)
5. Role Play – I
6. Role play – II
7. Body Language
8. Debate
9. Oral Presentation – Preparation & Delivery using Audio – Visual Aids with stress on body language and voice modulations. (Topics to be selected by the Instructor)

**COURSE OUTCOMES**

1. Knowledge Base
2. Critical Reflection
3. Expression
4. Interaction With Others
5. Valuing
6. Multiple Frameworks



## **REFERENCES**

1. A.J. Thomson and A.V. Martinet, A Practical English Grammar, Oxford IBH
  2. Pub Sanjay Kumarm Pushp Lata, English for Effective Communication, Oxford
- 

**Chairman**  
**(Board of studies)**  
**Seal**

**Dean**  
**(Faculty)**

**(Registrar)**

## AISECT UNIVERSITY, Bhopal, (M.P.)

### Scheme of Examination

Department: Civil Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBCE-101	Engineering Mechanics	4(2-1-1)	50	20	30	25	25	150	3 hr	2hr

#### Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical/short notes. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

#### COURSE OBJECTIVE:

1. To familiarize with different branches of mechanics
2. To familiarize with Static equilibrium of particles
3. To familiarize with Properties of surfaces and volumes.
4. To familiarize with fundamental concepts of dynamics

#### Syllabus

**UNIT-I:- Coplanar Concurrent Forces:** Introduction to Engineering Mechanics: What is Engineering Mechanics? Classification of Engineering Mechanics, Statics, Dynamics, Kinematics, Kinetics etc.

Fundamental Laws of Mechanics.

**UNIT-II:- Resolution and Composition of Forces:** Force, Pressure and Stress, Free Body Diagram, Bow's Notation, Characteristics and Effects of a Force, System of Forces, Resolution of a Force, Composition of Forces, Resultant / Equilibrant Force, Law of Parallelogram of Forces, Law of Triangle of Forces, Polygon Law of Forces, Lami's Theorem, Equilibrium of a Body Under Two / Three/More Than Three Forces. Law of Superposition of Forces.

**UNIT-III:- Coplanar Non Concurrent Forces:** Moment of a Force, Principle of Moments/ Varignon's Theorem, Parallel Forces : Resultant of Parallel Forces, Couple: Moment of a Couple, Resolution of Force into a Couple. Coplanar Non Concurrent Forces: Resultant of Coplanar, Non Con-Current Forces.

**UNIT-IV:- Beams:** Types of Beams: Simply Supported Beam, Overhanging Beam, Cantilever Beam. Types of Supports of a Beam or Frame: Roller, Hinged and Fixed Supports. Load on the Beam or Frame: Different Types of Loading. Support Reaction of a Beam or Frame: Analytical Method. Truss Analysis: Method of Joints & Sections.

**UNIT-V:- Centroid and Centre of Gravity:** Centroid, Centre of Gravity, Determination of Centroid of Simple Figures, Centroid of Composite Sections. Centre of Gravity of Solid Bodies. Area Moment of Inertia: Basic Concept of Inertia, Definition of Moment of Inertia, Theorems of Moment of Inertia, Radius of Gyration, Polar Moment of Inertia of Standard Sections, Moment of Inertia of Composite Section, Principal Moment of Inertia , Mass Moment of Inertia.

**Introduction to Dynamics:** Overview of Dynamics, Basic Concepts and Terms Used in Dynamics, Motion, Types of Motion, Newton's Laws of Motion, Newton's Law of Gravitation.

### **COURSE OUTCOMES**

- Ability to explain the differential principles applies to solve engineering problems dealing with force, displacement, velocity and acceleration. Ability to analyse the forces in any structures.
- Ability to solve rigid body subjected to dynamic forces.

### **LIST OF EXPERIMENTS**

As per suggested by the course coordinator.

## **REFERENCES**

1. KL Kumar, Engineering Mechanics, Tata McGraw- Hill Education.
  2. Ferdinand.P. Beer. E, Russell Johnston Jr., David Mazurek, Philip J Cornwell, “Vector Mechanics for Engineers: Statics and Dynamics” McGraw – Hill
  3. Timoshenko, and Young, “Engineering Mechanics”, Tata Mc-Graw Hill.
  4. P.N. Chanchandramouli, Engineering Mechanics, PHI Learning Private Limited.
- 

**Chairman**  
**(Board of studies)**  
**Seal**

**Dean**  
**(Faculty)**

**(Registrar)**

## AISECT UNIVERSITY, Bhopal, (M.P.)

### Scheme of Examination

Department: Chemistry

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBCH-102	Environmental Sciences.*	2 (1-0-1)*	-	-	50	-	50	100		-

**\*Pattern:** There will be no examination and credits will be awarded only on the basis of internal assessment.

#### COURSE OBJECTIVE:

This course introduces students to environment concerns. Students are expected to learn about environment, factors affecting it, environmental ethics and its protection through lectures, presentations, documentaries and field visits.

#### SYLLABUS

**UNIT-I:- Introduction:** Domestic and Global Environmental concerns, principles of sustainable development, Sustainable agriculture, organic farming, bio-fuels, Threats for sustainability

**UNIT-II:- Environmental Ethics & Legislations:** Enforcement of Environment laws in India – The water act, The Air (Prevention and Control of Pollution) Act, 1981, The Environment (Protection) Act, 1986, Environmental Auditing

**UNIT-III:- Environmental Pollution:** Air Pollution – sources, types of air pollutants, National Ambient Air Quality Standards, Controlling Air Pollution. Water pollution – sources, types of water

pollutants, water quality indicators, water quality standards. Soil Pollution - types of soil pollutants: industrial wastes, pesticides, fertilizers and manures, salination of soil, Controlling Soil Pollution.

**UNIT-IV:- Environmental Challenges:** Local Challenges - Solid Waste – Impact of solid waste on natural resources, Deforestation; Global Challenges - climate change and global warming, Kyoto Protocol, Greenhouse Gases, Ways to reduce Greenhouse gases emissions, Carbon Footprint, ways to reduce carbon footprint, Carbon Trading.

**UNIT-V:- Sustainable habitat, industrialisation and urbanization:** Concept of Green Building, Volatile Organic Compounds (VOC), GRIHA Rating, LEED Rating, HVAC, Hybrid Car Technology, Industrial ecology, India's renewable energy capacity. *Green Technology & Green Business:* Green Business, Green Computing, E-waste management.

## **COURSE OUTCOMES**

1. Understand the natural environment and its relationships with human activities.
2. Characterize and analyze human impacts on the environment.
3. Acquire practical skills for scientific problem-solving, including familiarity with laboratory and field instrumentation, computer applications, statistical and modeling techniques.
4. Understand and implement scientific research strategies, including collection, management, evaluation, and interpretation of environmental data.

## **EVALUATION**

Evaluation will be continuous an integral part of the class as well through external assessment.

## **REFERENCES**

- 1.R. Rajagopalan, Environmental Studies, Oxford IBH Pub, 2011.
- 2.Kogent Learning Solutions Inc., Energy, Environment, Ecology and Society, Dreamtech, 2012.
- 3.Rag, R. L, Ramesh, Lekshmi Dinachandran, Introduction to sustainable engineering

---

**Chairman**

**Dean**

(Board of studies)  
Seal

(Faculty)

(Registrar)

## AISECT UNIVERSITY, Bhopal, (M.P.)

### Scheme of Examination

Department: Civil Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBCE-102	Introduction to Civil Engineering*	2 (0-0-2)*	-	-	-	-	100	100	3hr	

**\*Pattern: There will be no examination and credits will be awarded only on the basis of internal assessment.**

#### COURSE OBJECTIVE:

This course introduces students to civil engineering and its sub-domains. Students are expected to learn about scope, current and future trends in infrastructure industry, jobs, innovations & research opportunities in the field of civil engineering. Course content will be covered through lectures, assignments, case-studies, presentations, documentaries and field visits.

#### Syllabus

**UNIT-I:-** Overview of Civil Engineering, types of Infrastructures, Effect of infrastructure facilities on economy and environment, Role of Civil Engineers in the infrastructural Development Introduction to sub-domains of Civil Engineering, Size of Infrastructure Industry, emerging trends in infra spending through public and public-private partnership (PPP), talent shortage, and global trends in workforce mobility and skill- demands.

**UNIT-II:-** Stages in the life of construction: Design, Construction, Maintenance, Repair,

Demolition/Recycling; an overview of Indian Standards, units and conversion factors for Lengths, Areas, Volumes and Weights; Opportunities and challenge of India's Infrastructure, Interdisciplinary nature of Civil Engineering Projects.

**UNIT-III:-** Roads: Types of Roads, Nagpur Road Plan, Components of Road and their function; Bridges: Important parts of bridges, classification of bridges; Types of Dams.

**UNIT-IV:-** Properties and classification of common building materials – Stones, Bricks, Sand, Limes, Cement, Mortar, Concrete, Steel.

**UNIT-V:-** Overview of Indian Road Congress, National Highway Authority of India (NHAI) and American Society of Civil Engineers (ASCE), Emerging areas and new technologies in the field of civil engineering.

### **COURSE OUTCOMES**

1. Apply mathematical concepts, including statistical methods, to field and laboratory data to study scientific phenomena.
2. Use GIS to solve geospatial problems.
3. Understand the complex relationships between natural and human systems.
4. Design and execute a scientific project.

### **REFERENCES**

- 1.Elements of Civil Engineering by MD Saikia, B Mohan Das, MM Das, PHI Learning Private Limited,2015.
- 2.Prakash M.N. Shesha, Ganesh B., A Textbook on Elements of Civil Engineering, PHI Learning Pvt. Ltd. Study material provided by the instructor.

---

**Chairman**  
**(Board of studies)**  
**Seal**

**Dean**  
**(Faculty)**

**(Registrar)**



## AISECT UNIVERSITY, Bhopal, (M.P.)

### Scheme of Examination

#### Department: English

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBEN-102	Communication.*	2 (1-0-1)*	-	-	-	-	100	100	-	-

**\*Pattern: There will be no examination and credits will be awarded only on the basis of internal assessment.**

#### **COURSE OBJECTIVE:**

The objective of this course is to help students to acquire reading and writing skills in a self-learning mode.

#### **Syllabus**

- Students are advised to read at least 3 books (novels, short stories, poems) written in English by authors of Indian origin.
- Genres may range from *Art, Culture, Business, Classics, Psychology, Travel, Science, Sports and Poetry* leaving aside all other genres.
- Students are expected to read actively and critically.
- Each student will have to make a separate choice of books depending upon his/ her interest at the time of course-registration in consultation with the course coordinator.

- Course Coordinator while recommending a book must ensure the book's level to be at least above 10th standard.
- The set of books *must contain at least one book* covering *following themes*:
  - a. Biography or Autobiography of any of the eminent Indian in the field of science, technology, engineering and sports

**OR**

- b. Books by Indian Industrialists/ Innovators in the areas of science, technology and engineering
- Any book(s) that is objectionable or is banned by the *Government of Madhya Pradesh* for any reasons whatsoever will not be permitted for the course.
  - One book is expected to be read in a period of not more than *20 days* after which students have to submit a *hand-written* review briefing the following aspects:
    - i. Relevance of the book title to the content
    - ii. About the main character and other characters
    - iii. Setting of the book
    - iv. Main Idea/ Theme of the book
    - v. Write précis and make presentation in consultation with the teacher
    - vi. Write 3 quotations from the book
    - vii. Message of the book and the student take away

### **COURSE OUTCOMES**

1. Demonstrate critical and innovative thinking.
2. Display competence in oral, written, and visual communication.
3. Apply communication theories.
4. Show an understanding of opportunities in the field of communication.
5. Use current technology related to the communication field.
6. Respond effectively to cultural communication differences.
7. Communicate ethically.
8. Demonstrate positive group communication exchanges.

### **REFERENCES**

1. My Experiments with Truth by Mahatma Gandhi.

2. Wings of Fire by Dr. APJ Abdul Kalam.
  3. History of Everything by Stephen Hawkings
  4. A Passage to India by E.M. Forster.
  5. The Argumentative Indian by Amartya Sen.
  6. The Old Man and the Sea by Ernest Hemingway.
  7. Life of Pi by William Dalrymple.
  8. The Alchemist by Paulo Coehlo.
  9. The Eighth Habbit by Stephen Covey.
  10. The Road Less Travelled by M.Scott Peck.
- 

**Chairman**  
**(Board of studies)**  
**Seal**

**Dean**  
**(Faculty)**

**(Registrar)**

## AISECT UNIVERSITY, Bhopal, (M.P.)

### Scheme of Examination

**Department: Mathematics**

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.		
			Theory			Practical			Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work				
TBMA-201	Mathematics-II	4(3-1-0)	50	20	30	-	-	100	3 hr	-	

#### **PATTERN:**

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical/short notes. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

#### **COURSE OBJECTIVE:**

The objective of this foundational course is to review mathematical concepts already learnt in higher secondary. This course deep understanding of matrix, differential equations as well as a strong sense of how useful the subject can be in other disciplines of learning.

#### **Syllabus**

**UNIT-I:-** Matrices & Linear Systems: Rank of a Matrix (By reducing it to Elementary Transformation,

Echelon & Normal Forms), Solution of Simultaneous equations by Elementary Transformation Methods, Consistency & Inconsistency of Equations, Eigen Values & Eigen Vectors, Cayley- Hamilton Theorem.

**UNIT-II:-** Ordinary Differential Equations-I: First-order differential equations (Separable, Exact, Homogeneous, Linear), Linear differential Equations with constant coefficients.

**UNIT-III:-** Ordinary Differential Equations-II: Homogeneous linear differential equations, Simultaneous linear differential equations. Second-Order Linear Differential Equations with Variable Coefficients: Solution by Method of Undetermined Coefficients, ByS Known Integral, Removal of First Derivative, Change of Independent Variable and Variation of Parameters.

**UNIT-IV:-** Partial Differential Equations-I: Definition, Formulation, Solution of PDE ( By Direct Integration Method & Lagranges Method), Non-Linear Partial Differential Equation of First order {Standard I, II, III & IV), Charpit's General Method of Solution Partial Differential equations.

**UNIT-V:-** Partial Differential Equations-II: Partial Differential Equations with Constant Coefficients (Second and Higher Orders Homogeneous and Non- Homogeneous equations), Partial differential Equations Reducible to equations with constant coefficients, The Method of Separation of Variables.

### **COURSE OUTCOMES**

- Apply mathematical concepts and principles to perform computations.
- Apply mathematics to solve problems.
- Create, use and analyze graphical representations of mathematical relationships.
- Communicate mathematical knowledge and understanding.
- Apply technology tools to solve problems

### **REFERENCES:**

1. Dean G. Duffy, Advanced Engineering Mathematics with MATLAB, CRC Press, 2013. E.Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons Inc.
2. Michael Greenberg, Advanced Engineering Mathematics, Second Edition, Pearson Education, 2002 (Indian Edition).
3. B.V. Rammana, Higher Engineering Mathematics, Tata McGraw Hill Publishing Company, 2007. Shanti Narayan, A Course of Mathematical Analysis. S.Chand & Co. Delhi.
4. Marwaha, Introduction to Linear Algebra, PHI Learning.

---

**Chairman**  
**(Board of studies)**  
**Seal**

**Dean**  
**(Faculty)**

**(Registrar)**

## AISECT UNIVERSITY, Bhopal, (M.P.)

### Scheme of Examination

**Department: Physics**

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.		
			Theory			Practical			Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work				
TBPH-101	Physics	4(2-1-1)	50	20	30	25	25	150	3 hr	2hr	

**Pattern:**

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical/short notes. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

**Syllabus**

**UNIT-I:- Elasto-dynamics:** Simple Harmonic Motion, Electric Flux, displacement vector, Columb law, Gradient, Divergence, Curl, Gauss Theorem, Stokes theorem, Gauss law in dielectrics, Maxwell's equation: Integral & Differential form in free space, isotropic dielectric medium.

**Lasers:** Properties of lasers, types of lasers, derivation of Einstein A & B Coefficients, Working He-Ne and Ruby lasers.

**UNIT-II:- Fibre Optics:** Light guidance through optical fibre, types of fibre, numerical aperture, V-

Number, Fibre dispersion (through ray theory in step index fibre), block diagram of fibre optic communication system.

**UNIT-III:- Quantum Mechanics:** Black body radiation, ultraviolet catastrophe, Crompton effect, Planck's theory of radiation, phase and group velocity, particle in a box, uncertainty principle, well-behaved wave equation, Schrodinger equation, application to particle in a box.

**UNIT-IV:- Optics:** Interference, division of amplitude & division of wave front, Young's double slit experiment, thin film interference, Newton Ring Experiment. Diffraction: Difference between interference and diffraction, types of diffraction, single slit, double slit & n-slit diffraction, Resolving power of grating.

**UNIT-V:- Semiconductors:** Crystalline and Amorphous solids, Band theory of solids, mobility and carrier concentrations, properties of P-N junction, Energy bands, Hall effect, VI characteristics of photodiode, Zener diode and photovoltaic cell

**Nuclear Physics:** Nuclear composition, mass defect, binding energy, nuclear force, liquid drop model, elementary idea about nuclear fission and fusion.

#### **COURSE OUTCOMES**

- Analyze the intensity variation of light due to Polarization, interference and diffraction
- Explain working principle of lasers
- Explain fundamentals of quantum mechanics and apply to one dimensional motion of particles
- Calculate Q-value of nuclear reactions and describe particle detectors and accelerators

#### **LIST OF EXPERIMENTS:**

Experiments as suggested by the course coordinator.

#### **REFERENCES**

A Beiser, Concepts of Modern Physics, McGraw Hills

Ghatak, Optics, McGraw Hills

---

**Chairman**  
**(Board of studies)**  
**Seal**

**Dean**  
**(Faculty)**

**(Registrar)**

## AISECT UNIVERSITY, Bhopal, (M.P.)

### Scheme of Examination

**Department: Civil Engineering**

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBCE-201	Introduction to Surveying	3(1-1-1)	50	20	30	25	25	150	3 hr	2hr

#### **Pattern:**

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical/short notes. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

#### **COURSE OBJECTIVE:**

- To Familiarize Students with Surveying & its Various Divisions
- To Familiarize Students with Surveying Equipment & their Use
- To Familiarize Students with Computation of Areas & Volumes



- To Make the Students Capable of Dealing with Field Problems.

### **Syllabus**

**UNIT-I:- Introduction to Surveying:** Overview of Surveying, branches of surveying, principles of Surveying. Instruments Used for various measurements, Electronic Distance Measurement (EDM), Various EDM Instruments, Survey Maps, Conventional Symbols of Objects in the Map, Introduction to GIS, GPS, remote sensing and Digital Terrain Models (DTMS), applications of Remote Sensing.

**UNIT-II:- Linear Measurements:** Methods and terminologies of linear measurements, linear measurements using chain surveying, various operations in carrying out the chain surveying, various accessories for chaining, different type of chains and tapes, testing of chains.

**Running Survey Lines:** Ranging, chaining and laying offsets, linear Measurements with chain on level ground /on sloping ground, **Errors in chaining:** Errors in Measurements with Incorrect Chain Length, Linear Measurements with Tape on Smooth Level or Sloping Ground / on Rough Ground, Tape Corrections, Setting out Right Angle on / From a Chain Line, Offsets – Limiting Length of Offset, Effect of Error in Laying out Direction, Effect of Error in Direction and Length Both. **Obstacles in Chain Survey:** Obstacles to Ranging, Obstacles to Chaining, Obstacles to Ranging and Chaining both. Numerical Problems.

**UNIT-III:- Angular measurements:** Overview and terminologies, Principle of Compass, Types of Compass, Compass Surveying, Traversing, Traversing with Chain and Compass, Designation of Bearings, Calculation of Included Angle from Bearings, Calculation of Bearing From Included Angles Errors and Precautions in Compass Surveying, Local attraction, Correction to Measured Bearing for Local Attraction, Adjustment of Closing Error. Magnetic Declination, Dip, Introduction Plane Table Surveying, Methods of Plane Table Surveying- Radiation Method and Intersection Method. Introduction to Theodolite. Numerical Problems.

**UNIT-IV:- Vertical Measurements:** Overview and terminologies, Leveling Instruments-Different Types of Levels, Leveling Staff. Temporary and Permanent Adjustments of a Level. Leveling: Classification Based on Purpose of Leveling –Simple leveling, Differential or Compound or Continuous Leveling, Fly Leveling, Profile or Longitudinal Leveling, Cross-Section Leveling, Reciprocal Leveling, Precise Leveling, Booking and Reducing Levels. Height of Collimation or Height of Instruments Method. Rise and Fall Method, Errors and Precautions in leveling, Balancing Back Sight and Foresight, Error Due to Earth's Curvature and Refraction, Field Problems or Difficulties in Leveling, Numerical Problems.

**UNIT-V:- Measurement of Areas and Volumes:** Introduction, Areas: Areas from Field Measurements –Area Consisting of Irregular Boundary, Area from Plan –Graphical Method, Measurement of Area by Planimeter Errors & Precautions in Computation of Area. Volumes: Measurement of Volume. –from Cross Sections, from Spot Levels , from Contours, Area of Sections, Capacity of a Reservoir, Elevation - Capacity Curve, Earthwork, Mass Diagram. Numerical Problems.

### **COURSE OUTCOMES**

Students are expected to use all surveying equipments, prepare chain survey, contour maps and carry out surveying works related to land and civil engineering projects.

### **REFERENCES:**

1. Surveying volume-1 3/e by S.K. Duggal Publisher Tata McGraw Hill Education.
2. Surveying, by Mimidas Saikia BM Das, MM Das Publisher PHI Learning .
3. Surveying & Leveling by N. N. Basak Publisher MC.Graw Hill Education.
4. Plane Surveying by A.M. Chandra New Age International Publisher .
5. Surveying Vol.1 by B.C. Punmia Publisher Luxmi Publications.

---

**Chairman**  
**(Board of studies)**  
**Seal**

**Dean**  
**(Faculty)**

**(Registrar)**

## AISECT UNIVERSITY, Bhopal, (M.P.)

### Scheme of Examination

#### Department: Social Science

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBSS-201	Rural Outreach.*	3 (0-0-3)*	-	-	-	-	150	150	-	

**\*Pattern:** There will be no examination and credits will be awarded only on the basis of internal assessment.

#### COURSE OBJECTIVE:

The main objective of introducing this course is to sensitize students about the *socio-cultural* aspects of the rural areas parochial to their colleges. Students are expected to observe, investigate and learn about the following aspects of the rural region:

- i. Demographics, Literacy, Geographical parameters of the Village
- ii. Schemes of government of India and State of Madhya Pradesh in operation in the villages
- iii. Social/ Cultural aspects ranging from popular dance forms, music and customs of the concerned village.

#### Syllabus

- This course shall be done by the students in a self-study mode. Study methodology shall comprise of combining field visits, case studies, analyzing policy documents from different government departments, discussions with field officers, active NGO's and so on.
  - The course will not be listed in the time-table and its activities shall be performed by the students *at any time* convenient to them.
  - The faculty associated with the course shall evaluate the candidate and grade him.
  - For evaluation purpose, students are expected to submit a *hand-written summary* on the government schemes and policies for the socio-cultural development of the concerned village. This shall be followed by final submission of two case studies covering broad spectrum of socio-cultural issues ranging from life in slums, infant mortality, watershed management, potability of water, animal welfare etc. These case studies (handwritten) shall be submitted to the mentor for the final evaluation of the coursework.
- 

**Chairman**  
**(Board of studies)**  
**Seal**

**Dean**  
**(Faculty)**

**(Registrar)**