

विश्वेश्वरय्या राष्ट्रीय प्रौद्योगिकी संस्थान, नागपूर
VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY, NAGPUR



Course Book
First Year B.Tech.

2021-2022



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VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY, NAGPUR



Vision

To contribute effectively to the national endeavor of producing quality human resource of world class standard by developing sustainable technical education system to meet the changing technological needs of the Country incorporating relevant social concerns and to build an environment to create and propagate innovative technologies for the economic development of the Nation.

Mission

The mission of VNIT is to achieve high standards of excellence in generating and propagating knowledge in engineering and allied disciplines. VNIT is committed to providing an education that combines rigorous academics with joy of discovery. The Institute encourages its community to engage in a dialogue with society to be able to effectively contribute for the betterment of humankind.



CREDITS SYSTEM

Education at the Institute is organized around semester-based credit system of study. The prominent feature of the credit system is a process of continuous evaluation of a student's performance and flexibility to allow a student to progress at an optimum pace suited to his/her ability, subject to fulfilling minimum requirement for continuation. A student's performance is measured by number of credits he/she has earned (i.e. completed satisfactorily). Based on the course credits and grades obtained by the student, Semester Grade Point Average (SGPA) or Cumulative Grade Point Average (CGPA) is calculated. A minimum number of earned credits and minimum grade point average should be acquired in order to qualify for the award of graduate degree. Details are given in the Academic Rules and Regulation available on the Institute website www.vnit.ac.in

Credit requirement

A student is required to earn minimum of 170 credits in eight semesters. These credits are to be earned from different category of courses. There are mainly two category of courses a) Program core (PC), and b) Program Elective (PE). There are sub categories like, Basic Sciences (BS), Departmental Core (DC), Departmental Elective (DE), Humanities & Management (HM), Open Course (OC) and Audit Course (AU).

Credit requirement for B. Tech. Program

Program Core (PC)		Program Elective (PE)	
Category	Credit	Category	Credit
Basic Science (BS)	18	Departmental Electives	33-48
Engineering Science (ES)	20	Humanities & Management	0-6
Humanities (HU)	05	Open Course	0-6
Departmental Core (DC)	79-82*		
	122-125		48-45
Total requirement (PC +PE) = 170 credits			

* The range in DC credits is for the Board of Studies to specify the requirement.

**Courses to Register in First Year B.Tech.***(Sections R, S, T, U, L)*

I Semester				
Code	Course	Type	L-T-P	Credits
AML151	Engineering Mechanics	ES	3-1-0	4
AMP151	Engineering Mechanics Laboratory	ES	0-0-2	1
HUL101	Communication Skills	HM	2-0-2	3
MAL101	Mathematics I	BS	3-1-0	4
MEL101	Engineering Drawing	ES	3-0-0	3
MEP101	Engineering Drawing Practical	ES	0-0-2	1
PHL101	Physics	BS	3-1-0	4
PHP101	Physics Laboratory	BS	0-0-2	1
SAP101	Health Information and Sports Part I	AU	0-0-2	0
			Total Credits	21

II Semester				
Code	Course	Type	L-T-P	Credits
CHL101	Chemistry	BS	3-1-0	4
CHP101	Chemistry Laboratory	BS	0-0-2	1
CSL101	Computer Programming	ES	3-0-2	4
EEL101	Electrical Engineering	ES	3-1-0	4
EEP101	Electrical Engineering Laboratory	ES	0-0-2	1
HUL102	Social Science	HM	2-0-0	2
MAL102	Mathematics II	BS	3-1-0	4
MEP102	Workshop	ES	0-0-4	2
SAP102	Health Information and Sports Part II	AU	0-0-2	0
			Total Credits	22

**Courses to Register in First Year B.Tech.***(Sections W, X, Y, Z, N)*

I Semester				
Code	Course	Type	L-T-P	Credits
CHL101	Chemistry	BS	3-1-0	4
CHP101	Chemistry Laboratory	BS	0-0-2	1
CSL101	Computer Programming	ES	3-0-2	4
EEL101	Electrical Engineering	ES	3-1-0	4
EEP101	Electrical Engineering Laboratory	ES	0-0-2	1
HUL102	Social Science	HM	2-0-0	2
MAL101	Mathematics I	BS	3-1-0	4
MEP102	Workshop	ES	0-0-4	2
SAP101	Health Information and Sports Part I	AU	0-0-2	0
			Total Credits	22

I Semester				
Code	Course	Type	L-T-P	Credits
AML151	Engineering Mechanics	ES	3-1-0	4
AMP151	Engineering Mechanics Laboratory	ES	0-0-2	1
HUL101	Communication Skills	HM	2-0-2	3
MAL102	Mathematics II	BS	3-1-0	4
MEL101	Engineering Drawing	ES	3-0-0	3
MEP101	Engineering Drawing Practical	ES	0-0-2	1
PHL101	Physics	BS	3-1-0	4
PHP101	Physics Laboratory	BS	0-0-2	1
SAP102	Health Information and Sports Part II	AU	0-0-2	0
			Total Credits	21

**DETAILS OF COURSE CONTENTS****AML151 Engineering Mechanics,****[3-1-0, Credit: 4]****Pre-requisites:** NIL**Type of Course:** ES**Semester:** I , II Sem B Tech**Assessment:** Sess-I 15% + Sess-II 15% + TA 10% + End Sem 60%**Course Objective:**

The objective of the course is to expose the students to the basic concepts of mechanics such as force, equilibrium, moment etc. and to solve simple structures like beam, truss and frame. To introduce mechanical properties of materials, concepts of stress and strain etc.

Course Outcomes:

- i. Students will be able to understand and analyse basic theory and principles of forces and their relationship to engineering applications.
- ii. Students will be able to determine centroid and second moment of area for various sections.
- iii. Students will be able to draw internal forces for beams with various boundary conditions under given set of loading.
- iv. Students will be able to understand the concepts of stresses and strains and their importance for engineering analysis and design.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	1	---	---	---	---	---	---	---	---
CO2	3	3	2	1	---	---	---	---	---	---	---	---
CO3	3	3	2	1	---	---	---	---	---	---	---	---
CO4	3	3	2	1	---	---	---	---	---	---	---	---

Course Content:

Force systems: Vector representation of force system, Moment of a force about a point and about an axis; couple moment; reduction of a force system to a force a couple Wrench

Equilibrium: Free Body Diagram, Reactions at supports, Equilibrium of Planar (including friction) and Spatial force system, Analysis of statically determinate systems (Beam, Trusses etc.)

Centroid and Moment of inertia: First moment of area, Centroid of area, Moment of inertia, Polar moment of inertia, Parallel axis theorem, Radius of gyration, Section modulus.

Internal forces in member: Determination of variation of Axial force (Axial Force Diagram), Shear force (Shear Force Diagram), Bending moment (Bending Moment Diagram) and twisting moment (Torque diagram)

Concept of stress and strain: Normal and shear stress and strain, State of stress at a point, Stress strain curve, Hook's law, Modulus of elasticity, Poisson's ratio, Modulus of rigidity, Bulk modulus.



Determination of stress: Stress across a rectangular, T & I section, and circular section due to bending moment, Stress across a rectangular, T & I section, and circular section due to shear force. Stress across a circular section due to torsion.

Reference Books:

1. R. C. Hibbler, Engineering Mechanics, Pearson Education, Asia Pvt Ltd.
2. F. P. Beer and E.R. Johnston, Vector Mechanics for Engineers: Statics and Dynamics, Tata McGraw-Hill
3. Irving H. Shames, Engineering Mechanics: Static and Dynamics, Pearson Education, Asia Pvt Ltd.
4. J. L. Meriam and L.G. Kraige, Engineering Mechanics, John Wiley and Sons.
5. Stephen Timoshenko, Strength of Materials, Part-1, CBS Publishers and Distributors, New Delhi.
6. F. L. Singer and Andrew Pytel, Strength of Material, Harper and Row Publishers, New York.
7. E. P. Popov, Mechanics of deformable bodies, Prentice-Hall
8. F. P. Beer and E. R. Johnston, Mechanics of materials, McGraw-Hill International

AMP151 Engineering Mechanics Laboratory,

[0-0-2, Credit: 1]

Pre-requisites: NIL

Type of Course: ES

Semester: I , II Sem B Tech

Assessment: Mid-term Eval 40% + End Term Eval 60%

Course Objective:

The objective of the course is to expose the students to simple practical experiments based on fundamental concept of mechanics.

Course Outcomes:

- i. The students will be able to see the experimental verification of certain laws of mechanics.
- ii. The students will be able to compare theoretical results with the experimental one.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	---	---	---	---	---	---	---	---	---	---
CO2	3	3	---	---	---	---	---	---	---	---	---	---
CO3	---	---	---	---	---	---	---	---	---	---	---	---
CO4	---	---	---	---	---	---	---	---	---	---	---	---

Course Content:

1. Introduction to Engineering Mechanics
2. Proving the Law of Polygon of Forces
3. Verification of Lami's Theorem
4. Analysis of Shear Leg Structure
5. Determination of Reactions of a Simply Supported Beam
6. Determination of Coefficient of Static Friction
7. Determination of C.G. of Planar Figures
8. Tension Test on Metal Specimen



9. Bending Test on Wooden Beam
10. Torsion Test on Metal Specimen.

Reference Books:

1. R. C. Hibbler, Engineering Mechanics, Pearson Education, Asia Pvt Ltd.
2. F. P. Beer and E.R. Johnston, Vector Mechanics for Engineers: Statics and Dynamics, Tata McGraw-Hill
3. Irving H. Shames, Engineering Mechanics: Static and Dynamics, Pearson Education, Asia Pvt Ltd.
4. J. L. Meriam and L.G. Kraige, Engineering Mechanics, John Wiley and Sons.
5. Stephen Timoshenko, Strength of Materials, Part-1, CBS Publishers and Distributors, New Delhi.
6. F. L. Singer and Andrew Pytel, Strength of Material, Harper and Row Publishers, New York.
7. E. P. Popov, Mechanics of deformable bodies, Prentice-Hall
8. F. P. Beer and E. R. Johnston, Mechanics of materials, McGraw-Hill International

CHL101 Chemistry,

[3-1-0, Credit: 4]

Pre-requisites: NIL**Type of Course:** BS**Semester:** I , II Sem B Tech**Assessment:** Sess-I 15% + Sess-II 15% + TA 10% + End Sem 60%**Course Objective:**

To impart basic and practically applicable knowledge in chemistry, as pertaining to everyday uses and applications.

Course Outcomes:

- i. Understanding the basic theories and principles of chemistry for engineering practices.
- ii. Exposure to chemical aspects of various kinds of engineering materials for industrial applications.
- iii. Ability to apply the chemical principles to solve the industrial/technological issues.
- iv. Ability to employ critical thinking and skills towards efficient numerical problem-solving.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	1	---	2	1	1	---	---	---	1
CO2	3	1	1	1	---	1	2	1	---	---	---	1
CO3	2	1	2	2	1	1	2	1	1	---	---	1
CO4	3	3	1	2	---	1	1	1	1	1	---	1
CO5	3	3	2	1	---	2	1	1	---	---	---	1

Course Content:

Water Treatment: Impurities in water: As+3 /As+5, F-, NO - , Alkalinity and Hardness. ; Boiler troubles (Causes, effect, prevention): Carry over, Caustic embroilment, Corrosion, Scale and Sludge Formation

Process for Water Softening (External Treatment): Lime Soda, Zeolite, Ion Exchange - Numerical based on these treatments

Internal Treatment / Conditioning: Carbonate, Phosphate, Calgon, Colloidal, EDTA Chemistry involved in domestic water treatment: Sedimentation, Coagulation, Filtration, Sterilization, Break point Chlorination



Adsorption: Physical adsorption, Chemisorption, Freundlich's expression, Langmuir adsorption isotherm, Homogeneous and Heterogeneous catalysis.

Electrochemical Phenomenon: Electrochemical and galvanic series, polarization, decomposition potential, over voltage. Theories of corrosion. Differential aeration theory. Factors influencing corrosion. Types of corrosion. Control of corrosion: Design and material selection, anodic and cathodic protection, protective coating, corrosion inhibitors. Fuel Cells.

Interaction of radiation with matter: Molecular spectroscopy, vibrational, rotational, absorption, emission and light scattering phenomenon.

Chemical kinetics: Introduction to rate equation and reaction order, First order & Second order reaction. Dependence of temperature on reaction rates. Arrhenius theory, collision theory, Transition – state theory.

Engineering Material: Refractory - Definition, Classification, Important Properties and Test (i) Refractoriness, (ii) Strength – RUL, (iii) Chemical Stability, (iv) Thermal conductivity, (v) Porosity, (vi) Thermal Spalling. General Manufacturing process and applications of refractory material.

Polymers: Classification of polymers Characteristics of polymers and Structure property relationship. Thermoplastic & Thermosetting Plastic. Preparation, properties and industrial applications of polyethylene, Teflon, Bakelite and styrene-butadiene rubber. Conducting Polymers.

Features of Coordination Chemistry & Organic Reaction Mechanism: Coordination Chemistry, Nomenclature and Coordination number, chelate effect, coordination complexes and their applications.

Organic Reaction mechanisms: Bakeman's reaction, Riemer-Tiemann reaction, Skraup synthesis

Reference Books:

1. Textbook of Engineering Chemistry – by S.S. Dara, S.S. Umare, Publisher: S Chand
2. Engineering Chemistry – by Jain & Jain
3. Chemistry in Engineering and Technology (Vol. 1 & 2) – J.C. Kuriacose, J. Rajaram, Publisher: McGraw Hill

CHP101 Chemistry Laboratory,

[0-0-2, Credit: 1]

Pre-requisites: NIL

Type of Course: BS

Semester: I , II Sem B Tech

Assessment: Mid-term Eval 40% + End Term Eval 60%

Course Objective:

To instruct students in performing basic chemistry experiments, as needed for common uses and applications.

Course Outcomes:

- i. Knows the proper procedures and regulations for safe handling and use of chemicals.
- ii. Are able to design, carry out, record and analyze the results of chemical experiments. Are skilled in problem solving, critical thinking and analytical reasoning.



- iii. Are able to use modern instrumentation for chemical analysis and measurements.
- iv. Are able to communicate the results of their work to chemists and non-chemists.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1	2	2	1	1	1	---	1
CO2	3	2	2	3	1	1	2	2	2	1	1	---
CO3	2	1	2	3	1	1	---	1	---	1	---	1
CO4	1	1	1	1	1	---	1	1	1	2	1	1

Course Content:

Experiment no.-1: Determination of type and extent of alkalinity in water

Experiment no.-2: Determination of type and extent of Hardness in water

Experiment no.-3: Determination of dissolved oxygen content in water

Experiment no.-4: Determination of free chlorine in water

Experiment no.-5: Determination of the capacity of the cation-exchange resin

Experiment no.-6: To study the adsorption of acetic acid on activated charcoal

Experiment no.-7: Determination of calorific value by Bomb Calorimeter

Experiment no.-8: Determination of viscosity By Redwood Viscometer

Experiment no.-9: Determination of flash point by Cleveland and Pensky-Marten's **apparatus**

Experiment no.-10: Verification of Beer-Lamber's law and determination of concentration of unknown solution by spectrophotometer

Reference Books:

1. A Textbook on Experiments and Calculations in Engineering Chemistry – by S.S. Dara, Publisher: S Chand.
2. Laboratory Manual on Engineering Chemistry – by S. Rani, Publisher: Dhanpat Rai.

CSL101 Computer Programming,[3-0-2, **Credit:** 4]**Pre-requisites:** NIL**Type of Course:** ES**Semester:** I , II Sem B Tech**Assessment:** Sess-I 15% + Sess-II 15% + TA 10% + End Sem 60%**Course Objective:**

The objective of the course is to introduce basics of programming and develop logical thinking of students. To help students understand how to model real world problems as computational problem and develop practical programming skills of students.

Course Outcomes:

- i. Understand basics of a computer program and develop logical steps to solve a computational problem using computers.
- ii. Understand different programming constructs and their syntax in C language and use them to implement a C program.
- iii. Develops the ability to analyze a problem, develop an algorithm to solve it.
- iv. Develops the use of the C programming language to implement various algorithms, and develops the basic concepts and terminology of programming in general.



- v. Understand and implement more advanced concepts of C language like structures, pointers etc. along with their programming constructs.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	3	---	---	---	---	3	---	3
CO2	3	2	3	2	2	---	---	---	---	2	---	3
CO3	3	3	3	3	1	---	---	---	2	3	---	3
CO4	3	1	---	1	---	1	1	3	---	1	2	1
CO5	3	2	2	1	---	3	2	3	2	3	---	3

Course Content:

Introduction: Fundamentals of Computer and programming, Program development and execution, basics of algorithm and flow charts [CO1]

Basic C Constructs: Structure of C program, identifiers and keywords, variables, data types, Input/Output, Operators arithmetic, relational, logical, conditional etc., Expressions precedence and associativity, Type conversion, Decision making constructs including Switch case, Repetition/Loops - while/for/do-while [CO2]

Basic Programming algorithms: Programs to illustrate basic language constructs in C like Factorial, Sine/cosine and other mathematical series. Fibonacci series, calculating, square-root of a number, calculating GCD of 2 integers (Euclid's method and otherwise), Calculating LCM of 2 integers and similar such programs. [CO2]

More C constructs: Nested loops and examples like printing patterns, Functions Declaration, Definition, function calls. Formal and actual parameters. Inter function communication by parameter passing, scope and lifetime of variables, storage classes, macros, Recursive functions.

Arrays and applications: Introduction to one dimensional and 2-D array with examples. Sorting methods: Selection sort, Bubble sort, Insertion sort, Linear and binary search, partitioning an array, merging of 2 sorted arrays. Use of 2-D array to represent a matrix and matrix operations. Strings and designing your own string related functions as well as using library functions (strlen, strcpy, strcat, strcmp, atoi, itoa, reverse, strstr, etc). [CO2].

Structures: Basic concept and syntax tagged and typedef format, Defining and accessing structure members, array of structures, nested structures and application examples. [CO3]

File Handling: Basic Concept and Syntax-open,close, read, write operations, programs- on text data and numeric data. [CO2]

Pointers: Introduction (declaration and initialization), pointers and arrays, pointer arithmetic, concept of dynamic memory allocation, use of pointers to represent variablesized 1-D and 2-D arrays, pointers to structures. [CO3]

Reference Books:

1. Deitel and Deitel, "C How to Program", 7th Edition, Pearson -- Text Book
2. Kerninghan; Ritchie, "C Programming Language", PHI -- Text Book
3. Balguruswamy, " Programming in ANSI C" Tata Mcgraw Hill Publishing -- Text Book



4. "Computer Science: A Structured Programming Approach Using C" by Behrouz A. Forouzan and Richard Gilberg. Publisher: CENGAGE LEARNING India PVT LTD; 3ed. -- Text Book
5. Kakde and Deshpande, "C and data Structure", Charles River Media Publisher. -- Reference Book
6. R G Dromey, "How to Solve it by Computer", PHI. -- Reference Book

EEL101 Electrical Engineering,

[3-1-0, **Credit: 4]**

Pre-requisites: NIL

Type of Course: ES

Semester: I , II Sem B Tech

Assessment: Sess-I 15% + Sess-II 15% + TA 10% + End Sem 60%

Course Objective:

- i. To learn basic ideas and principles of Electrical Engineering.
- ii. Understanding details of electrical power systems, transformers, generators and motors.

Course Outcomes:

- i. Understand basics of R, L, C circuit elements and voltage and current sources.
- ii. Appreciate and analyze DC, AC and magnetic circuits using KVL and KCL.
- iii. Understand working principle of electrical measuring instruments and transformers.
- iv. Comprehend the working of DC machines and induction motors.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	1	1	---	1	1	---	---	---	3
CO2	3	3	3	3	---	---	---	---	1	---	---	3
CO3	3	2	---	---	1	---	---	---	---	---	---	2
CO4	3	2	1	1	2	2	---	2	1	2	1	3

Course Content:

Electrical Circuits: Circuit Elements Resistance, Inductance & Capacitance, Kirchhoff's Laws, Voltage Source (Definition, Characteristics of Practical Source, and Equivalent Current Source), and Star-Delta Transformation.

Magnetic Circuits: Flux, MMF, Reluctance, Analogy with Electric Circuits. Simple Calculations for Composite Magnetic Circuits.

AC Circuits: Periodic Function, Average & R.M.S., Values, Steady State Behavior With Sinusoidal Excitation, Phasor Representation, Reactance & Impedance, Series & Parallel Circuit, Power Factor, Principle of Generation of Single Phase & Three Phase Voltages, Power in Balanced Three Phase AC System.

Electrical Measurements: Definition, Indicating, Integrating & Recording Instruments, Deflecting Controlling & Damping Mechanisms, Ammeter & Voltmeters, P.M.M.C. Type & Moving Iron Type, Electro-dynamometer Type Watt meter, Induction Type Single Phase Energy Meter

Transformers: Introduction, Basic Principles, Construction, Phasor Diagram for Transformer under No Load Condition Transformer on Load, Balance of MMF on Sides, Phasor Diagram, Equivalent Circuit, Voltage Regulation and Efficiency.



Power Systems: Elementary Idea about Power Generation, Transmission and Distribution

DC Machines: DC Shunt and Series Motor Construction, Principle of working, Characteristics, Speed Control and Applications

Induction Motors: Construction, Principle of Working of Single Phase and 3-Phase Motors. Torque Slip Characteristics, Basic issues involved in electrical hazard and electrical safety.

Reference Books:

1. D. C. Kulshretha, "Basic Electrical Engineering", Tata McGraw Hill, 2012.
2. S.K. Bhattacharya, "Basic Electrical and Electronics Engineering", Pearson Education, 2012
3. O.I. Elgerd, "Basic Electric Power Engineering", Addison Wesley Longman
4. Kothari D.P. and Nagrath I.J., "Theory And Problems of Basic Electrical Engineering," Prentice Hall, 2017
5. Edward Hughes, "Electrical Technology", Pearson Education , 2011
6. Basic Electrical Engineering - A Web course of NPTEL by Day, Bhattacharya & Roy, Available: www.nptel.ac.in
7. Fitzgerald, Higginbotham and Gabel, "Basic Electrical Engineering", McGraw Hill, 2009.

EET101 Electrical Engineering Laboratory,

[0-0-2, **Credit: 1]**

Pre-requisites: NIL

Type of Course: ES

Semester: I , II Sem B Tech

Assessment: Mid-term Eval 40% + End Term Eval 60%

Course Objective:

The objective of the course is

- To verify experimentally the basic principles of electric and magnetic circuits.
- To verify and validate experimentally the working principles of Three Phase systems, Transformers and Motors.

Course Outcomes:

Students are able to

- Handle basic instruments and elements R, L and C.
- Verify basic Laws of Single phase and three phase AC circuits and magnetic circuits experimentally.
- Demonstrate experimentally basics of transformer.
- Show the basic principles of DC Machines and induction motors experimentally.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	1	1	---	1	1	---	---	---	3
CO2	3	3	3	3	---	---	---	---	1	---	---	3
CO3	3	2	---	---	1	---	---	---	---	---	---	2
CO4	3	2	1	1	2	2	---	2	1	2	1	3

**List of Experiments:**

1. Study and verification of Kirchhoff's Laws applied to the direct current circuit.
2. Determination of B/H curve of a magnetic material.
3. Study of AC series circuits.
4. Study of AC Parallel circuits.
5. To study balanced three phase circuit.
6. Determine Voltage regulation and efficiency of a single-phase transformer by direct loading.
7. Speed control of a DC motor by varying:
 - a. Field current with armature voltage kept constant
 - b. Armature voltage with field current kept constant.
8. Reversal of direction of rotation of a three-phase induction motor.

Reference Books:

1. D. P. Kothari, B. S. Umre, "Laboratory manual for Electrical Machines", Second Edition, IK International Publishing House Pvt. Ltd., New Delhi.

HUL101 Communication Skill[2-0-2, **Credit: 3**]**Pre-requisites:** NIL**Type of Course:** HM**Semester:** I , II Sem B Tech**Assessment:** Sess-I 15% + Sess-II 15% + TA 10% + End Sem 60%**Course Objective:**

- i. To impart to the students the skills that they need in their academic, and later in their professional pursuit
- ii. To train the students to adopt an innovative approach to English language learning.

Course Outcomes:

- i. The syllabus enhances the language acquisition skill of the students (LSRW Skills)
- ii. It helps the students to acquire oral proficiency in English (Interpersonal Communication).
- iii. The course enables the students to have better presentation skills (GD, Interviews, PPT Presentations, Public Speaking)
- iv. It helps students sharpen their writing skills (CV, Resume, Job Applications, Reports, etc.)

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	---	---	---	1	---	---	---	2	3	3	3	2
CO2	---	---	---	1	---	---	---	3	3	3	3	2
CO3	---	---	---	1	---	---	---	2	3	3	3	2
CO4	---	---	---	1	---	---	---	2	2	3	2	2

Course Content:**Unit 1:** Energy- Oil, Nuclear Preparation, Alternative Sources



Unit 2: Computers- Introducing Computers, New Frontiers, Computers in India

Unit 3: Technology- Appropriate Technology, Printing, Evaluating Technology

Unit 4: Environment- Pollution, Ecology, Our Living Environment

Unit 5: Industry- Personnel and Production, Safety and Training, Selling Products

Reference Books:

1. Department of Humanities and Social Sciences, Anna University., A Textbook of English for Engineers and Technologist, Orient Longman.
2. Quirk R, and Greenbaum S., A University Grammar of English
3. Krishnaswamy N., Modern English: A Book of Grammar- Usage And Composition, Macmillan India Ltd

HUL102 Social Science,

[2-0-0, **Credit: 2]**

Pre-requisites: NIL

Type of Course: HM

Semester: I, II Sem B Tech

Assessment: Sess-I 15% + Sess-II 15% + TA 10% + End Sem 60%

Course Objective:

The objective of the course is to make the students familiar with the basic concepts used to understand the social, cultural and political activities with context to Indian society.

Course Outcomes:

- To understand the basic concepts in social science in the era of globalization.
- To get an awareness about social problems and issues in the nation.
- To gain knowledge of society and nation development with science and technology.
- Know the constitutional set-up, beaurocracy and current situation of India.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	---	---	---	1	---	3	3	3	3	3	1	3
CO2	---	---	1	3	---	3	2	3	3	3	2	3
CO3	---	---	3	3	---	3	2	3	3	3	1	3
CO4	---	---	3	---	---	3	1	3	3	3	1	3

Course Content:

Unit I Introduction

1. Meaning, scope and general utility of social sciences.
2. Society: types, characteristics and problems.

Unit II Fundamental concept in social science

1. Culture: types, characteristics, merit, demerit and some related terms.
2. Economics and social sustainable development.
3. Human resource management, public health, law enforcement and good governance.
4. Social control and social change.

Unit III Industrialization and Society

1. Field, involvement and development of science and technology.
2. Human values and professional ethics.
3. General issues on environment ecology, bi-diversity and climate change.



- Motivation, selection and training of employees.

Unit IV *The study of Political Orientation*

- Indian constitution and federal system.
- Fundamental rights and directive principles.
- Right to information (RTI).
- Beaurocracy in India.

Unit V *Social Problems in India*

- Over Population.
- Poverty.
- Slum.
- Family disorganization (divorce)
- Corruption

Reference Books:

- Social and Ethical Sciences for Engineers, Dr. G N Nimbarte, Mangesh Publication Nagpur
- Social Problems in India, Ram Ahuja, Rawat Publication Jaipur
- Ethical Science, Dr. G N Nimbarte, Dattson Publication, Nagpur
- Introduction to Sociology, Vidhyabhushan and Sachdeva, KitabMahal, New Delhi
- Social Problems in India, Dr. G N Nimbarte, Sankalp Publication, Nagpur

MAL101 Mathematics-I,[3-1-0, **Credit: 4**]**Pre-requisites:** NIL**Type of Course:** HM**Semester:** I Sem B Tech**Assessment:** Sess-I 15% + Sess-II 15% + TA 10% + End Sem 60%**Course Objective:**

The objective of this course is to expose student to understand the basic importance of Differential calculus, Integral calculus, Infinite series and Matrix theory in science and engineering.

Course Outcomes: After completing this course students will be able to

- Deal with differential calculus of functions of single variable and its applications.
- Understand concepts of integration of function of single variable and its applications.
- Test the convergence of sequence and series.
- Understand basic concepts of matrix theory and can apply it to solve problems of engineering

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	---	---	---	---	---	---	---	---	2
CO2	3	2	1	---	---	---	---	---	---	---	---	2
CO3	3	2	1	---	---	---	---	---	---	---	---	2
CO4	3	2	1	---	---	---	---	---	---	---	---	2

Course Content:

Differential Calculus: Functions of single variable: Review of limit, continuity and differentiability. Mean value theorems: Rolle's theorem, Lagrange's theorem, Cauchy's theorem, Taylor's theorem with Lagrange's form of remainder, curve tracing.



Integral Calculus: Fundamental theorem of Integral calculus, mean value theorems, evaluation of definite integrals, applications in area, length, volumes and surface of solids of revolutions, Improper integrals: Beta and Gamma functions, differentiation under integral sign.

Infinite series: Sequences, Infinite series of real and complex numbers, Cauchy criterion, tests of convergence, absolute and conditional convergence, improper integrals, improper integrals depending on a parameter, uniform convergence, power series, radius of convergence.

Matrices: Rank of matrix, consistency of a system of equations, linear dependence and independence, linear and orthogonal transformations, Eigen values and eigen vectors, Cayley Hamilton theorem, reduction to diagonal form, Hermitian and skew Hermitian matrices, Quadratic forms.

Reference Books:

1. Kreyszig, E. ; Advanced Engineering Mathematics (Eighth Edition); John Wiley & Sons.
2. Jain, R.K. and Iyengar, S.R.K.; Advanced Engineering Mathematics; Narosa Publishers .
3. Thomas, G.B. and Finney, R.L.; Calculus and Analytic Geometry (Ninth Edition); Addison Wesley Longman, Inc.
4. Michael D. Greenberg: Advanced Engineering Mathematics, Pearson Education Pvt. Ltd.
5. Piskunov, N. : Differential and Integral calculus, Vol. 1, Vol. 2, MIR Publishers, Moscow - CBS Publishers and Distributors (India).

MAL101 Mathematics-II,

[3-1-0, **Credit:** 4]**Pre-requisites:** NIL**Type of Course:** HM**Semester:** II Sem B Tech**Assessment:** Sess-I 15% + Sess-II 15% + TA 10% + End Sem 60%

Course Objective:

The objective of this subject is to expose student to understand the basic importance of multi variable calculus (Differential calculus & Integral calculus), Vector calculus and ordinary differential equations in engineering

Course Outcomes: After completing this course students will be able to

- i. Deal with differential calculus of functions of several variables and their applications.
- ii. Understand concepts of multiple integrals and their applications in engineering problems.
- iii. Understand the concepts of vector calculus and its applications in Engineering and Science.
- iv. Solve certain class of ordinary differential equations related to Science and Engineering.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	---	---	---	---	---	---	---	---	2
CO2	3	2	1	---	---	---	---	---	---	---	---	2
CO3	3	2	1	---	---	---	---	---	---	---	---	2
CO4	3	2	1	---	---	---	---	---	---	---	---	2



Course Content:

Several Variables Calculus: Limit, continuity and differentiability of functions of several variables, partial derivatives and their geometrical interpretation, Tangent plane and normal line. Euler's theorem on homogeneous functions, Total differentiation, chain rules, Jacobian, Taylor's formula, maxima and minima, Lagrange's method of undetermined multipliers.

Multiple Integrals: Double and triple integrals, change of order of integration, change of variables, application to area, volumes, Mass, Centre of gravity.

Vector Calculus: Scalar and vector fields, gradient of scalar point function, directional derivatives, divergence and curl of vector point function, solenoidal and irrotational motion.

Vector integration: line, surface and volume integrals, Green's theorem, Stoke's theorem and Gauss divergence theorem (without proof).

Ordinary Differential Equations: First order differential equations: Exact equation, Integrating factors, Reducible to exact differential equations, Linear and Bernoulli's form, orthogonal trajectories, Existence and Uniqueness of solutions. Picard's theorem, Picard's iteration method of solution (Statements only). Solutions of second and higher order linear equation with constant coefficients, Linear independence and dependence, Method of variation of parameters, Solution of Cauchy's equation, simultaneous linear equations.

Reference Books:

1. Kreyszig, E. ; Advanced Engineering Mathematics (Eighth Edition); John Wiley & Sons.
2. Jain, R.K. and Iyengar, S.R.K.; Advanced Engineering Mathematics; Narosa Publishers .
3. Thomas, G.B. and Finney, R.L.; Calculus and Analytic Geometry (Ninth Edition); Addison Wesley Longman, Inc.
4. Piskunov, N. : Differential and Integral calculus, Vol.1, Vol.2 MIR Publishers, Moscow- CBS Publishers and Distributors (India).
5. Michael D. Greenberg: Advanced Engineering Mathematics, Pearson Education Pvt. Ltd.

MEL103 Engineering Drawing,

[3-0-0, Credit: 3]

Pre-requisites: NIL

Type of Course: ES

Semester: I , II Sem B Tech

Assessment: Sess-I 15% + Sess-II 15% + TA 10% + End Sem 60%

Course Objective:

- i. To understand the Principles and methods of projections as per National Standards.
- ii. To develop the visualization skills for interpretation of use of various objects like lines, planes and solids.
- iii. To understand the section of solids and development of lateral surfaces and intersection of solids.
- iv. To acquire skills to interpret and convert multi-views drawing into single view and vice versa.

Course Outcomes:

- i. Students will be able to understand the conventions, standards for engineering drawing.



- ii. Students will be able to apply the knowledge of Projections, Methods to prepare the drawings for lines, planes and solids.
- iii. Students will be able to interpret and draw section of solids, development of lateral surfaces and intersection of solids.
- iv. Students will be able to visualize and convert 2D to 3D drawing and vice versa.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	2	1	3	1	3	3	3	2	3
CO2	2	2	2	1	3	2	2	2	3	3	3	2
CO3	3	2	2	2	3	2	2	2	3	3	3	2
CO4	2	2	2	2	3	1	2	2	3	3	3	3

Course Content:

Introduction to BIS SP-46-2003, Use of various drawing instruments, Concept of scales,

Representative factor and dimensioning, Conversation of Pictorial views to orthographic/profile views, orthographic projections of points, lines, plane on principle planes/Profile plane/Auxiliary planes.

Projection of right regular solids inclined to both the planes. Section and development of surfaces of solids. (Preferably in normal position/ Inclined to one plane). Intersection of combination of regular solid (Preferably in normal position/ Inclined to one plane).

Drawing isometric views and projection from orthographic projection/ orthographic views.

Reference Books:

1. Bhatt N D and Panchal V M, Elementary Engineering Drawing, (Plane and Solid Geometry), Charotar Publishing House, 53rd Edition.
2. Jolhe Dhananjay, Engineering Drawing with An introduction to Autocad, Tata McGraw Hill Publishing Company Limited, 5th Edition 2017.
3. BIS-SP-46-2003, Handbook BIS SP-46 -2003, BIS.

MEP103 Engineering Drawing Practical,

[0-0-2, Credit: 1]

Pre-requisites: NIL**Type of Course:** ES**Semester:** I , II Sem B Tech**Assessment:** Mid-term Eval 40% + End Term Eval 60%**Course Objective:**

The objectives of the course are

- i. To understand the Principles and methods of projections as per National Standards.
- ii. To develop the visualization skills for interpretation of use of various objects like lines, planes and solids.
- iii. To understand the section of solids and development of lateral surfaces and intersection of solids.
- iv. To acquire skills to interpret and convert multi-views drawing into single view and



vice versa.

Course Outcomes:

- Students will be able to understand the conventions, standards for engineering drawing.
- Students will be able to apply the knowledge of Projections, Methods to prepare the drawings for lines, planes and solids.
- Students will be able to interpret and draw section of solids, development of lateral surfaces and intersection of solids.
- Students will be able to visualize and convert 2D to 3D drawing and vice versa.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	2	1	3	1	3	3	3	2	3
CO2	2	2	2	1	3	2	2	2	3	3	3	2
CO3	3	2	2	2	3	2	2	2	3	3	3	2
CO4	2	2	2	2	3	1	2	2	3	3	3	3

Course Content:

Introduction to BIS SP-46-2003, explanation of various drawing instruments, symbols, RF, Dimensioning, etc. Practice of scales.

Representative Factor and dimensioning on some practical exemplary figure. Conversion of pictorial views to orthographic / profile views. Projection of points and lines Projections of planes. Projections of lines and planes using Auxiliary planes.

REVIEW I of sheets.

Projections of solids. Section and development of solids. Intersection of solids. Isometric views

REVIEW II of sheets

Reference Books:

- Bhatt N.D and Panchal VM, Elementary Engineering Drawing, (Plane and Solid Geometry), Charotar Publishing House, 53rd Edition.
- Jolhe Dhananjay, Engineering Drawing with An introduction to Autocad, Tata McGraw Hill Publishing Company Limited, 5th Edition 2017
- BIS-SP-46-2003, Handbook BIS SP-46 -2003, BIS

PHL101 Physics,

[3-1-0, **Credit: 4]**

Pre-requisites: NIL

Type of Course: BS

Semester: I , II Sem B Tech

Assessment: Sess-I 15% + Sess-II 15% + TA 10% + End Sem 60%

Course Objective:

- Provides a strong foundation in physics and mathematics in preparation for technical or scientific careers.
- The skills to be able to function as productive, qualified engineering professionals in areas where traditional science and engineering disciplines overlap.



iii. An awareness of the importance of continued professional development.

Course Outcomes:

- i. Evolution of elementary concepts of quantum mechanics and their applications.
- ii. Primitive crystal systems, through packing density and miller indices.
- iii. Basic concepts of semiconductors and working of devices like p-n junction diode and transistor based on band theory of solids.
- iv. The interaction of charged particles with electric and magnetic field and their applications.
- v. The phenomenon of interference and diffraction and their engineering applications.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	---	2	---	---	---	---	---	1	---	---
CO2	3	2	---	---	---	---	---	---	---	2	---	---
CO3	3	2	---	2	---	---	---	---	---	1	---	---
CO4	3	2	---	2	---	---	---	---	---	1	---	---
CO5	3	2	---	1	---	---	---	---	---	1	---	---

Course Content:

Black Body Radiations, Photoelectric effect, Compton effect, Concept of matter waves, Davission and Germer's experiment, Heisenberg's Uncertainty principle, Schrodinger's Wave equation and its application. Quantization of energy.

Crystal Structure : Unit cell and its characteristics in SC , BCC, FCC crystal structure, Miller indices, Bragg's Law, interplaner spacing.

Formation of energy bands in solid, Fermi level in an intrinsic and extrinsic semiconductor, Hall effect, p-n junction diode, transistors.

Motion of charged particles in electric and magnetic field. Electrostatic and magnetostatic focussing, CRO, Cyclotron.

Interference, diffraction and their applications.

Reference Books:

1. Resnick, Walker and Halliday, Fundamental of Physics, John Willey and Sons. Inc, 6th Edition, 2005.
2. B. G. Streetman, Solid State Electronics, Prentice Hall India (2nd Edition) 1986
3. M.N. Avadhanulu and P.G. Kshirsagar, A text Book of Engineering Physics, (7th Edition) 2004.
4. Dekkar A.J.; Electrical Engineering Materials; Prentice Hall og India Publication, 1992
5. Kenneth Krane; Modern Physics; (2 nd Edition); John Wiley Eastern, 1998
6. S. O. Pillai, Solid State Physics, New Age International Publishers, 3rd edition, 1999
7. Problems in Engineering Physics by M.N. Avadhanulu and S. R. Choubey, S. Chand Publication

**PHP101 Physics Laboratory,**[0-0-2, **Credit:** 1]**Pre-requisites:** NIL**Type of Course:** BS**Semester:** I , II Sem B Tech**Assessment:** Mid-term Eval 40% + End Term Eval 60%**Course Objective:**

- The Objective of this course is to make the students gain practical knowledge to co-relate with the theoretical studies.
- To achieve perfectness in experimental skills and the study of practical applications will bring more confidence and ability to develop and fabricate engineering and technical equipments.
- Design of circuits using new technology and latest components and to develop practical applications of engineering materials and use of principle in the right way to implement the modern technology.

Course Outcomes:

- Demonstrate experimental skills, analyze and interpret the results obtained.
- Acquire written communication skill to write reports of experiments performed in the lab.
- Understand basic concepts of Physics and develop oral communication skills.
- Enhance understanding of concepts in physics by performing practicals.
- Function effectively as an individual and as a member of a team.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	---	---	3	---	---	---	---	---	1	---	---
CO2	---	---	---	---	---	---	---	---	---	3	---	---
CO3	3	---	---	2	---	---	---	---	---	2	---	---
CO4	3	---	---	3	---	---	---	---	---	1	---	---
CO5	-	---	---	---	---	---	---	---	3	1	---	---

Course Content:

- To study the characteristics of Photocell and to determine the work function of the cathode material.
- To calibrate an electromagnet and to study the dependence of Hall voltage on magnetic field and current through the sample.
- To study the I/P, O/P and transfer characteristics and to determine ' α ' of transistor in common base mode.
- To study the forward and reverse characteristics of semiconductor diode.
- To determine the bandgap in a semiconductor using reverse biased p-n junction diode.
- To determine e/m for an electron by Thomson's method.
- To calibrate an audio frequency oscillator and to determine the unknown frequency and phase of RC network by using single trace CRO.
- To determine the radius of curvature of a plano-convex lens using Newton's Rings.
- To determine the wavelength of sodium vapour lamp by plane transmission grating.

**Reference Book:**

1. Experiments in Engineering Physics by M.N. Avadhanulu and P.G. Kshirsagar.

MEP102 Workshop,[0-0-4, **Credit: 2**]**Pre-requisites:** NIL**Type of Course:** ES**Semester:** I , II Sem B Tech**Assessment:** Mid-term Eval 40% + End Term Eval 60%**Course Objective:**

The objectives of the course are

- To make the students aware with various skills involved in basic engineering processes for manufacturing and assembly.
- To make students aware of various basic engineering processes like cutting, filing and joining and to have hands on experience for the same.

Course Outcomes:

- To understand basic manufacturing processes of carpentry, fitting, welding, molding and machining.
- To use different hand tools for basic manufacturing operations.
- To use different marking and measuring tools for basic manufacturing processes.
- To get hands on experience of manufacturing simple shapes.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	2	1	1	2	2	2	3	2	2	1
CO2	3	1	2	1	1	2	2	2	3	2	2	1
CO3	3	1	2	1	1	2	1	2	3	2	1	2
CO4	3	1	2	1	1	3	2	2	3	2	1	2

Course Content:

Fitting: Use and setting of fitting tools for chipping, cutting, filing, marking, center punching, drilling, tapping. Term work to include one job involving following operations: Filing to size, drilling and tapping.

Carpentry: Use and setting of hand tools like hacksaws, Jack planes, chisels and gauges for construction of various joints, wood turning and modern wood turning methods. Term work to include one carpentry job involving a joint and report on demonstration of a job involving wood turning.

Welding: Use and setting of tools and equipments for edge preparation for welding jobs and Arc welding for Jobs like, Lap welding of two plates, butt welding of plates.

Machining: At least one metal turning job is to be demonstrated.

CNC Machines: One job on CNC Lathe and CNC Milling machine to be demonstrated.

Foundry: At least one demonstration of mould making.

Reference Books:

1. Workshop Technology by W.A.J. Chapmen, Part I, II & III.



SAP101 Health Information and Sports- Part I

Pre-requisites: NIL. **Type of Course:** AU. **Semester:** I Sem B.Tech.

Assessment: End Sem 100%

Course Objective:

- i. To provide information about physical, Physiological & Psychological aspects of sports & physical.
- ii. To create awareness among the students about their health status, by conducting various physical fitness tests and suggest them suitable remedial physical fitness programme.
- iii. To provide information of different therapeutic exercises.
- iv. To make students aware about the rules and regulation of different games & sports.
- v. To provide opportunity to mingle with each other through participating in different physical education & sports activities.

Course Outcomes:

- i. Enriched proper knowledge among the students about emerging issues such as health & fitness, wellness etc.
- ii. Students will become aware about the sense of discipline & dedication in general life, develop the spirit of team work through various physical education & sports activities.
- iii. Development of rational thinking and scientific temper among the students.

Course Content:

1. Introduction to psychological problem of a sports person
 - A. Brief discussion on the technical aspect of sports psychology
 - B. Relaxation
 - C. Hypnotherapy
 - D. Counseling
 - E. Autosuggestion
 - F. Visualization
 - G. Imagination
 - H. Leadership building
 - I. Mental rehearsal
 - J. Neuro psychological technique for concentration, reaction time, eye hand coordination
 - K. Self-motivational instruction coaches workout and observation
2. Warming up, Cooling Down & Full Body Stretching
3. Obesity & its Management: Daily caloric requirements and daily energy expenditure
4. Scientific principles of training
5. Health & Performance related physical fitness

Practical:

- a) The student must actively participate in games: Football, Basketball, Volleyball, Handball, Cricket, Kho-Kho, Kabaddi, Badminton, Table Tennis, Yoga etc.
- b) Physical Efficiency Test
- c) Intramural Sports Programme
- d) Minor Technosport projects

Reference Books:

1. Edlin, Golanty and Brown, Health and wellness (Joines and Bartlett (5th&



7th Edition) Publishers, London) 2002

2. Arnold G. Nelson, (2007), "Stretching Anatomy" Human Kinetics
3. Marcia K. Anderson & Susan J. Hall (1997), Fundamentals of Sports Injury Management" Lippincott Williams & Wilkins

SAP102 Health Information and Sports- Part II

[0-0-2, Credit: 0]

Pre-requisites: NIL.

Type of Course: AU.

Semester: I Sem B.Tech.

Assessment: End Sem 100%

Course Objective:

- i. To make the learner enable to know the conditions of stress and its management technique.
- ii. To deliver the knowledge of daily calorie requirement and obesity.
- iii. To provide information of different training principles for practicing different sports & games.
- iv. To motivate the students to innovate new technologies in the field of physical education & sports.

Course Outcomes:

- i. The learner will be able to manage his stress level.
- ii. The student will be able to design his diet chart as per his daily requirements.
- iii. Students will be able to create some new designs of sports facilities and equipments.

Course Content:

1. Adjustment, Frustration, Tension and conflict
 - A. Meaning & Definition of Adjustment & Frustration
 - B. Kinds & Causes of Frustration
2. Periodization: Preparatory period, Competition period and transitional period
3. Effects of exercise on various physiological systems
4. Therapeutic Exercise & Therapeutic Modalities
5. The Science of Stress & its yogic Management

Practical:

- a) The student must actively participate in games: Football, Basketball, Volleyball, Handball, Kabaddi, Badminton, Table Tennis, Chess, Yoga etc.
- b) Intramural Sports Programme
- c) Physical Efficiency Test

Reference Books:

1. Edlin, Golanty and Brown, Health and wellness (Joines and Bartlett (5th&7th Edition) Publishers, London) 2002
2. Arnold G. Nelson, (2007), "Stretching Anatomy" Human Kinetics
3. Marcia K. Anderson & Susan J. Hall (1997), Fundamentals of Sports Injury Management" Lippincott Williams & Wilkins



GRADING SYSTEM

Continuous evaluation process, based on student's performance in uniformly placed I & II Sessional Examinations, Teachers Assessment (TA) and End-Semester Examination for each course. At the end of semester, grades shall be awarded by course coordinator or concerned faculty as a performance indicator. Details of these grades are as given below.

Grades	Grade Points	Description of performance
AA	10	Outstanding
AB	09	Excellent
BB	08	Very Good
BC	07	Good
CC	06	Average
CD	05	Below Average
DD	04	Marginal
FF	00	Very-poor/ Unsatisfactory / Absence in End-Sem Examination
W		Attendance Less than 75 % . Not Eligible for End-Sem Examination. Shall repeat the Course
SS		Satisfactory Completion of Audit Course
ZZ		Un-satisfactory / Audit Course continuation

Calculations of SGPA & CGPA

Semester Grade Point Average (SGPA) or Cumulative Grade Point Average (CGPA) is calculated as follows,

$$\text{SGPA} = \frac{\sum_{\text{Semester}} (\text{Course credits} \times \text{Grade points}) \text{ for all courses except audit}}{\sum_{\text{Semester}} (\text{Course credits}) \text{ for all courses except audit}}$$

$$\text{CGPA} = \frac{\sum_{\text{Semester}} (\text{Course credits} \times \text{Grade points}) \text{ for all courses with pass grade except audit}}{\sum_{\text{Semester}} (\text{Course credits}) \text{ for all courses except audit}}$$



ATTENDANCE

All students must attend every class and 100% attendance is expected from the students. However, in consideration of the constraints/ unavoidable circumstances, the attendance can be relaxed by course co-ordinator only to the extent of not more than 25%. Every student must attend minimum of 75% of the classes actually held for that Course

A student with less than 75% attendance in a course during the semester will be awarded W grade. Such a student will not be eligible to appear for the end semester and re-examination of that course. Even if such a student happens to appear for these examinations, then, answer books of such students will not be evaluated. A student with W grade is not eligible to appear for Re-examination and summer term also. Students will be informed about their attendance status after each sessional examination.

REGISTRATION & ENROLLMENT

Registration is a very important procedural part of the academic system. The registration procedure ensures that the student's name is on the roll list of each course that he/she wants to study. Web based registration facility is available but only on the intranet of VNIT, Nagpur. The choice of courses must be approved by his/her faculty adviser/ faculty Mentor.



Time Table for First Semester B. Tech. (Dec-2021 to Mar-2022)

Section →	R	S	T	U	L	Section →	W	X	Y	Z	N	Exam	
Course ↓	Slots					Course ↓	Slots						
Physics	C	E	A	G	A	Chemistry	G	H	A	G	E	Day 1	
Engineering Mechanics	A	C	E	B	F	Electrical Engineering	B	F	E	H	A	Day2	
Engineering Drawing	G	D	H	D	B	Computer Programming	A	E	F	B	C	Day3	
Communication Skill	H	F	G	C	D	Social Science	H	G	D	C	F	Day4	
Math – I	B	A	F	H	E	Math – I	C	A	B	D	D	Day5	
(.)_{Lab} ≡ (.)1,2,3,4 (Afternoon Slots) ⇨						Workshop	H_{Lab}	G_{Lab}	D_{Lab}	C_{Lab}	F_{Lab}		
Sports	Batch-1	E1	G1	C1	A1	A5	Sports	Batch-1	D1	B1	H1	F1	B5
	Batch-2	E2	G2	C2	A2	C5		Batch-2	D2	B2	H2	F2	D5
	Batch-3	E3	G3	C3	A3	E5		Batch-3	D3	B3	H3	F3	F5
	Batch-4	E4	G4	C4	A4	G5		Batch-4	D4	B4	H4	F4	H5



Time Table for Second Semester B. Tech. (Apr-2022 to July-2022)

Section →		W	X	Y	Z	N	Section →	R	S	T	U	L	Exam	
Course ↓		Slots					Course ↓		Slots					
Physics		C	E	A	G	A	Chemistry		G	H	A	G	E	Day 1
Engineering Mechanics		A	C	E	B	F	Electrical Engineering		B	F	E	H	A	Day2
Engineering Drawing		G	D	H	D	B	Computer Programming		A	E	F	B	C	Day3
Communication Skill		H	F	G	C	D	Social Science		H	G	D	C	F	Day4
Math – II		B	A	F	H	E	Math – II		C	A	B	D	D	Day5
(.)_{Lab} ≡ (.)_{1,2,3,4} (Afternoon Slots) ⇨							Workshop		H_{Lab}	G_{Lab}	D_{Lab}	C_{Lab}	F_{Lab}	
Sports	Batch-1	E1	G1	C1	A1	A5	Sports	Batch-1	D1	B1	H1	F1	B5	
	Batch-2	E2	G2	C2	A2	C5		Batch-2	D2	B2	H2	F2	D5	
	Batch-3	E3	G3	C3	A3	E5		Batch-3	D3	B3	H3	F3	F5	
	Batch-4	E4	G4	C4	A4	G5		Batch-4	D4	B4	H4	F4	H5	



Slot-wise Time Table (from December 2021)

	Lecture Hours						Lab Hours			
	1	2	3	4	5		6,7		8,9	
	08:00-08:55	09:00-09:55	10:00-10:55	11:00-11:55	12:00-12:55		13:00-13:55	14:00-14:55	15:00-15:55	16:00-16:55
MON	C-i	A-i	B-i	H-i	G-i	L U N C H B R E A K	B1		C1	
							D2		E2	
							F3		G3	
							H4		A4	
							B2		C2	
TUE	A-ii	C-ii	D-i	E-i	F-i		D3		E3	
							F4		G4	
							H5		A5	
							B3		C3	
							D4		E4	
WED	D-ii	A-iii	B-ii	E-ii	F-ii		F5		G5	
							H1		A1	
							B4		C4	
							D5		E5	
							F1		G1	
THU	B-iii	G-ii	H-ii	C-iii	D-iii	H2		A2		
						B5		C5		
						D1		E1		
						F2		G2		
						H3		A3		
FRI	A-iv	G-iii	H-iii	F-iii	E-iii	B-iv		C-iv		
						D-iv				
SAT		E-iv	F-iv	G-iv	H-iv					
	08:00-08:55	09:00-09:55	10:00-10:55	11:00-11:55	12:00-12:55	13:00-13:55	14:00-14:55	15:00-15:55	16:00-16:55	17:00-17:55

Notes:

1. A to H are slots. Roman numerals indicate the lecture hour within the slot.
2. The lab hours are to be used for practicals, tutorials, design studio etc.
3. In the lab hour, number after slot is batch number.
4. Provision is made for Lab/Tutorials for slot A also.
5. The Saturday lecture hours are to be used for the courses being conducted in on line mode. They may also be utilized for extra classes for the courses being conducted in-person.
6. In the case of a Saturday being declared as instruction day for higher semesters, time table as specified in the academic calendar will be followed on that Saturday for all the semesters.

Dean(ACD), VNIT



List of Faculty Mentors for First Year B Tech. (2021-2022)

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20	Dr. (Ms.) Purnima Satapathy	Mathematics	X3 + X4	7584961168	purnima@math.vnit.ac.in



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Course Book First Year B. Tech. (2021-2022)

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