## II SEMESTER CURRICULUM

**B.E. Electronics and Communication Engineering**

### SEMESTER II

#### THEORY

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>L</th>
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<tbody>
<tr>
<td>HS6251</td>
<td>Technical English - II</td>
<td>3</td>
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<td>MA6251</td>
<td>Mathematics - II</td>
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<td>Engineering Physics - II</td>
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<td>CY6251</td>
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<td>EC6201</td>
<td>Electronic Devices</td>
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<td>EE6201</td>
<td>Circuit Theory</td>
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#### PRACTICAL

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<td>GE6262</td>
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<td>EC6211</td>
<td>Circuits and Devices Laboratory</td>
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**TOTAL** 18 3 5 24
HS6251  TECHNICAL ENGLISH II  L T P C
3 1 0 4

OBJECTIVES:
- To make learners acquire listening and speaking skills in both formal and informal contexts.
- To help them develop their reading skills by familiarizing them with different types of reading strategies.
- To equip them with writing skills needed for academic as well as workplace contexts.
- To make them acquire language skills at their own pace by using e-materials and language lab components.

OUTCOMES:
Learners should be able to
- speak convincingly, express their opinions clearly, initiate a discussion, negotiate, argue using appropriate communicative strategies.
- write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
- read different genres of texts, infer implied meanings and critically analyse and evaluate them for ideas as well as for method of presentation.
- listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.

UNIT I
9 + 3
Listening - Listening to informal conversations and participating; Speaking - Opening a conversation (greetings, comments on topics like weather) - Turn taking - Closing a conversation (excuses, general wish, positive comment, thanks); Reading - Developing analytical skills, Deductive and inductive reasoning - Extensive reading; Writing - Effective use of SMS for sending short notes and messages - Using ‘emoticons’ as symbols in email messages; Grammar - Regular and irregular verbs - Active and passive voice; Vocabulary - Homonyms (e.g. ‘can’) - Homophones (e.g. ‘some’, ‘sum’); E-materials - Interactive exercise on Grammar and vocabulary – blogging; Language Lab - Listening to different types of conversation and answering questions.

UNIT II
9 + 3
Listening - Listening to situation based dialogues; Speaking - Conversation practice in real life situations, asking for directions (using polite expressions), giving directions (using imperative sentences), Purchasing goods from a shop, Discussing various aspects of a film (they have already seen) or a book (they have already read); Reading - Reading a short story or an article from newspaper, Critical reading, Comprehension skills; Writing - Writing a review / summary of a story / article, Personal letter (Inviting your friend to a function, congratulating someone for his / her success, thanking one’s friends / relatives); Grammar - modal verbs, Purpose expressions; Vocabulary - Phrasal verbs and their meanings, Using phrasal verbs in sentences; E-materials - Interactive exercises on Grammar and vocabulary, Extensive reading activity (reading stories / novels), Posting reviews in blogs - Language Lab - Dialogues (Fill up exercises), Recording students’ dialogues.

UNIT III
9 + 3
Listening - Listening to the conversation - Understanding the structure of conversations; Speaking - Conversation skills with a sense of stress, intonation, pronunciation and meaning - Seeking
information – expressing feelings (affection, anger, regret, etc.); Reading – Speed reading – reading passages with time limit – Skimming; Writing – Minutes of meeting – format and practice in the preparation of minutes – Writing summary after reading articles from journals – Format for journal articles – elements of technical articles (abstract, introduction, methodology, results, discussion, conclusion, appendices, references) – Writing strategies; Grammar – Conditional clauses – Cause and effect expressions; Vocabulary – Words used as nouns and verbs without any change in the spelling (e.g. ‘rock’, ‘train’, ‘ring’); E-materials – Interactive exercise on Grammar and vocabulary – Speed Reading practice exercises; Language Lab – Intonation practice using EFLU and RIE materials – Attending a meeting and writing minutes.

UNIT IV
9 + 3
Listening – Listening to a telephone conversation, Viewing model interviews (face-to-face, telephonic and video conferencing); Speaking – Role play practice in telephone skills – listening and responding, -asking questions, -note taking – passing on messages, Role play and mock interview for grasping interview skills; Reading – Reading the job advertisements and the profile of the company concerned – scanning; Writing – Applying for a job – cover letter – résumé preparation – vision, mission and goals of the candidate; Grammar – Numerical expressions – Connectives (discourse markers); Vocabulary – Idioms and their meanings – using idioms in sentences; E-materials – Interactive exercises on Grammar and Vocabulary – Different forms of résumés- Filling up a résumé / cover letter; Language Lab – Telephonic interview – recording the responses – e-résumé writing.

UNIT V
9 + 3
Listening – Viewing a model group discussion and reviewing the performance of each participant – Identifying the characteristics of a good listener; Speaking – Group discussion skills – initiating the discussion – exchanging suggestions and proposals – expressing dissent/agreement – assertiveness in expressing opinions – mind mapping technique; Reading – Note making skills – making notes from books, or any form of written materials – Intensive reading; Writing – Checklist – Types of reports – Feasibility / Project report – report format – recommendations / suggestions – interpretation of data (using charts for effective presentation); Grammar – Use of clauses; Vocabulary – Collocation; E-materials – Interactive grammar and vocabulary exercises – Sample GD – Pictures for discussion, Interactive grammar and vocabulary exercises; Language Lab – Different models of group discussion.

TOTAL: 60 PERIODS

TEXTBOOKS

REFERENCES

EXTENSIVE Reading (Not for Examination)
Websites
2. http://owl.english.purdue.edu

TEACHING METHODS:
- Lectures
- Activities conducted individually, in pairs and in groups like individual writing and presentations, group discussions, interviews, reporting, etc
- Long presentations using visual aids
- Listening and viewing activities with follow up activities like discussions, filling up worksheets, writing exercises (using language lab wherever necessary/possible) etc
- Projects like group reports, mock interviews etc using a combination of two or more of the language skills

EVALUATION PATTERN:

Internal assessment: 20%
3 tests of which two are pen and paper tests and the other is a combination of different modes of assessment like
- Project
- Assignment
- Report
- Creative writing, etc.

All the four skills are to be tested with equal weightage given to each.
- Speaking assessment: Individual presentations, Group discussions
- Reading assessment: Reading passages with comprehension questions graded following Bloom’s taxonomy
- Writing assessment: Writing essays, CVs, reports etc. Writing should include grammar and vocabulary.
- Listening/Viewing assessment: Lectures, dialogues, film clippings with questions on verbal as well as audio/visual content graded following Bloom’s taxonomy.

End Semester Examination: 80%

MA6251 MATHEMATICS – II

OBJECTIVES:
- To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
- To acquaint the student with the concepts of vector calculus, needed for problems in all engineering disciplines.
- To develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow of electric current.
- To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.
UNIT I VECTOR CALCULUS
Gradient, divergence and curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration – Green’s theorem in a plane, Gauss divergence theorem and Stokes’ theorem (excluding proofs) – Simple applications involving cubes and rectangular parallelepipeds.

UNIT II ORDINARY DIFFERENTIAL EQUATIONS
Higher order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy’s and Legendre’s linear equations – Simultaneous first order linear equations with constant coefficients.

UNIT III LAPLACE TRANSFORM

UNIT IV ANALYTIC FUNCTIONS
Functions of a complex variable – Analytic functions: Necessary conditions – Cauchy-Riemann equations and sufficient conditions (excluding proofs) – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping: w = z+k, kz, 1/z, z², e^z and bilinear transformation.

UNIT V COMPLEX INTEGRATION
Complex integration – Statement and applications of Cauchy’s integral theorem and Cauchy’s integral formula – Taylor’s and Laurent’s series expansions – Singular points – Residues – Cauchy’s residue theorem – Evaluation of real definite integrals as contour integrals around unit circle and semi-circle (excluding poles on the real axis).

TOTAL: 60 PERIODS

TEXT BOOKS:

REFERENCES:
OBJECTIVE:
- To enrich the understanding of various types of materials and their applications in engineering and technology.

UNIT I CONDUCTING MATERIALS

UNIT II SEMICONDUCTING MATERIALS

UNIT III MAGNETIC AND SUPERCONDUCTING MATERIALS
Superconductivity : properties – Type I and Type II superconductors – BCS theory of superconductivity(Qualitative) - High T_c superconductors – Applications of superconductors – SQUID, cryotron, magnetic levitation.

UNIT IV DIELECTRIC MATERIALS

UNIT V ADVANCED ENGINEERING MATERIALS

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
UNIT I  WATER TECHNOLOGY  9
Introduction to boiler feed water-requirements-formation of deposits in steam boilers and heat换热- disadvantages (wastage of fuels, decrease in efficiency, boiler explosion) prevention of scale formation -softening of hard water -external treatment zeolite and demineralization - internal treatment- boiler compounds (phosphate, calgon, carbonate, colloidal) - caustic embrittlement-boiler corrosion-priming and foaming- desalination of brackish water –reverse osmosis.

UNIT II  ELECTROCHEMISTRY AND CORROSION  9

UNIT III  ENERGY SOURCES  9
Introduction- nuclear energy- nuclear fission- controlled nuclear fission- nuclear fusion-differences between nuclear fission and fusion- nuclear chain reactions- nuclear reactor power generator- classification of nuclear reactor- light water reactor- breeder reactor- solar energy conversion- solar cells- wind energy. Batteries and fuel cells:Types of batteries- alkaline battery-lead storage battery- nickel-cadmium battery- lithium battery- fuel cell H₂ -O₂ fuel cell-applications.

UNIT IV  ENGINEERING MATERIALS  9
Abrasives: definition, classification or types, grinding wheel, abrasive paper and cloth. Refractories: definition, characteristics, classification, properties – refractoriness and RUL, dimensional stability, thermal spalling, thermal expansion, porosity; Manufacture of alumina, magnesite and silicon carbide, Portland cement- manufacture and properties - setting and hardening of cement, special cement- waterproof and white cement- properties and uses. Glass - manufacture, types, properties and uses.

UNIT V  FUELS AND COMBUSTION  9

TOTAL: 45 PERIODS

TEXT BOOKS
REFERENCE BOOKS

EC6201 ELECTRONIC DEVICES

OBJECTIVES:
- To acquaint the students with the construction, theory and operation of the basic electronic devices such as PN junction diode, Bipolar and Field effect Transistors, Power control devices, LED, LCD and other Opto-electronic devices

UNIT I SEMICONDUCTOR DIODE
PN junction diode, Current equations, Diffusion and drift current densities, forward and reverse bias characteristics, Switching Characteristics.

UNIT II BIPOLAR JUNCTION

UNIT III FIELD EFFECT TRANSISTORS
JFETs – Drain and Transfer characteristics, -Current equations - Pinch off voltage and its significance- MOSFET- Characteristics- Threshold voltage - Channel length modulation, D-MOSFET, E-MOSFET, Current equation - Equivalent circuit model and its parameters, FINFET, DUAL GATE MOSFET.

UNIT IV SPECIAL SEMICONDUCTOR DEVICES
Metal-Semiconductor Junction- MESFET, Schottky barrier diode-Zener diode-Varactor diode – Tunnel diode- Gallium Arsenide device, LASER diode, LDR.

UNIT V POWER DEVICES AND DISPLAY DEVICES
UJT, SCR, Diac, Triac, Power BJT- Power MOSFET- DMOS-VMOS. LED, LCD, Photo transistor, Opto Coupler, Solar cell, CCD.

TOTAL : 45 PERIODS

TEXT BOOKS

REFERENCES:
UNIT I  BASIC CIRCUITS ANALYSIS  

UNIT II  NETWORK REDUCTION AND NETWORK THEOREMS FOR DC AND AC CIRCUITS  
Network reduction: voltage and current division, source transformation – star delta conversion. Thevenins and Novton & Theorem – Superposition Theorem – Maximum power transfer theorem – Reciprocity Theorem.

UNIT III  RESONANCE AND COUPLED CIRCUITS  
Series and paralled resonance – their frequency response – Quality factor and Bandwidth - Self and mutual inductance – Coefficient of coupling – Tuned circuits – Single tuned circuits.

UNIT IV  TRANSIENT RESPONSE FOR DC CIRCUITS  
Transient response of RL, RC and RLC Circuits using Laplace transform for DC input and A.C. with sinusoidal input – Characterization of two port networks in terms of Z,Y and h parameters.

UNIT V   THREE PHASE CIRCUITS  
Three phase balanced / unbalanced voltage sources – analysis of three phase 3-wire and 4-wire circuits with star and delta connected loads, balanced & un balanced – phasor diagram of voltages and currents – power and power factor measurements in three phase circuits.  
TOTAL: 60 PERIODS

TEXT BOOKS:

REFERENCES:
PHYSICS LABORATORY – II

(Any FIVE Experiments)

1. Determination of Young’s modulus by uniform bending method
2. Determination of band gap of a semiconductor
3. Determination of Coefficient of viscosity of a liquid – Poiseuille’s method
4. Determination of Dispersive power of a prism – Spectrometer
5. Determination of thickness of a thin wire – Air wedge method
6. Determination of Rigidity modulus – Torsion pendulum

CHEMISTRY LABORATORY -II

(Any FIVE Experiments)

1. Determination of alkalinity in water sample
2. Determination of total, temporary & permanent hardness of water by EDTA method
3. Estimation of copper content of the given solution by EDTA method
4. Estimation of iron content of the given solution using potentiometer
5. Estimation of sodium present in water using flame photometer
6. Corrosion experiment – weight loss method
7. Conductometric precipitation titration using BaCl₂ and Na₂SO₄

TOTAL : 30 PERIODS

REFERENCES:

• Laboratory classes on alternate weeks for Physics and Chemistry.

EC6211

CIRCUITS AND DEVICES LABORATORY

1. Characteristics of PN Junction Diode
2. Zener diode Characteristics & Regulator using Zener diode
3. Common Emitter input-output Characteristics
4. Common Base input-output Characteristics
5. FET Characteristics
6. SCR Characteristics
7. Clipper and Clamper & FWR
8. Verifications Of Thevinin & Norton theorem
9. Verifications Of KVL & KCL
10. Verifications Of Super Position Theorem
11. verifications of maximum power transfer & reciprocity theorem
12. Determination Of Resonance Frequency of Series & Parallel RLC Circuits
13. Transient analysis of RL and RC circuits

LABORATORY REQUIREMENTS

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<tr>
<td>BC 107, BC 148, 2N2646, BFW10</td>
<td>- 25 each</td>
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<tr>
<td>1N4007, Zener diodes</td>
<td>- 25 each</td>
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<tr>
<td>Resistors, Capacitors, Inductors</td>
<td>- sufficient quantities</td>
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<tr>
<td>Bread Boards</td>
<td>- 15 Nos</td>
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<tr>
<td>CRO (30MHz)</td>
<td>- 10 Nos.</td>
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<tr>
<td>Function Generators (3MHz)</td>
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<tr>
<td>Dual Regulated Power Supplies (0–30V)</td>
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TOTAL: 45 PERIODS