



CURRICULUM SCHEME OF FIRST YEAR ENGINEERING

With effect from Session 2022-23

Semester-I (Group-I: CS and ET)

Scheme of Teaching & Examination of Bachelor of Technology

| Sr. No. | Course Code | Course Title | Hours per week | | | Credits | Maximum Marks | | | ESE |
|---------|-------------|-------------------------------------|----------------|----------|-----------|-----------|-----------------------|--------------|------------|----------------|
| | | | L | T | P | | Continuous Evaluation | End Sem Exam | Total | Duration (Hrs) |
| | | | | | | | | | | |
| 1 | BSC101T | Engineering Mathematics-I | 3 | 1 | 0 | 4 | 40 | 60 | 100 | 3 |
| 2 | BSC105T | Modern Physics | 3 | 1 | 0 | 4 | 40 | 60 | 100 | 3 |
| 3 | BSC105P | Modern Physics Lab | 0 | 0 | 2 | 1 | 25 | 25 | 50 | - |
| 4 | ESC101T | Electrical Engineering | 3 | 1 | 0 | 4 | 40 | 60 | 100 | 3 |
| 5 | ESC101P | Electrical Engineering Lab | 0 | 0 | 2 | 1 | 25 | 25 | 50 | - |
| 6 | ESC102P | Workshop Practices | 0 | 0 | 4 | 2 | 25 | 25 | 50 | - |
| 7 | ESC105T | Programming for Problem Solving | 3 | 0 | 0 | 3 | 40 | 60 | 100 | 3 |
| 8 | ESC105P | Programming for Problem Solving Lab | 0 | 0 | 4 | 2 | 25 | 25 | 50 | - |
| 9 | MC101 | Environment Studies | 2 | 0 | 0 | 0 | 50 | - | 50 | - |
| 10 | MC102 | Indian Constitution | 2 | 0 | 0 | 0 | 50 | - | 50 | - |
| | | TOTAL | 16 | 3 | 12 | 21 | 360 | 340 | 700 | |

Semester-I (Group-II: EE, ME, AD and AM)

Scheme of Teaching & Examination of Bachelor of Technology

| Sr. No. | Course Code | Course Title | Hours per week | | | Credits | Maximum Marks | | | ESE |
|---------|-------------|-------------------------------------|----------------|----------|-----------|-----------|-----------------------|--------------|------------|----------------|
| | | | L | T | P | | Continuous Evaluation | End Sem Exam | Total | Duration (Hrs) |
| | | | | | | | | | | |
| 1 | BSC101T | Engineering Mathematics-I | 3 | 1 | 0 | 4 | 40 | 60 | 100 | 3 |
| 2 | BSC103T | Engineering Chemistry | 3 | 1 | 0 | 4 | 40 | 60 | 100 | 3 |
| 3 | BSC103P | Engineering Chemistry Lab | 0 | 0 | 2 | 1 | 25 | 25 | 50 | - |
| 4 | ESC104T | Engineering Graphics and Design | 1 | 0 | 0 | 1 | 40 | 60 | 100 | 4 |
| 5 | ESC104P | Engineering Graphics and Design Lab | 0 | 0 | 4 | 2 | 25 | 25 | 50 | - |
| 6 | ESC105T | Programming for Problem Solving | 3 | 0 | 0 | 3 | 40 | 60 | 100 | 3 |
| 7 | ESC105P | Programming for Problem Solving Lab | 0 | 0 | 4 | 2 | 25 | 25 | 50 | - |
| 8 | HSMC101T | Communicative English | 2 | 0 | 0 | 2 | 20 | 30 | 50 | 2 |
| 9 | HSMC101P | Communicative English Lab | 0 | 0 | 2 | 1 | 25 | 25 | 50 | - |
| | | TOTAL | 12 | 2 | 12 | 20 | 280 | 370 | 650 | |

Handwritten signatures and names of faculty members:

- Dr. S.M. Kondekar
- Dr. D.B. Rana
- Dr. R.K. Kellor
- Dr. P. Paou
- Dr. V. ASudhan
- Dr. S. Anwar



Semester-II (Group-I: CS and ET)

| Scheme of Teaching & Examination of Bachelor of Technology | | | | | | | | | | |
|--|-------------|-------------------------------------|----------------|----------|-----------|-----------|-----------------------|--------------|------------|----------------|
| Sr. No. | Course Code | Course Title | Hours per week | | | Credits | Maximum Marks | | | ESE |
| | | | L | T | P | | Continuous Evaluation | End Sem Exam | Total | Duration (Hrs) |
| 1 | BSC104T | Engineering Mathematics-II | 3 | 1 | 0 | 4 | 40 | 60 | 100 | 3 |
| 2 | BSC103T | Engineering Chemistry | 3 | 1 | 0 | 4 | 40 | 60 | 100 | 3 |
| 3 | BSC103P | Engineering Chemistry Lab | 0 | 0 | 2 | 1 | 25 | 25 | 50 | - |
| 4 | ESC104T | Engineering Graphics and Design | 1 | 0 | 0 | 1 | 40 | 60 | 100 | 4 |
| 5 | ESC104P | Engineering Graphics and Design Lab | 0 | 0 | 4 | 2 | 25 | 25 | 50 | - |
| 6 | ESC106P | Computer Workshop Lab | 0 | 0 | 4 | 2 | 25 | 25 | 50 | - |
| 7 | ESC107P | Web Development Lab | 0 | 0 | 4 | 2 | 25 | 25 | 50 | - |
| 8 | HSMC101T | Communicative English | 2 | 0 | 0 | 2 | 20 | 30 | 50 | 2 |
| 9 | HSMC101P | Communicative English Lab | 0 | 0 | 2 | 1 | 25 | 25 | 50 | - |
| | | TOTAL | 9 | 2 | 16 | 19 | 265 | 335 | 600 | |

Semester-II (Group-II: EE, ME, AD and AM)

| Scheme of Teaching & Examination of Bachelor of Technology | | | | | | | | | | |
|--|-------------|----------------------------|----------------|----------|-----------|-----------|-----------------------|--------------|------------|----------------|
| Sr. No. | Course Code | Course Title | Hours per week | | | Credits | Maximum Marks | | | ESE |
| | | | L | T | P | | Continuous Evaluation | End Sem Exam | Total | Duration (Hrs) |
| 1 | BSC104T | Engineering Mathematics-II | 3 | 1 | 0 | 4 | 40 | 60 | 100 | 3 |
| 2 | BSC105T | Modern Physics | 3 | 1 | 0 | 4 | 40 | 60 | 100 | 3 |
| 3 | BSC105P | Modern Physics Lab | 0 | 0 | 2 | 1 | 25 | 25 | 50 | - |
| 4 | ESC101T | Electrical Engineering | 3 | 1 | 0 | 4 | 40 | 60 | 100 | 3 |
| 5 | ESC101P | Electrical Engineering Lab | 0 | 0 | 2 | 1 | 25 | 25 | 50 | - |
| 6 | ESC102P | Workshop Practices | 0 | 0 | 4 | 2 | 25 | 25 | 50 | - |
| 7 | ESC106P | Computer Workshop Lab | 0 | 0 | 4 | 2 | 25 | 25 | 50 | - |
| 8 | ESC107P | Web Development Lab | 0 | 0 | 4 | 2 | 25 | 25 | 50 | - |
| 9 | MC101 | Environment Studies | 2 | 0 | 0 | 0 | 50 | - | 50 | - |
| 10 | MC102 | Indian Constitution | 2 | 0 | 0 | 0 | 50 | - | 50 | - |
| | | TOTAL | 13 | 3 | 16 | 20 | 345 | 305 | 650 | |

Dr. S.M. Kondeo
 Dr. D.S. Ram
 Dr. R.K. Kellow
 Dr. H.S. Singh
 Dr. P. Parashar
 Dr. A.S. Suddhan
 Dr. Anwar
 Dr. Anwar



S. B. JAIN INSTITUTE OF TECHNOLOGY, MANAGEMENT AND RESEARCH, NAGPUR

(An Autonomous Institute, Affiliated to RTMNU, Nagpur)

FIRST YEAR ENGINEERING DEPARTMENT

"Emerge as a leading Institute for developing competent and creative Professionals"



| Course Code | Course Title | Hours / Week | | | Credits | Maximum Marks | | | ESE |
|-------------|-----------------------|--------------|---|---|---------|-----------------------|---------------|-------|-----------------|
| | | L | T | P | | Continuous Evaluation | End Sem. Exam | Total | Duration (Hrs.) |
| HSMC101T | Communicative English | 2 | 0 | 0 | 2 | 20 | 30 | 50 | 2 |

Course Objective

The course empowers the learners to enhance the communication skills and hence employability.

Course Outcomes

After successful completion of this course the student will be able to:

| | |
|-----|--|
| CO1 | Apply: Use word power in their professional career. |
| CO2 | Understand: Understand grammatical structure in oral and written communication. |
| CO3 | Create: Develop competency for drafting skills. |
| CO4 | Create: Develop competency for professional correspondence. |

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Dr. S. Anwar

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SYLLABUS

UNIT-I: Vocabulary Building:

Word Formation & Building, Common spoken language errors, Degrees of comparison, Words from foreign language, prefixes and suffixes, Antonyms, Synonyms.

UNIT-II: Functional Grammar:

Articles, Conjunction, Preposition, Subject Verb Agreement, Tenses, Transformation of Sentences: Positive, Negative, Exclamatory, Interrogative, Phrasal verb, Homonyms, Idioms/Phrases, Punctuations, Voice: Active and Passive Voice.

UNIT-III: Technical writing:

Précis writing, paragraph writing, types of paragraph.

UNIT-IV: Comprehension & Business Letter writing:

Comprehension, Unseen passages, Words commonly mispronounced, Speed Reading /Scanning, Introductory letter of a commodity, Words commonly misspelled.

Text Books Recommended

1. English Grammar & Composition- Wren & Martin, Revised by Dr. N. D. V. Prasadarao Edition Regular, Blackie ELT Books.
2. Corporate Softskills - Sarvesh Gulati, 5th edition, 2012, Rupa & Co. Publication.

Reference Books Recommended

1. Cambridge Grammar of English - A comprehensive guide spoken and written English Grammar and Usage - Ronald Carter & Michael McCarthy, 1st Edition June 2008, Cambridge University press.
2. Technical Writing, Presentation Skills, & Online Communication - Professional Tools and Insights - Raymond Greenlaw, 1st Edition March 2012, IGI Global.
3. Technical Communication - Principles & Practices - Meenakshi Raman, 3rd Edition.

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Dr. V. A. Sudam
Dr. S. Anwar
Dr. P. D. B. Raw
Dr. A. M. S. ...
Dr. ...
Dr. ...
Dr. ...



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| Course Code | Course Title | Hours / Week | | | Credits | Maximum Marks | | | ESE |
|-------------|---------------------------|--------------|---|---|---------|-----------------------|---------------|-------|-----------------|
| | | L | T | P | | Continuous Evaluation | End Sem. Exam | Total | Duration (Hrs.) |
| HSMC101P | Communicative English Lab | 0 | 0 | 2 | 1 | 25 | 25 | 50 | - |

Course Objective

The course empowers the learners to develop the competency in spoken English communication & Presentation for professional development.

Course Outcomes

After successful completion of this course the student will be able to:

| | |
|-----|---|
| CO1 | Create: Construct grammatically correct sentences in English. |
| CO2 | Create: Compose sentences to communicate effectively in personal and professional situation. |
| CO3 | Create: Develop public speaking skills to effectively tackle interview process. |
| CO4 | Apply: Demonstrate non verbal communication effectively. |
| CO5 | Create: Develop Reading and Listening skills catering to the need of an engineer. |

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Handwritten signature: Dr. V. A. Sudani

Handwritten signature: Dr. S. Anwar

| Sr. No. | List of Modules |
|---------|---|
| 1 | Public speaking - Learn the art of influencing decisions and impacting the listeners. |
| 2 | Time management - Increase effectiveness, efficiency and productivity. |
| 3 | Presentation skills - Interact with the audience, transmit the message with clarity and interpret and understand the mindset of the listeners. |
| 4 | Conversational skills - Develop & connect with people and build strong relationship. |
| 5 | Situational conversational skills – Develop oral communication skill and gain confidence to speak in public. |
| 6 | Reading skills - Effectively handle reading skills and develop active listening skills. |
| 7 | Non verbal skills - Compliment the message with the body during delivery. |
| 8 | Listening skills - Develop the art of effective listening. |
| 9 | Open ended Experiment. |

- All the contents of above modules shall be covered during the course of the practical sessions.
- Activities on the above modules must be conducted wherever applicable.

Suggested References:

1. DLM, Digital Linguistic Mentor Software (Version 1.5.2).
2. Personality Development and Soft Skills - Barun Mitra, Edition 2012, Oxford University press.
3. The Quick and Easy Way to Effective Speaking - Dale Carnegie, Cedar, 1990, F.P. Publication.

The bottom of the page contains several handwritten signatures and initials in blue ink. On the left, there are initials 'ms' and 'PK'. In the center, there is a signature that appears to be 'Dr. S. Anwar' and another signature below it. On the right, there is a signature 'S. Anwar' and another signature below it. At the bottom right, there is a printed name 'Dr. V. ASudani' with a handwritten signature over it.



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| Course Code | Course Title | Hours / Week | | | Credits | Maximum Marks | | | ESE |
|-------------|--------------|--------------|---|---|---------|----------------------|---------------|-------|---------|
| | | L | T | P | | Continual Evaluation | End Sem. Exam | Total | |
| | | | | | | | | | BSC103T |

| Sr. No. | Course Objectives |
|---------|---|
| 1 | To provide the students with knowledge of chemical properties of matter for its concern with application in engineering. |
| 2 | To acquaint the students with relevant skill sets to identify usefulness of concepts in chemistry to cater industry and social needs. |

Course Outcomes

After successful completion of this course the student will be able to:

| | |
|-----|---|
| CO1 | Understand: Describe basic fundamental terms like filling of electron, periodic trends, oxidation states, electronegativity which are required for understanding nature of a matter used for an engineering application. |
| CO2 | Evaluate: Calculate and evaluate various important parameters like hardness, alkalinity, pH of water as required in specific industrial application and domestic use. |
| CO3 | Evaluate: Classify various alkanes, alkenes, alkynes, aromatic hydrocarbons compounds and Estimate the energy efficiencies of coal, furnace oil, natural gas with respect to its use as a fuel source in given industry. |
| CO4 | Apply: Choose and explain various properties of advanced materials to be used in the specific engineering and medical applications such as a coating material, electric conductor, drug carrier. |
| CO5 | Understand: Summarize the basic principles and laws of thermodynamics, chemical kinetics and electrochemistry for their applications in given chemical processes. |
| CO6 | Analyze: Outline reaction mechanisms, construction, working and applications of primary, secondary, reserve batteries, alkaline fuel cells. |

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SYLLABUS

UNIT-I: Structure of Atom and Periodicity:

Introduction to Bohr's Atomic model and fundamental particle electron, proton and Neutron, Introduction to the concept of atomic orbitals, diagrams of s, p and d orbitals, Pauli's exclusion principle, Hund's rule, Aufbau principle. Modern periodic table, group trends and periodic trends in physical properties: electron affinity, electronegativity, oxidation states, effective nuclear charges, trends in all of above.

UNIT-II: Water Technology:

Hardness of water and types of hardness, Domestic water treatment: Brief discussion of coagulation and sterilization using UV, Ozone, chlorine, break point chlorination, Lime-Soda process, Zeolite process, and de-mineralization process. Numerical based on lime-soda and Zeolite process. Boiler Troubles- (causes, effect on boiler operation and methods of prevention) – Scales and sludge, caustic embrittlement, boiler corrosion.

UNIT-III: Energy and its Calculations:

Basic Hydrocarbon Structures and their Properties: Alkane, Alkene, Alkyne, Aromatics, Cyclic compounds. IUPAC names of some important compounds. Energy Calculations: Solid Fuel: Introduction: Calorific value, higher and lower calorific value; determination of calorific value by Bomb and Boy's calorimeter; numerical based on calorific value determination; Solid fuels-significance of proximate and ultimate analysis; numerical (Dulong's formula) Liquid Fuel :Fractional distillation of crude petroleum(boiling point wise separation only) use of gasoline and diesel in internal combustion engine: knocking and chemical constitution of fuel, Octane and Cetane number, Combustion calculations – Numerical based on combustion calculations for solid, liquid and gaseous fuels.

UNIT-IV: Advanced Materials:

Properties and applications – Biodegradable polymers-Polylactic acid (PLA) and Polycaprolactone (PCL). Conducting polymers –Polycetylene, Polyaniline, Polypyrrole, (Brief Idea about advancement in improved Solar Conducting Materials) Composite materials-introduction, general classification –Particle reinforced, Fiber reinforced structural and its industrial applications. Liquid Crystal Polymers-general properties and application. Nanomaterial-Definition, nano scale. Carbon nano tubes (CNT) types and

difference between Single wall NT, Multi wall NT; applications of nanomaterial in medicine, environment and electronics

UNIT-V: Basic Physical Chemistry:

Basic Laws in Physical Chemistry: Avogadro's No. Thermodynamics first and second Law. Entropy enthalpy, Gibbs's Free Energy, Kinetics: Order of reaction, Molecularity, Rate of reaction, Reaction rate constant. Laws of electrochemistry, Faraday's Law, Dielectric Constant. (Brief idea about Smoke Precipitator). Expression of Chemical Concentrations: Mass %. Volume %, Mole concept, Mole Fraction, Molarity, Molality, PPM.

UNIT-VI: Advanced Electrochemistry and Battery Technology:

Types of batteries, primary and secondary batteries, important definitions-energy density, power density. Types of batteries a) Secondary Battery: Lithium ion, Nickel-Cadmium b) Fuel cell application, advantages and limitation (Example: Alkaline fuel Cell). (Brief idea about paper batteries)

TEXT BOOKS RECOMMENDED

1. Engineering Chemistry - S.S. Dara, 12th Edition, 2010, S. Chand Publications, New Delhi.
2. A Textbook of Engineering Chemistry - Jain Anil K., 1st Reprint, 2010, Dhanpat Rai Publications, New Delhi.
3. Textbook of Engineering Chemistry - S.N. Narkhede, R.T. Jadhav, A. B. Bhake, A.U. Zadgaonkar, 1st Edition, 2008, Das Dasganu Prakashan, Nagpur.
4. Applied Chemistry - Dr. A.V. Bharati and Walekar, 1st Edition, 2012, Tech-Max Publications, Pune.

REFERENCE BOOKS RECOMMENDED

1. Physical Chemistry - Barrow Gordon M, 1st Edition, 2007 The Mcgraw-Hill Companies, New York.
2. Inorganic Chemistry Principles of Structure and Reactivity - Huhheey James, 1st Edition, 1960, Pearson Publication, India.



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| Course Code | Course Title | Hours / Week | | | Credits | Maximum Marks | | | ESE |
|-------------|---------------------------|--------------|---|---|---------|----------------------|---------------|-------|-----------------|
| | | L | T | P | | Continual Evaluation | End Sem. Exam | Total | Duration (Hrs.) |
| BSC103P | Engineering Chemistry Lab | 0 | 0 | 2 | 1 | 25 | 25 | 50 | - |

| Sr. No. | Course Objectives |
|---------|---|
| 1 | To inculcate amongst students the understanding of various chemical reactions involved in qualitative as well as quantitative analysis of water pertaining to the various impurities which can be subsequently analyzed and recorded in a scientific way. |
| 2 | To impart the knowledge of the various methods about grading of coal. |
| 3 | To provide the students with the knowledge of preparation of advanced material and overview its engineering applications. |

| Course Outcomes | |
|---|--|
| After successful completion of this course the student will be able to: | |
| CO1 | Evaluate: Explain and estimate important parameters like hardness, alkalinity, dissolved oxygen, pH of given water sample. |
| CO2 | Evaluate: Analyze and estimate various metal ions like Ni ²⁺ and metals like Ca ²⁺ , Mg ²⁺ in given water. |
| CO3 | Apply: Demonstrate the preparation of urea formaldehyde and phenol formaldehyde polymers and Explain its specific engineering applications. |
| CO4 | Evaluate: Evaluate moisture content, volatile content and ash content of a given coal sample and outline its significances which are required for coal grading. |

| Sr. No. | LIST OF EXPERIMENTS |
|---|---|
| Pre-Lab | 1. Familiarization with applied chemistry lab. 2. Overview of instruments used in proximate analysis of coal (hot air oven, muffle furnace). 3. Outline the various types of titrations. 4. Brief idea regarding do's and don'ts to be followed during working in a chemistry lab. |
| 1 | Determination of temporary and permanent hardness of water by complexometric method. |
| 2 | Estimation the amount of Ni^{+2} ions in a given solution by complexometric method. |
| 3 | Estimation of free chlorine in the water by iodometry. |
| 4 | Determination of type and extent of alkalinity by Warder's method. |
| 5 | Estimation of dissolved oxygen in a water sample. |
| 6 | Determination of capacity of anion exchange resin. |
| 7 | Determination of moisture content of coal. |
| 8 | Determination of volatile matter content of coal. |
| 9 | Determination of ash content of coal. |
| 10 | Preparation of urea formaldehyde resin (Demonstration). |
| 11 | Preparation of phenol formaldehyde resin (Demonstration). |
| 12 | Determination of pH of waste sample (Demonstration). |
| Post laboratory session: <ol style="list-style-type: none"> Open ended experiments. Determine the total hardness of domestic water sample by complexometric method. Estimate the amount of free chlorine in a given water sample by iodometry method. | |

(A minimum of **EIGHT** experiments (excluding Pre-lab and Post lab sessions) to be performed based on the above list with minimum **ONE** experiment on **VIRTUAL LAB** wherever possible).

SUGGESTED REFERENCES

1. A Textbook on experiment and calculation in engineering chemistry - S.S. Dara, 1st Edition, 2008, S. Chand Publication, New Delhi.
2. Vogel's Textbook of Quantitative Chemical Analysis - C. K. Jerry, 5th Edition, 1989, Longman Publishers, New York.
3. Applied Chemistry theory and practical - O. P. Virmani and A. K. Narula, 2nd Edition, 2020, New Age International, New Delhi.
4. Laboratory Manual on Engineering Chemistry - Dr. Subdharani, 3rd Edition, 2012, Dhanpat Rai Publishing, New Delhi.



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FIRST YEAR ENGINEERING DEPARTMENT

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|-------------|----------------|--------------|---|---|---------|-----------------------|---------------|-------|-----------------|
| | | L | T | P | | Continuous Evaluation | End Sem. Exam | Total | Duration (Hrs.) |
| BSC105T | Modern Physics | 3 | 1 | 0 | 4 | 40 | 60 | 100 | 3 |

| Sr. No. | Course Objectives |
|---------|---|
| 1 | To introduce the fundamentals of quantum mechanics to form the foundation of quantum computing. |
| 2 | To introduce more advanced physics concepts, which form the basis of modern engineering. |

| Course Outcomes | |
|---|--|
| After successful completion of this course the student will be able to: | |
| CO1 | Analyze: Interpret the fundamentals of quantum mechanics and analyze one-dimensional motion of particle in potential box. |
| CO2 | Understand: Discuss the fundamentals of quantum computing. |
| CO3 | Understand: Explain the elementary need and current trends in nanoscience and nanotechnology. |
| CO4 | Analyze: Analyze the working of various semiconductor devices. |
| CO5 | Understand: Explain the principle, components, working and applications of Laser in engineering fields. |
| CO6 | Apply: Explain and Apply the concept of TIR in optical communication using fiber cables. |

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SYLLABUS

UNIT I: Quantum Mechanics:

Introduction of quantum mechanics, de-Broglie's hypothesis, Heisenberg uncertainty relations, Wave function and its probability interpretation, Schrodinger's equation, Energies and wave functions of a single electron in one-dimensional infinite potential well, Phenomenon of tunneling.

UNIT II: Quantum Computing:

History and development of computation, Introduction to quantum information and quantum computing, Bits and Qubits, development and current trends in quantum computing, Comparison: Quantum computing and classical computing, Future applications of quantum computing.

UNIT III: Nanoscience and Nanotechnology:

Introduction to nanoscience and nanotechnology, Nanomaterial's (Engineered nanomaterial's), Synthesis processes of nanomaterial's, Properties of nanomaterial's, Characterization of nanomaterial's (qualitative idea of X-ray diffractometer and electron microscopes), Nano and micro-electro-mechanical systems (NEMS and MEMS), Applications.

UNIT IV: Semiconductors Physics and Devices:

Review of semiconductor (Band theory, Conductivity in semiconductors, Intrinsic and extrinsic semiconductors, P-N junction and depletion region)

Devices: Characteristics and applications

P-N junction diode, Zener diode and Transistor

UNIT V: Laser Physics:

Einstein's coefficient, Quantum processes involved in Laser, Stimulated emission and photon amplification, Three level and Four level pumping scheme, Laser oscillation conditions, Ruby laser, He-Ne laser, Applications of Laser in industry.

UNIT VI: Optical Fibers:

Optical fibers: Propagation of light by total internal reflection, Structure and classification (Based on material, refractive index and number of modes), Modes of propagation in fiber, Acceptance angle, Numerical aperture, Attenuation and dispersion, Fiber optics communication system.

Text Books Recommended

1. A Text Book of Engineering Physics- M.N. Avadhanulu, P.G. Kshirsagar and TVS Arun Murthy, 11th Edition 2010, Chand Publication.
2. Engineering Physics- H. Malik and A.K. Singh, 2nd Edition 2017, McGraw Hill Education.
3. Engineering Physics- D.K. Bhattacharya and A. Bhaskaran, 2010, Oxford University Press.
4. Introduction to Quantum Mechanics, David J Griffiths and Darrell F. Schroeter, 3rd Edition 2019, Cambridge University Press.
5. Quantum Computation and quantum Information- Michael A Nielsen and Isaac L Chaung, 10th Edition 2010, Cambridge University Press.
6. Quantum Computing for Computer Scientists- Noson S. Yanofsky and Mirco A. Mannucci, 2008, Cambridge University Press.

Reference Books Recommended

1. Fundamentals of Physics- David Halliday, Robert Resnick and Jearl Walker, 11th Edition 2018, John Willey and Sons. Inc.
2. Modern Physics- Kenneth Krane, 4th Edition 2019, John Wiley Eastern.
3. Solid State Physics- S.O. Pillai, 9th Edition 2020, New Age International Publishers.
4. Quantum Computing Explained- David McMohan, 2008, Willey-IEEE.
5. NANO: The Essentials: Understanding Nanoscience and Nanotechnology- T. Pardeep, 2017, McGraw Hill Education.
6. IBM Experience: <https://quantumexperience.ng.bluemix.net>
7. Microsoft Quantum Development Kit: <https://www.microsoft.com/en-us/quantum/development-kit>

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|-------------|--------------------|--------------|---|---|---------|-----------------------|---------------|-------|-----------------|
| | | L | T | P | | Continuous Evaluation | End Sem. Exam | Total | Duration (Hrs.) |
| BSC105P | Modern Physics Lab | 0 | 0 | 2 | 1 | 25 | 25 | 50 | - |

| Sr. No. | Course Objectives |
|---------|---|
| 1 | To understand and strengthen the theoretical concepts of physics by thorough experimentation and effectively communicate experimental results in a standard scientific way. |
| 2 | To become familiar with the proper use of various measuring instruments/techniques used in physics laboratories. |

| Course Outcomes | |
|---|--|
| After successful completion of this course the student will be able to: | |
| CO1 | Apply: Apply and demonstrate theoretical concepts of physics through experimentation. |
| CO2 | Analyze: Analyze the working and characteristics of various semiconductor devices. |
| CO3 | Analyze: Make use of the various instruments/techniques for the analysis of various phenomenon of solid-state physics and optics. |

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| Sr. No. | List of Experiments |
|--|--|
| Pre-Lab | 1. Familiarization with Applied Physics lab. 2. Introduction to the basic semiconductor devices and their applications (Prerequisite). 3. Brief idea regarding Do's and Don'ts to be followed during working in a lab. |
| 1 | Experimenting the V-I characteristics of semiconductor diode & determine the value of cut in voltage, static resistance and dynamic resistance. |
| 2 | Experimenting the V-I characteristics of Zener diode & determine the value of cut in voltage, breakdown voltage and dynamic resistance. |
| 3 | Experimenting the V-I characteristics of LED & determine the value of conduction voltage and dynamic resistance. |
| 4 | Experimenting the characteristics of solar cell. |
| 5 | Experimenting the characteristics of n-p-n transistor in common base mode & determine the value of input resistance, output resistance and current amplification factor. |
| 6 | Experimenting the characteristics of n-p-n transistor in common emitter mode & determine the value of input resistance, output resistance and current amplification factor. |
| 7 | Experimenting the Hall Effect in semiconductor & determine the value of Hall coefficient, concentration of charge carrier and its mobility. |
| 8 | Determination of wavelength of laser light using plane diffraction Grating. |
| 9 | Determination of numerical aperture of optical fiber cable. |
| 10 | Determination of Plank's constant using light emitting diode. |
| 11 | Determination of radius of curvature of a plano-convex lens by Newton's Rings. |
| 12 | Determination of thickness of thin foil paper using air wedge arrangement. |
| 13 | Study of Spectrometer and its applications (Demonstration). |
| 14 | Determination of the divergence of laser beam (Demonstration). |
| 15 | Study of CRO (Voltage and frequency measurement using Calibration and Lissajous figure method) (Demonstration). |
| Post Lab session: | |
| 1. Open ended Experiment. | |
| 2. Determination of band gap energy in semiconductor. | |
| 3. Real life applications of semiconductor devices (Practical application using mobile charger). | |

(A minimum of **EIGHT** experiments to be performed based on the above list with minimum **ONE** experiment on **VIRTUAL LAB** wherever possible.)

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Suggested References:

1. Experiments of Engineering Physics- M.N. Avadhanulu, A.A. Dani and P.M. Pokley, 2003, S. Chand Publication.
2. A Text Book of Engineering Physics- M.N. Avadhanulu, P.G. Kshirsagar and TVS Arun Murthy, 2010, Chand Publication.
3. Engineering Physics- H. Malik and A.K. Singh, 2nd Edition 2017, McGraw Hill Education.
4. Engineering Physics- D.K. Bhattacharya and A. Bhaskaran, 2010, Oxford University Press.
5. Engineering Physics- P.K. Palaniswamy, 2005, Sciotech.

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**S. B. JAIN INSTITUTE OF TECHNOLOGY,
MANAGEMENT AND RESEARCH, NAGPUR**
(An Autonomous Institute, Affiliated to RTMNU, Nagpur)



FIRST YEAR ENGINEERING DEPARTMENT

"Emerge as a leading Institute for developing competent and creative Professionals"

| CourseCode | Course Title | Hours / Week | | | Credits | Maximum Marks | | | ESE |
|--|---------------|--------------|---|---|---------|-----------------------|---------------|-------|-----------------|
| | | L | T | P | | Continuous Evaluation | End Sem. Exam | Total | Duration (Hrs.) |
| HSMCME401P/ HSMCEE401P/ HSMCET401P/ HSMCCS402P/ HSMCAM401P/ HSMCAD401P/ | Soft Skills-I | 0 | 0 | 2 | 1 | 25 | 25 | 50 | - |

Course Objective

The course empowers the learner to develop and nurture soft skills so as to enhance their employability quotient.

Course Outcomes

After successful completion of this course the student will be able to:

| | |
|-----|--|
| CO1 | Understand: Assimilate the concept of soft skills in their professional career to nurture the Employability skills. |
| CO2 | Apply: Apply grammatically correct structure in communication. |
| CO3 | Apply: To build competency for presentation skills. |
| CO4 | Apply: To make use of competency for professional correspondence. |

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SYLLABUS

MODULE 1: PROFESSIONAL READINESS ACQUISITION PROGRAM - (PRAP)

- 1. Importance of Soft Skills:** Differentiate between hard and soft skills, Discipline specific skills Vs soft skills, Employability skills and its types, Learning & core values. The confidence grid, The power of thoughts, How Thoughts work, Anxiety, Decoding Self confidence , Self confidence cycle, Techniques, Protecting self Confidence, Building positive self Image, Affirmations.
- 2. Time Management:** Time, Time Management, Need for time management, Benefits of time management, Obstacle of Time management, What can we do, How to use Time effectively, Set goals, Prioritize Work, Organizing the work, When to say No, Identifying, celebrating success.
- 3. Presentation Skills:** Important Tips, Role of Power point presentation.
- 4. Leadership Skills:** Leadership, Identifying the traits and skills of an effective leader, examine the role, understanding the limits of authority in a team leader's role.
- 5. Team Work:** Objectives, What are Goals, Categorization of Goals, 5 Philosophies for goals, Types of goals?
- 6. Conversational Skills:** Dialogues, Short Stories.

MODULE 2 : ENGLISH LANGUAGE ACQUISITION PROGRAM(ELAP)

- 1. Grammar in Action:** Subject-Verb Agreement, Idioms& Phrases, Common spoken Language errors, Direct-Indirect speech, Phrasal Verbs, Active Passive Voice.
- 2. Written Communication & Formal Correspondence:** Notice Writing, Circular Writing, Technical Report Writing, Project Writing, e-mail etiquettes
- 3. Comprehension:** Listening & Reading comprehension.

- ❖ All the contents of above modules shall be covered during the course of the practical sessions.
- ❖ Activities on the above modules must be conducted wherever applicable.

Text Books Recommended

1. The ACE of Soft Skills-Attitude, Communication and Etiquette for Success - Gopaldaswamy Ramesh and Mahadevan Ramesh, 1st Edition, 2010, Pearson Publication.
2. Corporate Softskills - Sarvesh Gulati, 5th Edition, 2012, Rupa & Co. Publication.

Reference Books Recommended

Soft skills - Know yourself and know the world - Dr. K. Alex, 2009, S. Chand Publication.

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FIRST YEAR ENGINEERING DEPARTMENT

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6

| Course Code | Course Title | Hours / Week | | | Credits | Maximum Marks | | | ESE |
|--|--|--------------|---|---|---------|-----------------------|---------------|-------|-----------------|
| | | L | T | P | | Continuous Evaluation | End Sem. Exam | Total | Duration (Hrs.) |
| HSMCEE501T/ HSMCET501T/ HSMCAD501T/ HSMCAM501T/ HSMCCS601T / HSMCME601T | Economics & Finance for Engineers | 2 | 0 | 0 | 2 | 20 | 30 | 50 | 2 |

| Sr. No. | Course Objectives |
|---------|---|
| 1 | The course empowers the learner to acquire skills related to economics and finance domain. |
| 2 | The course aims at providing different techniques of economics and financial management to be applied by the engineers. |

| Course Outcomes | |
|--|--|
| After successful completion of this course, the student will be able to: | |
| CO1 | Understand: Understand the concept of economics and demand & its elasticity for managerial decisions. |
| CO2 | Create: Prepare the financial statement for ascertaining profit/loss of an organization. |
| CO3 | Analyze: Classify the various types of ratios for interpretation of financial data. |
| CO4 | Apply: Compute time value of money to know the future/present value of money. |

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SYLLABUS

UNIT - I: Introduction to Economics and Demand & Supply Function

Meaning of Economics, Concept of Microeconomics and Macroeconomics, Scope of Economics. Meaning of Demand, Types of demand, Determinants of Demand; Definition and Measurement of Elasticity concept, Price Elasticity of Demand, Income Elasticity of Demand, Cross Elasticity of Demand; The Law of Supply, Economies and Diseconomies of Scale.

UNIT - II: Financial Statement

Meaning and Types of Financial Statements, Income Statement/Statement of Profit and Loss, Balance Sheet Statements per Companies Act, 2013. Introduction to Cash Flow Statement: Cash Flow from Operating Activities, Cash Flow from Financing Activities and Cash Flow from Investing Activities.

Exposure to the financial statements of the organizations.

UNIT - III: Ratio Analysis

Concept of Ratio Analysis, Significance of Ratio Analysis, Classification of Ratios: Liquidity Ratios, Solvency Ratios, Leverage Ratios, Activity Ratios, Profitability Ratios.

UNIT - IV: Time Value of Money

Concept of Time Value of Money, Meaning and Types of Interest, Future Value of Money, Present Value of Money.

Text Books Recommended

1. Managerial Economics - D. N. Dwivedi, 8th Edition 2015, Vikas Publications.
2. Financial Management Theory and Practice - Dr. P. C, Tulsian & CA Bharat Tulsian, 6th Edition 2016, S. Chand Publication.
3. Financial Management - Ravi M. Kishore, 7th Edition 2009, Taxmann's.

Reference Books Recommended

1. Managerial Economics: Analysis, Problems and Cases - P.L. Mehta, 21st Edition 2016, S. Chand Publication.
2. Managerial Economics - Damodaran Suma, 2nd Edition 2010, Oxford University Press.
3. Financial Management - M. Y. Khan & P. K. Jain, 7th Edition 2014, Tata McGraw Hill.
4. Financial Management - I. M. Pandey 11th Edition 2016, Vikas Publications.

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Dr. V. Asudani
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FIRST YEAR ENGINEERING DEPARTMENT

"Emerge as a leading Institute for developing competent and creative Professionals"



| CourseCode | Course Title | Hours / Week | | | Credits | Maximum Marks | | | ESE |
|--|----------------|--------------|---|---|---------|-----------------------|---------------|-------|-----------------|
| | | L | T | P | | Continuous Evaluation | End Sem. Exam | Total | Duration (Hrs.) |
| HSMCET502P HSMCEE502P/ HSMCME501P/ HSMCCS501P/ HSMCAD502P/ HSMCAM502P | Soft skills-II | 0 | 0 | 2 | 1 | 25 | 25 | 50 | - |

Course Objective

To enhance the employability skills of the engineering students through soft skills with emphasis on interpersonal skills.

Course Outcomes

After successful completion of this course the student will be able to:

| | |
|-----|---|
| CO1 | Understand: Understand and learn etiquettes and manners for professional behavior leading to employment. |
| CO2 | Apply: Apply negotiation skills to enhance the employability. |
| CO3 | Apply: Use Interview skills to sharpen employability skills. |
| CO4 | Create: Develop competency for written communication in English to widen the scope of employability. |

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Dr. V. ASudani

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SYLLABUS

MODULE 1: PROFESSIONAL READINESS ACQUISITION PROGRAM - (PRAP)

- 1. PUBLIC SPEAKING** - Role of public speaking: in presentation skills, in formal settings and in informal settings, Role of visual aids in formal settings.
- 2. GROUP DISCUSSIONS** - About group discussion, Types of GD, GD phases and procedure, Do's and don'ts, GD etiquettes, GD evaluation criteria, Handling discussions in a systematic manner, Discussions over current topics.
- 3. ETIQUETTES AND MANNERS** - Manners and its types, Impact of etiquettes, Difference between general etiquettes and mannerism, Role and importance of etiquettes and manners in formal settings, Success habits and mannerisms.
- 4. NON VERBAL COMMUNICATION** - Defining body language, Scope and relevance, Defining Proxemics, Four zones, Oculistics-I, Oculistics-II, Importance of non-verbal communication in formal and in informal settings.
- 5. NEGOTIATION SKILLS** - Introduction, Nature of Negotiation, 4P's of Negotiation, Factors affecting Negotiation, Negotiation process - Strategizing and Persuasion, Role of critical thinking in negotiation skills, Result of Negotiation.
- 6. INTERVIEW SKILLS** - What are Interview Skills, Preparation and Research, How to ace your interview, Interview: Do's and Don'ts.
- 7. PRESENTATION SKILLS** - Preparing PowerPoint presentations, Tips to ace your presentation.
- 8. CONVERSATION SKILLS** - Features of a good conversation, Tips for improving conversation, Practice conversational dialogues.

MODULE 2 : ENGLISH LANGUAGE ACQUISITION PROGRAM(ELAP)

- 1. Written Communication & Formal Correspondence:** MOM writing, e-mail etiquettes, Resume writing.
- 2. Comprehension:** Listening & Reading comprehension, Summarization, Speed Reading /Scanning.

- All the contents of above modules shall be covered during the course of the practical sessions.
- Activities on the above modules must be conducted wherever applicable.




Text Books Recommended

1. The ACE of Soft Skills-Attitude, Communication and Etiquette for Success - Gopaldaswamy Ramesh and Mahadevan Ramesh, 1st Edition, 2010, Pearson Publication.
2. Corporate Softskills - Sarvesh Gulati, 5th Edition, 2012, Rupa & Co. Publication.


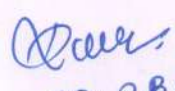

Reference Books Recommended

Soft skills - Know yourself and know the world - Dr. K. Alex, 2009, S. Chand Publication.


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