

# Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal

## New Scheme of Examination as per AICTE Flexible Curricula

### I Semester (Group A)

### Bachelor of Technology (B.Tech.)

**W.E.F. JULY 2018**

### GROUP A: (CS, IT, EE, EX, EI, FT, AT, MI, BT, & BM)

| S. No.  | Subject Code | Category | Subject Name  | Maximum Marks Allotted  |            |                 |            |                      | Total Marks | Contact Hours per week |          |           | Total Credits |
|---|--------------|----------|---|---|------------|-----------------|------------|----------------------|-------------|------------------------|----------|-----------|---------------|
|   |              |          |   | Theory  |            |                 | Practical  |                      |             | L                      | T        | P         |               |
|   |              |          |   | End Sem.  | Mid Sem.   | Quiz/Assignment | End Sem.   | Lab work & Sessional |             |                        |          |           |               |
| Mandatory Induction Program (First three weeks) |              |          |   | Physical Activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations |            |                 |            |                      |             |                        |          |           |               |
| Fourth week onwards classes will start          |              |          |   |   |            |                 |            |                      |             |                        |          |           |               |
| 1.  | BT101        | BSC-1    | Engineering Chemistry   | 70  | 20         | 10              | 30         | 20                   | 150         | 3                      | -        | 2         | 4             |
| 2.  | BT102        | BSC-2    | Mathematics-I   | 70  | 20         | 10              | -          | -                    | 100         | 3                      | 1        | -         | 4             |
| 3.  | BT103        | HSMC-1   | English for Communication   | 70  | 20         | 10              | 30         | 20                   | 150         | 3                      | -        | 2         | 4             |
| 4.  | BT104        | ESC-1    | Basic Electrical & Electronics Engineering                                    | 70  | 20         | 10              | 30         | 20                   | 150         | 2                      | -        | 2         | 3             |
| 5.  | BT105        | ESC-2    | Engineering Graphics  | 70  | 20         | 10              | 30         | 20                   | 150         | 2                      | -        | 2         | 3             |
| 6.  | BT106        | ESC-3    | Manufacturing Practices   | -   | -          | -               | 15         | 10                   | 25          | -                      | -        | 2         | 1             |
| 7.  | BT107        | DLC-1    | Internship-I (60 Hrs Duration) at the Institute level                         | <b>To be completed during or at the end of the second semester. Its evaluation/credit to be added in third semester.</b>  |            |                 |            |                      |             |                        |          |           |               |
| 8.  | BT108        | DLC-2    | Swachh Bharat Summer Internship Unnat Bharat Abhiyan (100Hrs)/ Rural Outreach |   |            |                 | 15         | 10                   | 25          | -                      | -        | 4         | 2             |
| <b>Total</b>                                    |              |          |   | <b>350</b>  | <b>100</b> | <b>50</b>       | <b>150</b> | <b>100</b>           | <b>750</b>  | <b>13</b>              | <b>1</b> | <b>14</b> | <b>21</b>     |

|              |               |                |
|--------------|---------------|----------------|
| 1 Hr Lecture | 1 Hr Tutorial | 2 Hr Practical |
| 1 Credit     | 1 Credit      | 1 Credit       |

## Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal

New Scheme of Examination as per AICTE Flexible Curricula

**II Semester (Group A)**

**Bachelor of Technology (B.Tech.)**

**W.E.F. JULY 2018**

**GROUP A: (CS, IT, EE, EX, EI, FT, AT, MI, BT, & BM)**

| S.No         | Subject Code | Category | Subject Name  | Maximum Marks Allotted   |               |                 |                |                      | Total Marks | Contact Hours per week |          |           | Total Credits |
|--------------|--------------|----------|---|--|---------------|-----------------|----------------|----------------------|-------------|------------------------|----------|-----------|---------------|
|              |              |          |   | Theory Slot  |               |                 | Practical Slot |                      |             | L                      | T        | P         |               |
|              |              |          |   | End Sem.   | Mid Sem Exam. | Quiz/Assignment | End Sem.       | Lab work & Sessional |             |                        |          |           |               |
| 1.           | BT201        | BSC-3    | Engineering Physics                                   | 70   | 20            | 10              | 30             | 20                   | 150         | 2                      | 1        | 2         | 4             |
| 2.           | BT202        | BSC-4    | Mathematics-II  | 70   | 20            | 10              | -              | -                    | 100         | 3                      | 1        | -         | 4             |
| 3.           | BT203        | ESC-4    | Basic Mechanical Engineering                          | 70   | 20            | 10              | 30             | 20                   | 150         | 3                      | -        | 2         | 4             |
| 4.           | BT204        | ESC-5    | Basic Civil Engineering & Mechanics                   | 70   | 20            | 10              | 30             | 20                   | 150         | 3                      | -        | 2         | 4             |
| 5.           | BT205        | ESC-6    | Basic Computer Engineering                            | 70   | 20            | 10              | 30             | 20                   | 150         | 3                      | -        | 2         | 4             |
| 6.           | BT206        | HSMC-2   | Language Lab & Seminars                               | -  | -             | -               | 30             | 20                   | 50          | -                      | -        | 2         | 1             |
| 7.           | BT107        | DLC-1    | Internship-I (60 Hrs Duration) at the Institute level | To be completed during first/second semester. Its evaluation/credit to be added in third semester. |               |                 |                |                      |             |                        |          |           |               |
| <b>Total</b> |              |          |   | <b>350</b>   | <b>100</b>    | <b>50</b>       | <b>150</b>     | <b>100</b>           | <b>750</b>  | <b>14</b>              | <b>2</b> | <b>10</b> | <b>21</b>     |

|              |               |                |
|--------------|---------------|----------------|
| 1 Hr Lecture | 1 Hr Tutorial | 2 Hr Practical |
| 1 Credit     | 1 Credit      | 1 Credit       |

# Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal

## New Scheme of Examination as per AICTE Flexible Curricula

### I Semester (Group B)

### Bachelor of Technology (B.Tech.)

**W.E.F. JULY 2018**

### GROUP B: (AU, ME, IP, CE, IEM, TX, EC, & CM)

| S.No  | Subject Code | Category | Subject Name  | Maximum Marks Allotted  |               |                  |                |                      | Total Marks | Contact Hours per week |          |           | Total Credits |
|---|--------------|----------|---|---|---------------|------------------|----------------|----------------------|-------------|------------------------|----------|-----------|---------------|
|   |              |          |   | Theory Slot   |               |                  | Practical Slot |                      |             | L                      | T        | P         |               |
|   |              |          |   | End Sem.  | Mid Sem Exam. | Quiz/ Assignment | End Sem.       | Lab work & Sessional |             |                        |          |           |               |
| Mandatory Induction Program (First three weeks) |              |          |   | Physical Activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations |               |                  |                |                      |             |                        |          |           |               |
| Fourth week onwards classes will start          |              |          |   |   |               |                  |                |                      |             |                        |          |           |               |
| 1.  | BT201        | BSC-3    | Engineering Physics                                   | 70  | 20            | 10               | 30             | 20                   | 150         | 2                      | 1        | 2         | 4             |
| 2.  | BT102        | BSC-2    | Mathematics-I   | 70  | 20            | 10               | -              | -                    | 100         | 3                      | 1        | -         | 4             |
| 3.  | BT203        | ESC-4    | Basic Mechanical Engineering                          | 70  | 20            | 10               | 30             | 20                   | 150         | 3                      | -        | 2         | 4             |
| 4.  | BT204        | ESC-5    | Basic Civil Engineering & Mechanics                   | 70  | 20            | 10               | 30             | 20                   | 150         | 3                      | -        | 2         | 4             |
| 5.  | BT205        | ESC-6    | Basic Computer Engineering                            | 70  | 20            | 10               | 30             | 20                   | 150         | 3                      | -        | 2         | 4             |
| 6.  | BT206        | HSMC-2   | Language Lab & Seminars                               | -   | -             | -                | 30             | 20                   | 50          | -                      | -        | 2         | 1             |
| 7.  | BT107        | DLC-1    | Internship-I (60 Hrs Duration) at the Institute level | To be completed during first/second semester. Its evaluation/credit to be added in third semester.  |               |                  |                |                      |             |                        |          |           |               |
| <b>Total</b>                                    |              |          |   | <b>350</b>  | <b>100</b>    | <b>50</b>        | <b>150</b>     | <b>100</b>           | <b>750</b>  | <b>14</b>              | <b>2</b> | <b>10</b> | <b>21</b>     |

|              |               |                |
|--------------|---------------|----------------|
| 1 Hr Lecture | 1 Hr Tutorial | 2 Hr Practical |
| 1 Credit     | 1 Credit      | 1 Credit       |

# Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal

New Scheme of Examination as per AICTE Flexible Curricula

**II Semester (Group B)**

**Bachelor of Technology (B.Tech.)**

**W.E.F. JULY 2018**

**GROUP B: (AU, ME, IP, CE, IEM, TX, EC, & CM)**

| S. No. | Subject Code | Category | Subject Name  | Maximum Marks Allotted  |            |                 |            |                      | Total Marks | Contact Hours per week |          |           | Total Credits |
|--------|--------------|----------|---|---|------------|-----------------|------------|----------------------|-------------|------------------------|----------|-----------|---------------|
|        |              |          |   | Theory  |            |                 | Practical  |                      |             | L                      | T        | P         |               |
|        |              |          |   | End Sem.  | Mid Sem.   | Quiz/Assignment | End Sem.   | Lab work & Sessional |             |                        |          |           |               |
| 1.     | BT101        | BSC-1    | Engineering Chemistry   | 70  | 20         | 10              | 30         | 20                   | 150         | 3                      | -        | 2         | 4             |
| 2.     | BT202        | BSC-4    | Mathematics-II  | 70  | 20         | 10              | -          | -                    | 100         | 3                      | 1        | -         | 4             |
| 3.     | BT103        | HSMC-1   | English for Communication   | 70  | 20         | 10              | 30         | 20                   | 150         | 3                      | -        | 2         | 4             |
| 4.     | BT104        | ESC-1    | Basic Electrical & Electronics Engineering                                    | 70  | 20         | 10              | 30         | 20                   | 150         | 2                      | -        | 2         | 3             |
| 5.     | BT105        | ESC-2    | Engineering Graphics  | 70  | 20         | 10              | 30         | 20                   | 150         | 2                      | -        | 2         | 3             |
| 6.     | BT106        | ESC-3    | Manufacturing Practices   | -   | -          | -               | 15         | 10                   | 25          | -                      | -        | 2         | 1             |
| 7.     | BT107        | DLC-1    | Internship-I (60 Hrs Duration) at the Institute level                         | To be completed during or at the end of the second semester. Its evaluation/credit to be added in third semester. |            |                 |            |                      |             |                        |          |           |               |
| 8.     | BT108        | DLC-2    | Swachh Bharat Summer Internship Unnat Bharat Abhiyan (100Hrs)/ Rural Outreach |   |            |                 | 15         | 10                   | 25          | -                      | -        | 4         | 2             |
|        |              |          | <b>Total</b>  | <b>350</b>  | <b>100</b> | <b>50</b>       | <b>150</b> | <b>100</b>           | <b>750</b>  | <b>13</b>              | <b>1</b> | <b>14</b> | <b>21</b>     |

|              |               |                |
|--------------|---------------|----------------|
| 1 Hr Lecture | 1 Hr Tutorial | 2 Hr Practical |
| 1 Credit     | 1 Credit      | 1 Credit       |

**RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL**  
**New Scheme Based On AICTE Flexible Curricula**  
**B.Tech. First Year**

**Branch- Common to All Disciplines**

|              |                              |                 |                  |
|--------------|------------------------------|-----------------|------------------|
| <b>BT101</b> | <b>Engineering Chemistry</b> | <b>3L-0T-2P</b> | <b>4 Credits</b> |
|--------------|------------------------------|-----------------|------------------|

**Course Contents:**

**(i) Water – Analysis, Treatments and Industrial Applications (4 Lectures)**

Sources, Impurities, Hardness & its units, Determination of hardness by EDTA method, Alkalinity & It's determination and related numerical problems.

**(ii) Boiler problem & softening methods (4 Lectures)**

Boiler troubles (Sludge & Scale, Priming & Foaming, Boiler Corrosion, Caustic Embrittlement), Softening methods (Lime-Soda, Zeolite and Ion Exchange Methods) and related numerical problems.

**(iii) Lubricants and Lubrication (4 Lectures)**

Introduction, Mechanism of lubrication, Classification of lubricants, significance & determination of Viscosity and Viscosity Index, Flash & Fire Points, Cloud & Pour Points, Aniline Point, Acid Number, Saponification Number, Steam Emulsification Number and related numerical problems.

**(iv) Polymer & polymerization (4 Lectures)**

Introduction, types of polymerisation, Classification, mechanism of polymerisation (Free radical & Ionic polymerization). Thermoplastic & Thermosetting polymers Elementary idea of Biodegradable polymers, preparation, properties & uses of the following polymers- PVC, PMMA, Teflon, Nylon 6, Nylon 6:6, Polyester phenol formaldehyde, Urea- Formaldehyde, Buna N, Buna S, Vulcanization of Rubber.

**(v) Phase equilibrium and Corrosion (5 Lectures)**

Phase diagram of single component system (Water) Phase diagram of binary Eutectic System (Cu-Ag.) Corrosion: Types, Mechanisms & prevention.

**(vi) Spectroscopic techniques and application (6 Lectures)**

Principle, Instrumentation & Applications, electronics spectroscopy, Vibrational & Rotational Spectroscopy of diatomic molecules.

**(vii) Periodic properties (4 Lectures)**

Effective Nuclear Charge, Variations: S, P, d & f Orbital energies of atoms in periodic table, Electronics Configuration, atomic & Ionic sizes, electron affinity & electro negativity, Polarizability & Oxidation States.

*Course Outcomes*

The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications.

Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels. The course will enable the student to:

- Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
- Rationalise bulk properties and processes using thermodynamic considerations.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular

- energy levels in various spectroscopic techniques
- Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
- List major chemical reactions that are used in the synthesis of molecules.

#### Practical List

NOTE: At least 8 of the following core experiments must be performed during the session.

- 1. Water testing**
  - (i) Determination of Total hardness by Complexometric titration method.
  - (ii) Determination of mixed alkalinity
    - a) **OH & CO<sub>3</sub>**
    - b) **CO<sub>3</sub> & HCO<sub>3</sub>**
  - (iii) Chloride ion estimation by Argentometric method.
- 2. Fuels & Lubricant testing:**
  - (i) Flash & fire points determination by
    - a) Pensky Martin Apparatus,
    - b) Abel's Apparatus
    - c) Cleveland's open cup Apparatus
    - d) Calorific value by bomb calorimeter.
  - (ii) Viscosity and Viscosity index determination by
    - a) Redwood viscometer No.1
    - b) Redwood viscometer No.2
  - (iii) Proximate analysis of coal
    - a) Moisture content
    - b) Ash content
    - c) Volatile matter content
    - d) Carbon residue
  - (iv) Steam emulsification No & Anline point determination
  - (v) Cloud and Pour point determination of lubricating oil
- 3. Alloy Analysis**
  - (i) Determination of percentage of Fe in an iron alloy by redox titration using N-Phenyl anthranilic acid as internal indicator.
  - (ii) Determination of Cu and or Cr in alloy by Iodometric Titration.
  - (iii) Determination of % purity of Ferrous Ammonium Sulphate & Copper Sulphate.

#### Reference Books :

- 1 Chemistry in Engineering and Technology - Vol.1 &2 Kuriacose and Rajaram , McGraw Hill Education
- 2 Fundamental of Molecular Spectroscopy C.N. Banwell , McGraw Hill Education
- 3 Engineering Chemistry – B.K. Sharma, Krishna Prakashan Media (P) Ltd., Meerut.
- 4 Basics of Engineering Chemistry – S.S. Dara & A.K. Singh, S. Chand &Company Ltd., Delhi.
- 5 Applied Chemistry – Theory and Practice, O.P. Viramani, A.K. Narula, New Age International Pvt. Ltd. Publishers, New Delhi.
- 6 Elementary Spectroscopy ,Y .R. Sharma , S. Chand Publishing
- 7 Polymer Science, Vasant R. Gowariker, N. V. Viswanathan, Jayadev Sreedhar, New Age International Pvt. Ltd
- 8 Advanced Inorganic Chemistry, G.R. Chatwal, Goal Publishing house
- 9 Engineering Chemistry (NPTEL Web-book ) B.L. Tembe, Kamaluddin and M.S. Krishna

**RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL**  
**New Scheme Based On AICTE Flexible Curricula**  
**B. Tech. First Year (I Semester)**

**Branch- Common to All Disciplines**

|              |                      |                 |                  |
|--------------|----------------------|-----------------|------------------|
| <b>BT102</b> | <b>MATHEMATICS-I</b> | <b>3L-1T-0P</b> | <b>4 Credits</b> |
|--------------|----------------------|-----------------|------------------|

**OBJECTIVES:** The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines. More precisely, the objectives are:

To introduce the idea of applying differential and integral calculus to notions of curvature and to improper integrals. Apart from some applications it gives a basic introduction on Beta and Gamma functions.

To introduce the fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.

To develop the tool of power series and Fourier series for learning advanced Engineering Mathematics.

To familiarize the student with functions of several variables that is essential in most branches of engineering.

To develop the essential tool of matrices and linear algebra in a comprehensive manner.

**Course Contents:**

**Module 1: Calculus: (10 hours):** Rolle's theorem, Mean Value theorems, Expansion of functions by Mc. Laurin's and Taylor's for one variable; Taylor's theorem for function of two variables, Partial Differentiation, Maxima & Minima (two and three variables), Method of Lagranges Multipliers.

**Module 2: Calculus: (8 hours):** Definite Integral as a limit of a sum and Its application in summation of series; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions. Multiple Integral, Change the order of the integration, Applications of multiple integral for calculating area and volumes of the curves.

**Module 3: Sequences and series: (6 hours):** Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

**Module 4: Vector Spaces (8hours):** Vector Space, Vector Sub Space, Linear Combination of Vectors, Linearly Dependent, Linearly Independent, Basis of a Vector Space, Linear Transformations.

**Module 5: Matrices (8 hours):** Rank of a Matrix, Solution of Simultaneous Linear Equations by Elementary Transformation, Consistency of Equation, Eigen Values and Eigen Vectors, Diagonalization of Matrices, Cayley-Hamilton theorem and its applications to find inverse.

**Textbooks/References:**

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

**RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL**  
**New Scheme Based On AICTE Flexible Curricula**  
**B.Tech. First Year**

**Branch- Common to All Disciplines**

|              |                                  |                 |                  |
|--------------|----------------------------------|-----------------|------------------|
| <b>BT103</b> | <b>English for Communication</b> | <b>3L-0T-2P</b> | <b>4 Credits</b> |
|--------------|----------------------------------|-----------------|------------------|

**COURSE CONTENTS:**

**Unit-I**

**Identifying Common errors in writing:** Articles, Subject-Verb Agreement, Prepositions, Active and Passive Voice, Reported Speech: Direct and Indirect, Sentence Structure.

**Unit-II**

**Vocabulary building and Comprehension:**

Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives, synonyms, antonyms, Reading comprehension.

**Unit-III**

**Communication:**

Introduction, Meaning and Significance, Process of Communication, Oral and Written Communication, 7 c's of Communication, Barriers to Communication and Ways to overcome them, Importance of Communication for Technical students, nonverbal communication.

**Unit-IV**

**Developing Writing Skills:**

Planning, Drafting and Editing, Precise Writing, Précis, Technical definition and Technical description. Report Writing: Features of writing a good Report, Structure of a Formal Report, Report of Trouble, Laboratory Report, Progress Report.

**Unit-V**

**Business Correspondence:**

Importance of Business Letters, Parts and Layout; Application, Contents of good Resume, guidelines for writing Resume, Calling/ Sending Quotation, Order, Complaint, E-mail and Tender.

**Books Recommended:**

1. 'Technical Communication : Principles and practice', Meenakshi Raman and Sangeeta Sharma (Oxford)
2. 'Effective Business Communication', Krizan and merrier (Cengage learning)
3. 'Communication Skill, Sanjay Kumar and pushlata, OUP2011
4. "Practical English Usage Michael Swan OUP, 1995.
5. "Exercises in spoken English Parts I-III CIEFL, Hyderabad, Oxford University Press
6. On writing well, William Zinsser, Harper Resource Book 2001.
7. Remedial English Grammar, F.T. Wood, Macmillan 2007.

**Course Outcomes:**

The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

**Communicative Language Laboratory:**

**Course objective:** The language laboratory focuses on the practice of English through audio-visual aids and Computer software. It intends to enable the students to speak English correctly with confidence and intends to help them to overcome their inhibitions and self –consciousness while speaking in English.

Topics to be covered in the Language laboratory sessions:

1. Listening Comprehension.
2. Pronunciation, Intonation, Rhythm
3. Practising everyday dialogues in English
4. Interviews.
5. Formal Presentation

Final Assessment should be based on assignment, assessment, presentation and interview of each candidate.

**RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL**  
**New Scheme Based On AICTE Flexible Curricula**  
**B.Tech. First Year**

**Branch- Common to All Disciplines**

|              |   |                 |                 |
|--------------|---|-----------------|-----------------|
| <b>BT104</b> | <b>Basic Electrical &amp; Electronics Engineering</b> | <b>2L-0T-2P</b> | <b>3Credits</b> |
|--------------|---|-----------------|-----------------|

**Course Contents:**

**Unit- I :**

**D.C. Circuits:** Voltage and current sources, dependent and independent sources, Units and dimensions, Source Conversion, Ohm's Law, Kirchoff's Law, Superposition theorem, Thevenin's theorem and their application for analysis of series and parallel resistive circuits excited by independent voltage sources, Power & Energy in such circuits. Mesh & nodal analysis, Star Delta transformation & circuits.

**Unit – II :**

**1- phase AC Circuits:** Generation of sinusoidal AC voltage, definition of average value, R.M.S. value, form factor and peak factor of AC quantity , Concept of phasor, Concept of Power factor, Concept of impedance and admittance, Active, reactive and apparent power, analysis of R-L, R-C, R-L-C series & parallel circuit

**3-phase AC Circuits:** Necessity and advantages of three phase systems, Meaning of Phase sequence, balanced and unbalanced supply and loads. Relationship between line and phase values for balanced star and delta connections. Power in balanced & unbalanced three-phase system and their measurements

**Unit – III : Magnetic Circuits:** Basic definitions, magnetization characteristics of Ferro magnetic materials, self inductance and mutual inductance, energy in linear magnetic systems, coils connected in series, AC excitation in magnetic circuits, magnetic field produced by current carrying conductor, Force on a current carrying conductor. Induced voltage, laws of electromagnetic Induction, direction of induced E.M.F.

**Single phase transformer-** General construction, working principle, e.m.f. equation, equivalent circuits, phasor diagram, voltage regulation, losses and efficiency, open circuit and short circuit test

**Unit IV:**

**Electrical Machines:** Construction, Classification & Working Principle of DC machine, induction machine and synchronous machine. Working principle of 3-Phase induction motor, Concept of slip in 3- Phase induction motor, Explanation of Torque-slip characteristics of 3-Phase induction motor. Types of losses occurring in electrical machines. Applications of DC machine, induction machine and synchronous machine.

**Unit V :**

**Basic Electronics:** Number systems & Their conversion used in digital electronics, De morgan's theorem, Logic Gates, half and full adder circuits, R-S flip flop, J-K flip flop. Introduction to Semiconductors, Diodes, V-I characteristics, Bipolar junction transistors (BJT) and their working, introduction to CC, CB & CE transistor configurations, different configurations and modes of operation of BJT

**Course outcomes:**

The final outcome of the subject will result into an enhancement in understanding the basic concepts of Core Electrical Engineering subjects. The topics covered under this subject will help to enhance the basic understanding of Electrical machines and power systems and basic electronics.

**Evaluation:** Evaluation will be continuous and integral part of the class followed by final examination.

**List of experiments/demonstrations:**

- Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.
- Measuring the steady-state and transient time-response of R-L, R-C, and R-L-C circuits to a step change in voltage (transient may be observed on a storage oscilloscope). Sinusoidal steady state response of R-L, and R-C circuits – impedance calculation and verification. Observation of phase differences between current and voltage. Resonance in R-L-C circuits.
- Transformers: Observation of the no-load current waveform on an oscilloscope (non- sinusoidal wave-shape due to B-H curve nonlinearity should be shown along with a discussion about harmonics). Loading of a transformer: measurement of primary and secondary voltages and currents, and power.
- Determination of equivalent circuit parameters of a single phase transformer by O.C. and S.C. tests and estimation of voltage regulation and efficiency at various loading conditions and

verification by load test.

- Demonstration of cut-out sections of machines: dc machine (commutator-brush arrangement), induction machine (squirrel cage rotor), synchronous machine (field winding - slip ring arrangement) and single-phase induction machine.
- Torque Speed Characteristic of separately excited dc motor.
- Synchronous speed of two and four-pole, three-phase induction motors. Direction reversal by change of phase-sequence of connections. Torque-Slip Characteristic of an induction motor. Generator operation of an induction machine driven at super- synchronous speed.
- Synchronous Machine operating as a generator: stand-alone operation with a load. Control of voltage through field excitation.
- Study of V-I Characteristics of Diodes.
- Applications of Diodes and their verification.
- Transistor applications as amplifier and switch.
- Verification of truth table for various gates, Flip-Flops.
- Realizations of Various gates, Flip-Flops etc.
- Verification of De Morgan's theorems.

### References

1. D.P. Kothari & I.J. Nagrath, Basic Electrical Engineering, Tata McGraw Hill, latest edition.
2. S.N. Singh, Basic Electrical Engineering, P.H.I., 2013
3. Rajendra Prasad, Fundamentals of Electrical Engineering, Prentice Hall, 2014
4. M.S. Sukhija, T. K. Nagsarkar, Basic Electrical and electronics engineering, Oxford University press, 2012
5. C.L. Wadhwa, Basic Electrical Engineering. New Age International.
6. B.L. Theraja & A.K. Theraja Textbook of Electrical Technology - Vol. 1, S. Chand Publication
7. E. Hughes & I.M. Smith Hughes Electrical Technology Pearson
8. Vincent Del Toro Electrical Engineering Fundamentals

**RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL**  
**New Scheme Based On AICTE Flexible Curricula**  
**B.Tech. First Year**

**Branch- Common to All Disciplines**

|              |                             |                 |                 |
|--------------|-----------------------------|-----------------|-----------------|
| <b>BT105</b> | <b>Engineering Graphics</b> | <b>2L-0T-2P</b> | <b>3Credits</b> |
|--------------|-----------------------------|-----------------|-----------------|

**Course Objective:**

All phases of manufacturing or construction require the conversion of new ideas and design concepts into the basic line language of graphics. Therefore, there are many areas (civil, mechanical, electrical, architectural and industrial) in which the skills of the CAD technicians play major roles in the design and development of new products or construction. Students prepare for actual work situations through practical training in a new state-of-the-art computer designed CAD laboratory using engineering software. This course is designed to address:

- to prepare you to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- to prepare you to communicate effectively
- to prepare you to use the techniques, skills, and modern engineering tools necessary for engineering practice

**Course Contents:**

**Traditional Engineering Graphics:** Principles of Engineering Graphics; Orthographic Projection; Descriptive Geometry; Drawing Principles; Isometric Projection; Surface Development; Perspective; Reading a Drawing; Sectional Views; Dimensioning & Tolerances; True Length, Angle; intersection, Shortest Distance.

**Computer Graphics:** Engineering Graphics Software; -Spatial Transformations; Orthographic Projections; Model Viewing; Co-ordinate Systems; Multi-view Projection; Exploded Assembly; Model Viewing; Animation; Spatial Manipulation; Surface Modelling; Solid Modelling; Introduction to Building Information Modelling (BIM)

(Except the basic essential concepts, most of the teaching part can happen concurrently in the laboratory)

**Module 1:** Introduction to Engineering Drawing covering, Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Vernier Scales;

**Module 2:** Orthographic Projections covering, Principles of Orthographic Projections- Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes - Auxiliary Planes;

**Module 3:** Projections of Regular Solids covering, those inclined to both the Planes- Auxiliary Views; Draw simple annotation, dimensioning and scale. Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc.

**Module 4:** Sections and Sectional Views of Right Angular Solids covering, Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (foundation to slab only)

**Module 5:** Isometric Projections covering, Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids;

Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions;

**Module 6:** Overview of Computer Graphics covering, listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids]

**Module 7:** Customisation & CAD Drawing consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerancing; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles;

**Module 8:** Annotations, layering & other functions covering applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques; Drawing sectional views of composite right regular geometric solids and project the true shape of the sectioned surface; Drawing annotation, Computer-aided design (CAD) software modeling of parts and assemblies. Parametric and non-parametric solid, surface, and wireframe models. Part editing and two-dimensional documentation of models. Planar projection theory, including sketching of perspective, isometric, multiview, auxiliary, and section views. Spatial visualization exercises. Dimensioning guidelines, tolerancing techniques; dimensioning and scale multi views of dwelling;

**Module 9:** Demonstration of a simple team design project that illustrates Geometry and topology of engineered components: creation of engineering models and their presentation in standard 2D blueprint form and as 3D wire-frame and shaded solids; meshed topologies for engineering analysis and tool-path generation for component manufacture; geometric dimensioning and tolerancing; Use of solid-modeling software for creating associative models at the component and assembly levels; floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc. Applying colour coding according to building drawing practice; Drawing sectional elevation showing foundation to ceiling; Introduction to Building Information Modelling (BIM).

#### **Goals & Outcomes:**

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to solid modelling
- Exposure to computer-aided geometric design
- Exposure to creating working drawings
- Exposure to engineering communication

#### **Text/Reference Books:**

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
3. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
4. Narayana, K.L. & P Kanniah (2008), Text book on Engineering Drawing, Scitech Publishers
5. (Corresponding set of) CAD Software Theory and User Manuals

**RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL**  
**New Scheme Based On AICTE Flexible Curricula**  
**B.Tech. First Year**

**Branch- Common to All Disciplines**

|              |                                |                 |                 |
|--------------|--------------------------------|-----------------|-----------------|
| <b>BT106</b> | <b>Manufacturing Practices</b> | <b>0L-0T-2P</b> | <b>1Credits</b> |
|--------------|--------------------------------|-----------------|-----------------|

**Course Objective:**

Manufacturing is fundamental to the development of any engineering product. The course on Engineering Workshop Practice is intended to expose engineering students to different types of manufacturing / fabrication processes, dealing with different materials such as metals, ceramics, plastics, wood, glass etc. While the actual practice of fabrication techniques is given more weightage, some lectures and video clips available on different methods of manufacturing are also included.

**Course Contents:**

*Lectures & videos: (10 hours)*

1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods **(3 lectures)**
2. CNC machining, Additive manufacturing **(1 lecture)**
3. Fitting operations & power tools **(1 lecture)**
4. Electrical & Electronics **(1 lecture)**
5. Carpentry **(1 lecture)**
6. Plastic moulding, glass cutting **(1 lecture)**
7. Metal casting **(1 lecture)**
8. Welding (arc welding & gas welding), brazing **(1 lecture)**

**Course Outcomes:**

At the end of this course, students will demonstrate the ability to

- Understanding different manufacturing techniques and their relative advantages/ disadvantages with respect to different applications.
- Selection of a suitable technique for meeting a specific fabrication need.
- Acquire a minimum practical skill with respect to the different manufacturing methods and develop the confidence to design & fabricate small components for their project work and also to participate in various national and international technical competitions.
- Introduction to different manufacturing methods in different fields of engineering.
- Practical exposure to different fabrication techniques.
- Creation of simple components using different materials.
- Exposure to some of the advanced and latest manufacturing techniques being employed in the industry.

**(ii) Workshop Practice:(60 hours)**

1. Machine shop **(10 hours)**
2. Fitting shop **(8 hours)**
3. Carpentry **(6 hours)**
4. Electrical & Electronics **(8 hours)**
5. Welding shop **( 8 hours (Arc welding 4 hrs + gas welding 4 hrs)**
6. Casting **(8 hours)**
7. Smithy **(6 hours)**
8. Plastic moulding & Glass Cutting **(6 hours)**

Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

### *Laboratory Outcomes*

- Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
- They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
- By assembling different components, they will be able to produce small devices of their interest.

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**New Scheme Based On AICTE Flexible Curricula**  
**B. Tech. First Year**

**Branch- Common to All Disciplines**

|              |                            |                 |                  |
|--------------|----------------------------|-----------------|------------------|
| <b>BT201</b> | <b>Engineering Physics</b> | <b>2L-1T-2P</b> | <b>4 Credits</b> |
|--------------|----------------------------|-----------------|------------------|

**Course Contents:**

Module 1: Wave nature of particles and the Schrodinger equation (8 lectures)

Introduction to Quantum mechanics, Wave nature of Particles, operators, Time-dependent and time-independent Schrodinger equation for wavefunction, Application: Particle in a One dimensional Box, Born interpretation, Free-particle wavefunction and wave-packets,  $v_g$  and  $v_p$  relation Uncertainty principle.

Module 2: Wave optics (8 lectures)

Huygens' principle, superposition of waves and interference of light by wave front splitting and amplitude splitting; Young's double slit experiment, Newton's rings, Michelson interferometer, Mach-Zehnder interferometer.

Farunhofer diffraction from a single slit and a circular aperture, the Rayleigh criterion for limit of resolution and its application to vision; Diffraction gratings and their resolving power.

Module 3: Introduction to solids (8 lectures)

Free electron theory of metals, Fermi level of Intrinsic and extrinsic, density of states, Bloch's theorem for particles in a periodic potential, Kronig-Penney model(no derivation) and origin of energy bands. V-I characteristics of PN junction, Zener diode, Solar Cell, Hall Effect .

Module 4: Lasers (8 lectures)

Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: gas lasers ( He-Ne, CO<sub>2</sub>), solid-state lasers(ruby, Neodymium), Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles, applications of lasers in science, engineering and medicine. Introduction to Optical fiber, acceptance angle and cone, Numerical aperture, V number, attenuation.

Module 5: Electrostatics in vacuum (8 lectures)

Calculation of electric field and electrostatic potential for a charge distribution; Electric displacement, Basic Introduction to Dielectrics, Gradient, Divergence and curl, Stokes' theorem, Gauss Theorem, Continuity equation for current densities; Maxwell's equation in vacuum and non-conducting medium; Poynting vector.

**List of Experiment**

1. To determine the dispersive power of prism.
2. To determine the  $\lambda$  of sodium light with the help of newton's Ring.
3. Resolving Power of Telescope.
4. YDSE (Young's double slit Experiment).
5. To determine the frequency of AC mains supply.
6. V-I Characteristics of P-N junction diode.
7. To determine the  $\lambda$  of diode loses by single slit diffraction.
8. To determine the plank's constant with the help of photocell.
9. Hall's effect experiment.
10. Calibration of ammeter by using reference zener diode.

11. To study the effect of temperature on reverse saturation current in P-N junction diode and to determine the energy band gap.
12. To determine the  $\lambda$  of sodium by using plane diffraction grating.
13. To determine the prominent lines of mercury source by plane diffraction grating.
14. To determine the numerical aperture of an optical fiber.
15. To determine  $\lambda$  of given laser by plane diffraction grating.

### **Suggested Reference Books**

1. A. Ghatak, Optics.
2. O. Svelto, Principles of Lasers.
3. David Griffiths, Introduction to Electrodynamics.
4. D.J. Griffiths, Quantum Mechanics.
5. Halliday & Resnick, Physics.

**RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL**  
**New Scheme Based On AICTE Flexible Curricula**  
**B. Tech. First Year (II Semester)**

**Branch- Common to All Disciplines**

|              |                       |                 |                  |
|--------------|-----------------------|-----------------|------------------|
| <b>BT202</b> | <b>MATHEMATICS-II</b> | <b>3L-1T-0P</b> | <b>4 Credits</b> |
|--------------|-----------------------|-----------------|------------------|

**OBJECTIVES:** The objective of this course is to familiarize the prospective engineers with techniques in Ordinary and partial differential equations, complex variables and vector calculus. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines. More precisely, the objectives are:

- To introduce effective mathematical tools for the solutions of ordinary and partial differential equations that model physical processes.
- To introduce the tools of differentiation and integration of functions of complex variable that are used in various techniques dealing engineering problems.
- To acquaint the student with mathematical tools available in vector calculus needed various field of science and engineering.

**Course Contents:**

**Module 1: Ordinary Differential Equations I :(6 hours) :** Differential Equations of First Order and First Degree (Leibnitz linear, Bernoulli's, Exact), Differential Equations of First Order and Higher Degree, Higher order differential equations with constants coefficients, Homogeneous Linear Differential equations, Simultaneous Differential Equations.

**Module 2: Ordinary differential Equations II:(8 hours) :** Second order linear differential equations with variable coefficients, Method of variation of parameters, Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

**Module 3: Partial Differential Equations : (8 hours) :** Formulation of Partial Differential equations, Linear and Non-Linear Partial Differential Equations, Homogeneous Linear Partial Differential Equations with Constants Coefficients.

**Module 4: Functions of Complex Variable :(8 hours) :** Functions of Complex Variables: Analytic Functions, Harmonic Conjugate, Cauchy-Riemann Equations (without proof), Line Integral, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Singular Points, Poles & Residues, Residue Theorem, Application of Residues theorem for Evaluation of Real Integral (Unit Circle).

**Module 5: Vector Calculus : (10 hours) :** Differentiation of Vectors, Scalar and vector point function, Gradient, Geometrical meaning of gradient, Directional Derivative, Divergence and Curl, Line Integral, Surface Integral and Volume Integral, Gauss Divergence, Stokes and Green theorems.

**Textbooks/References:**

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.
4. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
5. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
6. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
7. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., McGraw Hill, 2004.
8. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
9. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

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**New Scheme Based On AICTE Flexible Curricula**  
**B. Tech. First Year**

**Branch- Common to All Disciplines**

|              |                                     |                 |                  |
|--------------|-------------------------------------|-----------------|------------------|
| <b>BT203</b> | <b>Basic Mechanical Engineering</b> | <b>3L-0T-2P</b> | <b>4 Credits</b> |
|--------------|-------------------------------------|-----------------|------------------|

**Course Contents:**

**Unit I :**

**Materials :** Classification of engineering material, Composition of Cast iron and Carbon steels, Iron Carbon diagram. Alloy steels their applications. Mechanical properties like strength, hardness, toughness , ductility, brittleness , malleability etc. of materials , Tensile test- Stress-strain diagram of ductile and brittle materials , Hooks law and modulus of elasticity, Hardness and Impact testing of materials, BHN etc.

**Unit II:**

**Measurement:** Concept of measurements, errors in measurement, Temperature, Pressure, Velocity, Flow strain, Force and torque measurement, Vernier caliper, Micrometer, Dial gauge, Slip gauge, Sine-bar and Combination set.

**Production Engineering:** Elementary theoretical aspects of production processes like casting, carpentry, welding etc Introduction to Lathe and Drilling machines and their various operations.

**Unit III :**

**Fluids :** Fluid properties pressure, density and viscosity etc. Types of fluids , Newton's law of viscosity , Pascal's law , Bernoulli's equation for incompressible fluids, Only working principle of Hydraulic machines, pumps, turbines, Reciprocating pumps .

**Unit IV:**

**Thermodynamics :** Thermodynamic system, properties, state, process, Zeroth, First and second law of thermodynamics, thermodynamic processes at constant pressure, volume, enthalpy & entropy.

**Steam Engineering :** Classification and working of boilers, mountings and accessories of boilers, Efficiency and performance analysis, natural and artificial draught, steam properties, use of steam tables.

**Unit V:**

**Reciprocating Machines :**

Working principle of steam Engine, Carnot, Otto, Diesel and Dual cycles P-V & T-S diagrams and its efficiency, working of Two stroke & Four stroke Petrol & Diesel engines. Working principle of compressor.

**Reference Books:**

- 1- Kothandaraman & Rudramoorthy, Fluid Mechanics & Machinery, New Age .
- 2- Nakra & Chaudhary , Instrumentation and Measurements, TMH.
- 3- Nag P.K, Engineering Thermodynamics , TMH .
- 4- Ganesan , Internal Combustion Engines, TMH .
- 5- Agrawal C M, Basic Mechanical Engineering , Wiley Publication.
- 6- Achuthan M , , Engineering Thermodynamics ,PHI.

**List of Suggestive Core Experiments:**

Theory related Eight to Ten experiments including core experiments as follows:

- 1- Study of Universal Testing machines.
- 2- Linear and Angular measurement using, Micrometer, Slip Gauges, Dial Gauge and Sine-bar.
- 3- Study of Lathe Machine.
- 4- Study of Drilling Machines.
- 5- Verification of Bernoulli's Theorem.
- 6- Study of various types of Boilers.
- 7- Study of different IC Engines.
- 8- Study of different types of Boilers Mountings and accessories.

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**B. Tech. First Year**

**Branch- Common to All Disciplines**

|              |  |                 |                  |
|--------------|--|-----------------|------------------|
| <b>BT204</b> | <b>Basic Civil Engineering<br/>&amp; Mechanics</b> | <b>3L-0T-2P</b> | <b>4 Credits</b> |
|--------------|--|-----------------|------------------|

**Course Contents:**

**Unit I Building Materials & Construction**

Stones, bricks, cement, lime, timber-types, properties, test & uses, laboratory tests concrete and mortar Materials: Workability, Strength properties of Concrete, Nominal proportion of Concrete preparation of concrete, compaction, curing.

Elements of Building Construction, Foundations conventional spread footings, RCC footings, brick masonry walls, plastering and pointing, floors, roofs, Doors, windows, lintels, staircases – types and their suitability

**Unit II Surveying & Positioning:**

Introduction to surveying Instruments – levels, theodolites, plane tables and related devices.

Electronic surveying instruments etc. Measurement of distances – conventional and EDM methods, measurement of directions by different methods, measurement of elevations by different methods. Reciprocal leveling.

**Unit III Mapping & sensing:**

Mapping details and contouring, Profile Cross sectioning and measurement of areas, volumes, application of measurements in quantity computations, Survey stations, Introduction of remote sensing and its applications.

**Engineering Mechanics**

**Unit IV**

Forces and Equilibrium: Graphical and Analytical Treatment of Concurrent and non-concurrent Co- planner forces, free Diagram, Force Diagram and Bow's notations, Application of Equilibrium Concepts: Analysis of plane Trusses: Method of joints, Method of Sections. Frictional force in equilibrium problems

**Unit – V**

Centre of Gravity and moment of Inertia: Centroid and Centre of Gravity, Moment Inertia of Area and Mass, Radius of Gyration, Introduction to product of Inertia and Principle Axes.

Support Reactions, Shear force and bending moment Diagram for Cantilever & simply supported beam with concentrated, distributed load and Couple.

**Reference Books:**

1. S. Ramamrutam & R.Narayanan; Basic Civil Engineering, Dhanpat Rai Pub.
2. Prasad I.B., Applied Mechanics, Khanna Publication.
3. Punmia, B.C., Surveying, Standard book depot.
4. Shesha Prakash and Mogaveer; Elements of Civil Engg & Engg. Mechanics; PHI
5. S.P, Timoshenko, Mechanics of structure, East West press Pvt.Ltd.
6. Surveying by Duggal – Tata McGraw Hill New Delhi.
7. Building Construction by S.C. Rangwala- Charotar publications House, Anand.
8. Building Construction by Grucharan Singh- Standard Book House, New Delhi
9. Global Positioning System Principles and application- Gopi, TMH
10. R.C. Hibbler – Engineering Mechanics: Statics & Dynamics.
11. A. Boresi & Schmidt- Engineering Mechines- statics dynamics, Thomson' Books
12. R.K. Rajput, Engineering Mechanics S.Chand & Co.

### **List of suggestive core Experiments:**

Students are expected to perform minimum ten experiments from the list suggested below by preferably selecting experiments from each unit of syllabus.

1. To perform traverse surveying with prismatic compass, check for local attraction and determine corrected bearings and to balance the traverse by Bowditch's rule.
2. To perform leveling exercise by height of instrument of Rise and fall method.
3. To measure horizontal and vertical angles in the field by using Theodolite.
4. To determine (a) normal consistency (b) Initial and Final Setting time of a cement Sample.
5. To determine the workability of fresh concrete of given proportions by slump test or compaction factor test.
6. To determine the Compressive Strength of brick.
7. To determine particle size distribution and fineness modulus of course and fine Aggregate.
8. To verify the law of Triangle of forces and Lami's theorem.
9. To verify the law of parallelogram of forces.
10. To verify law of polygon of forces
11. To find the support reactions of a given truss and verify analytically.
12. To determine support reaction and shear force at a given section of a simply Supported beam and verify in analytically using parallel beam apparatus.
13. To determine the moment of inertia of fly wheel by falling weight method.
14. To verify bending moment at a given section of a simply supported beam.

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**B. Tech. First Year**

**Branch- Common to All Disciplines**

|              |                                   |                 |                  |
|--------------|-----------------------------------|-----------------|------------------|
| <b>BT205</b> | <b>Basic Computer Engineering</b> | <b>3L-0T-2P</b> | <b>4 Credits</b> |
|--------------|-----------------------------------|-----------------|------------------|

**Course Contents:**

**UNIT I**

**Computer:** Definition, Classification, Organization i.e. CPU, register, Bus architecture, Instruction set, Memory & Storage Systems, I/O Devices, and System & Application Software. Computer Application in e-Business, Bio-Informatics, health Care, Remote Sensing & GIS, Meteorology and Climatology, Computer Gaming, Multimedia and Animation etc.

**Operating System:** Definition, Function, Types, Management of File, Process & Memory. Introduction to MS word, MS powerpoint, MS Excel

**UNIT II**

Introduction to Algorithms, Complexities and Flowchart, Introduction to Programming, Categories of Programming Languages, Program Design, Programming Paradigms, Characteristics or Concepts of OOP, Procedure Oriented Programming VS object oriented Programming. Introduction to C++: Character Set, Tokens, Precedence and Associativity, Program Structure, Data Types, Variables, Operators, Expressions, Statements and control structures, I/O operations, Array, Functions,

**UNIT III**

Object & Classes, Scope Resolution Operator, Constructors & Destructors, Friend Functions, Inheritance, Polymorphism, Overloading Functions & Operators, Types of Inheritance, Virtual functions. Introduction to Data Structures.

**UNIT IV**

**Computer Networking:** Introduction, Goals, ISO-OSI Model, Functions of Different Layers. Internetworking Concepts, Devices, TCP/IP Model. Introduction to Internet, World Wide Web, E-commerce

**Computer Security Basics:** Introduction to viruses, worms, malware, Trojans, Spyware and Anti-Spyware Software, Different types of attacks like Money Laundering, Information Theft, Cyber Pornography, Email spoofing, Denial of Service (DoS), Cyber Stalking, Logic bombs, Hacking Spamming, Cyber Defamation, pharming Security measures Firewall, Computer Ethics & Good Practices, Introduction of Cyber Laws about Internet Fraud, Good Computer Security Habits,

**UNIT V**

**Data base Management System:** Introduction, File oriented approach and Database approach, Data Models, Architecture of Database System, Data independence, Data dictionary, DBA, Primary Key, Data definition language and Manipulation Languages.

**Cloud computing:** definition, cloud infrastructure, cloud segments or service delivery models (IaaS, PaaS and SaaS), cloud deployment models/ types of cloud (public, private, community and hybrid clouds), Pros and Cons of cloud computing

**List of Experiment**

01. Study and practice of Internal & External DOS commands.
02. Study and practice of Basic linux Commands – ls, cp, mv, rm, chmod, kill, ps etc.
03. Study and Practice of MS windows – Folder related operations, My-Computer, window explorer, Control Panel,
04. Creation and editing of Text files using MS- word.
05. Creation and operating of spreadsheet using MS-Excel.
06. Creation and editing power-point slides using MS- power point
07. Creation and manipulation of database table using SQL in MS-Access.
- 08.WAP to illustrate Arithmetic expressions
09. WAP to illustrate Arrays.
10. WAP to illustrate functions.
11. WAP to illustrate constructor & Destructor
12. WAP to illustrate Object and classes.

13. WAP to illustrate Operator overloading
14. WAP to illustrate Function overloading
15. WAP to illustrate Derived classes & Inheritance
16. WAP to insert and delete and element from the Stack
17. WAP to insert and delete and element from the Queue
18. WAP to insert and delete and element from the Linked List

**Recommended Text Books:**

1. Fundamentals of Computers : E Balagurusamy, TMH
2. Basic Computer Engineering: Silakari and Shukla, Wiley India
3. Fundamentals of Computers : V Rajaraman, PHI
4. Information Technology Principles and Application: Ajoy Kumar Ray & Tinku Acharya PHI.

**Recommended Reference Books:**

1. Introduction of Computers : Peter Norton, TMH
2. Object Oriented Programming with C++ :E.Balagurusamy, TMH
3. Object Oriented Programming in C++: Rajesh K.Shukla, Wiley India
4. Concepts in Computing: Kenneth Hoganson, Jones & Bartlett.
5. Operating Systems – Silberschatz and Galvin - Wiley India
6. Computer Networks:Andrew Tananbaum, PHI
7. Data Base Management Systems, Korth, TMH
8. Cloud Computing, Kumar, Wiley India

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**New Scheme Based On AICTE Flexible Curricula**  
**B. Tech. First Year**

**Branch- Common to All Disciplines**

|              |                                  |                 |                  |
|--------------|----------------------------------|-----------------|------------------|
| <b>BT206</b> | <b>Language Lab and Seminars</b> | <b>0L-0T-2P</b> | <b>1 Credits</b> |
|--------------|----------------------------------|-----------------|------------------|

**Course objective:** This course intends to impart practical training in the use of English Language for Communicative purposes and aims to develop students' personality through language Laboratory.

Topics to be covered in the Language laboratory sessions:

1. Introducing oneself, family, social roles.
2. Public Speaking and oral skills with emphasis on conversational practice, extempore speech, JAM(Just a minute sessions), describing objects and situations, giving directions, debate, telephonic etiquette.
3. Reading Comprehension: Intensive reading skills, rapid reading, and reading aloud (Reading material to be selected by the teacher).
4. To write a book review. Standard text must be selected by the teacher.
5. Role plays: preparation and delivery topic to be selected by teacher/faculty.





## 2.1 Physical Activity

This course involves a study routine of physical activity with groups and spaces. It would seem self-evident to students looking to the field of team for high-impact events, or more. They would not be worse in the evening or at other times, a time according to the local climate. This would help decrease team work. Each student should pick one team and learn for three weeks. There could also be performing or other activity designed activity, such as dance, yoga, or other activities.

## 2.2 Creative Arts

Every student would choose one class related to the arts, whether visual arts or performing arts. Elements can include sculpture, painting, music, dance, etc. The student would choose to study by the instructor of the program.

This would allow for creative expression. It would develop a sense of individuality and also enhance team work, which would help make their time studying their class.

## 2.3 Universal Human Values

It gets the student to explore a self and know one's competence. The joy of learning, stand up to your personal and definition, with someone to learn about relationships with colleagues and supporting staff in the home and department. The objective is to see, or find, a commonality, building for team, maintaining order. A model is Universal Human Values (UHV) (Korten, 1980):

The history of reading this section is extremely important. It is not only through color and design that get students to explore and think by engaging their knowledge. It is what might be a good learning experience, and it is not only for the student. The role of good education, however, with a study of thought & the teacher can be seen as a student. It is a good learning experience, and it is not only for the student.

The student must come from all the departments, unless they are separated by the UHV system to study of the Institute. Experiments in the direction of UHV (UHV) are underway and are being done.

Experiments would be conducted by small groups of students with a faculty member. It is a good learning experience, and it is not only for the student. The role of good education, however, with a study of thought & the teacher can be seen as a student. It is a good learning experience, and it is not only for the student.

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<sup>2</sup>The Universal Human Values Commission is a long series of departments of education, including studies in UHV (Korten, 1980). Korten, 1980, UHV and UHV as a learning experience, MIT Education. UHV is a good learning experience, and it is not only for the student. The role of good education, however, with a study of thought & the teacher can be seen as a student. It is a good learning experience, and it is not only for the student.

## 2.4. Literary

Literary activity would encompass reading, writing and possibly watching, creating a portfolio.

## 2.5. Proficiency Modules

This period can be used to emphasize some critical business that students might have forgotten, English composition skills, etc. These should be the main courses, a transition period before starting the induction program, the student has written the 100 hours as subject to it. We hope this problem of doing the lack of English skills, where students start going toward falling in several subjects, because that of course, could be a challenge to do in the past.

## 2.6. Lectures by Eminent People

This period can be utilized, we can also be student projects, say, once a week. It would give the students exposure to projects and activities which are important.

## 2.7. Visits to Local Areas

A couple of visits to the surrounding community as a support to development, could be required. This would be in conjunction with the other activities assigned them to the other privileged.

## 2.8. Familiarization to Dept./Branch & Innovations

The students should be told about different devices, already designed to machines that generate a ITs. They should be told about what is going on in a branch or department about what role it plays in society, through its technology. They should also be shown the future, the world, and other facilities.

## 3. Schedule

The schedule during the Induction Program should have an Initial Phase, a Middle Phase and a Closing Phase. The Initial and Middle Phases would be two days each.

### 3.1 Initial Phase

| Time  | Activity  |
|---|---|
| <b>Week 0</b><br>7:00 am - 7:00 pm  | Student arrival - Room assignment - Orientation for participants  |
| <b>Day 1</b><br>08:00 am - 02:00 pm<br>04:30 pm - 06:00 pm                        | Orientation presentation<br>Orientation   |
| <b>Day 2</b><br>08:00 am - 11:00 am<br>11:15 am - 12:30 pm<br>02:30 pm - 04:30 pm | Registration for English test<br>Visit to registration office<br>Lunch  |
| 04:30 pm - 04:55 pm   | Library orientation   |
| 04:55 pm - 05:00 pm<br>05:00 pm - 05:00 pm  | Interacted with course<br>Vertical meeting groups - Presentation within group<br>(Room no. Unknown, Location Unknown) |

### 3.2 Regular Phase

Students discuss the start of the Regular Phase in detail. What this phase then would be, and an attempt to be followed every day.

#### 3.2.1 Daily Schedule

Some of the activities are set a daily time, while others are set a specified period within the 16-hour program. Below is a typical daily schedule.

| Block | Time                                       | Activity  | Remarks                           |
|-------|--|---|-----------------------------------|
|       | <b>Day 3 onwards</b>                       |   |                                   |
|       | 07:00 am                                   | Break room  |                                   |
| I     | 08:00 am - 09:00 am<br>09:15 am - 09:45 am | Physical activity (with instructor)<br>Self-reflection            |                                   |
| II    | 09:00 am - 10:15 am                        | Orations: <i>Values of Education</i> / <i>Human Values</i>        | Half day groups of 10-12 students |
| III   | 11:00 am - 12:00 pm                        | Classical Exams: <i>Values of Education</i> / <i>Human Values</i> | Complementary activities          |
|       | 02:00 pm - 02:30 pm                        | Lunch   |                                   |
| IV    | 02:30 pm - 03:15 pm                        | Mini-essay Session  | Self-reflection                   |
| V     | 03:00 pm - 05:30 pm                        | Self-reflection Session   | Self-reflection                   |
|       | 05:00 pm - 05:30 pm                        | Break / Relaxation  |                                   |
| VI    | 05:30 pm - 06:45 pm<br>06:55 pm - 07:55 pm | Games / Social Exchanges<br>Relaxation (Music)                    |                                   |
| VII   | 08:00 pm - 10:05 pm                        | Interacted presentations (if needed)                              |                                   |

Students are all encouraged to follow the daily schedule as above to the extent possible.

### 3.2.5 Afternoon Activities (Non-Daily)

The following list of activities are scheduled at different times of the Instructional Program, and are not held daily for everyone:

1. Faculty activities (Dept./Program & Campus Dept)
2. Study-related Area
3. Activities by Faculty, English
4. Internals
5. Professional Modules

It is the opportunity availability of these activities, which may be changed by institutional needs:

| Activity   | Medium      | Remarks                                    |
|--|-------------|--|
| Faculty activities (Dept./Program & Institutional) | TV          | For 30 days (Day 300-310)                  |
| Study-related Area                                 | TV, V and V | For 3 days - interspersed (eg. 2 hrs/week) |
| Activities by Faculty (English)                    | TV          | As scheduled (eg. 4 hrs/week)              |
| Internals (Day 2 Week 1)                           | TV          | For 30 days                                |
| Professional Modules                               | V           | Daily, but only for those who need it.     |

### 3.3 Closing Phase

| Time                       | Activity   |
|----------------------------|--|
| <b>Last But One Day</b>    |  |
| 0800 am - 12 noon          | Discussions and clarification of issues related within each group  |
| 0200 pm - 05:00 pm         | Presenting individual groups' findings/ solutions to discuss their own (direct or indirect) contribution |
| <b>Last Day (Last Day)</b> |  |
| 0800 am - 09:00 am         | Announcement of award, sign in, lay down of last 3 days' in-class notes                                  |

### 3.4 Follow Up after Closure

A written course report will be the follow-up program after the formal closure. Students' assignments need. The agencies which are formal work facilities are to communicate with students should be free to approach his faculty member or the student with whom they are close of problem, what to make use of financial or psychological

the 250 years of the college and the year-class of 2000 would have an unusual, but not special, year, and for every 20 students there would be a faculty member (such a group should occur) in the entire 20-year duration of the life of the college. Therefore, it would be good to have groups with the students as well as teachers from the same fundamental discipline.

There are some important suggestions which have occurred and which have been experimental with.

#### 4.1.1 Follow Up after Closure – Same Semester

It is suggested that the groups meet with their faculty mentors (one or more) within the semester after the 2 week induction Program is over. This would be a 1 hour-1 day meeting about the final talk. The annual curriculum committee should meet together on this day every year for the student groups to be invited by their faculty mentors who are for their own educational work.

#### 4.1.2 Follow Up – Subsequent Semesters

It is extremely important that continuity be maintained in subsequent semesters.

It is suggested that by the end of the induction program each group should have been able to see each of three to four of activities referred to follow up by their faculty mentors. The students have been meeting three or four times and work has been discussed by committee. Subsequently, the groups should meet at least once a month.

## 4 Summary

Engineering institutions were set up to generate well trained individuals in engineering with a feeling of responsibility towards growth, their family, and society. The engineering institutions should be driven by their own fundamental principles in giving a good level of understanding their weaknesses and talents. As a result, they should be able to pick up with the public and meet its needs.

The graduating student must have values of a human being, and must have good moral skills that will be his/her asset in an ever changing world. Most of students might be concerned to study engineering or their branch, and not necessarily following.

The Institute of Engineers of England has set the example for the engineering institutions. It is stated that they have to working their students in a wide and as well as in a narrow, and provide an excellent education in all their professional training with the relevant relations between teachers and students, with a better use of time and learning of education.

The Institute of Physics has a long history, and it has been a model of a good education and excellent feeling of equality, respect, and awareness of the attention to society and

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<sup>4</sup>It is suggested that the curriculum committee should be formed by a group of teachers in a group of 10 or 15 members and should be organized by the group leader who will be the main focus of discussion. Therefore, the groups should be same size, but have of wings have the same students from the same topics. The students of the same subjects should be in a laboratory or in a laboratory class.

