ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES
(AUTONOMOUS)
(Approved by AICTE, Recognized by the GOVT. of T.S., Permanent Affiliated to JNTU, Hyderabad)
Accredited by "NAAC" with B+ Grade, Recognized by UGC under Section 2(f) and 12(B)

Department of Chemistry

Board of studies – First meeting on 18/06/2024

AGENDA

Item-1: Welcoming the distinguished members of the Board of studies for the BOS meeting by the Head of the Department.

Item-2: Review / Approval of the academic regulation for the B.Tech Program.

Item-3: Review / Approval of the course structure of B.Tech Program.

Item-4: Review / Approval of the detailed syllabus of Engineering Chemistry theory.

Item-5: Review / Approval of the detailed syllabus of Engineering Chemistry lab.

Item-6: Any other suggestions to the Department.

Item-7: Vote of thanks.

PRINCIPAL
Annamacharya Institute of
Technology & Sciences
Piglipur (V), Batasingaram (P),
Abdullapurmet (M), R.R. Dist. HYD-001 512.

G. Kiran Kumar

Chairperson of BOS, HOD H & S

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Department of Chemistry

BoS Members

S.NO	NAME	DESIGNATION	POSITION
1	Dr. P. V. Krishna Murthy	Principal, AITS, Hyderabad	Special Invitee
2	G. Kiran Kumar	HOD, H & S	Chairperson
3	Dr. T. Sabithakala	Asst. Professor in Chemistry, JNTUH, UCESTH	University Nominee
4	Dr. K. N. Shashi Kumar	Professor, AITK, Kadapa	Subject Expert
5	Dr. I. Pugazhenthi	Assoc. Professor, AITS, Rajampet	Subject Expert
6	Dr. K. Sunder Kumar	Assoc. Professor, AITS, Hyderabad	Member
7	K. Umadevi	Asst. Professor, AITS, Hyderabad	Member
8	Y. Madhavi	Asst. Professor, AITS, Hyderabad	Member
9	K. Anitha	Asst. Professor, AITS, Hyderabad	Member

PRINCIPAL
Annamacharya Institute of
Technology & Sciences
Piglipur (V), Batasingaram (?)
Abdullapurmet (M), R.R. Dist. H_ _ _ ?_

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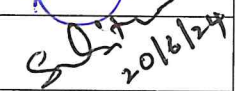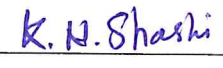

Department of Chemistry

Board of Studies – First meeting on 18/06/2024

<u>Minutes of Meeting</u>

Suggestions made by **Dr. T. Sabithakala**, University Nominee and **Dr. K. N. Shashi Kumar** and **Dr. I. Pugazhenthi** Subject Experts.

1. The committee members approved R-22 Academic Regulation for the B.Tech Program.
2. Agreed with Course Structure of B.Tech Programs:
   a. Engineering Chemistry Theory
   b. Engineering Chemistry Lab
3. After the detailed discussion on JNTUH'S R-22 Syllabi of Engineering Chemistry Theory and Engineering Chemistry Lab, it is decided to follow the same syllabus.

The following members attended for BoS meeting:

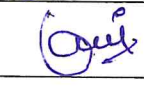| S.NO	NAME	DESIGNATION	POSITION	SIGNATURE
1	Dr. P. V. Krishna Murthy	Principal, AITS, Hyderabad	Special Invitee	
2	G. Kiran Kumar	HOD, H & S	Chairperson	
3	Dr. T. Sabithakala	Asst. Professor in Chemistry, JNTUH, UCESTH	University Nominee	20/6/24
4	Dr. K. N. Shashi Kumar	Professor, AITK, Kadapa	Subject Expert	K. N. Shashi
5	Dr. I. Pugazhenthi	Assoc. Professor, AITS, Rajampet	Subject Expert	Zhent
6	Dr. K. Sunder Kumar	Assoc. Professor, AITS, Hyderabad	Member	Sumd 20/6/24
7	K. Umadevi	Asst. Professor, AITS, Hyderabad	Member	
8	Y. Madhavi	Asst. Professor, AITS, Hyderabad	Member	
9	K. Anitha	Asst. Professor, AITS, Hyderabad	Member	

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES, HYDERABAD (AUTONOMOUS)

ENGINEERING CHEMISTRY

B.Tech. I Year I Sem & II Sem (Common to all branches)

Credits distribution:

S.No	Course Name	No. of Credits allotted
1	Engineering Chemistry	04
	Total credits for the subject	04

Course Objectives:
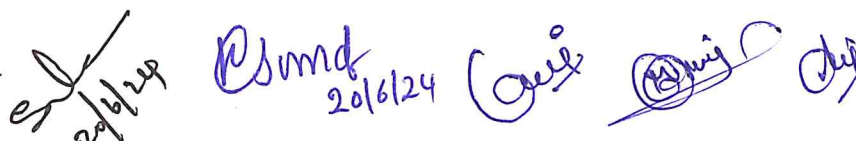
1. To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.
2. To include the importance of water in industrial usage, fundamental aspects of battery chemistry, significance of corrosion it's control to protect the structures.
3. To imbibe the basic concepts of petroleum and its products.
4. To acquire required knowledge about engineering materials like cement, smart materials and Lubricants.

Course Outcomes:

1. Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
3. They can learn the fundamentals and general properties of polymers and other engineering materials.
4. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

UNIT - I: Water and its treatment: [8]

Introduction to hardness of water — Estimation of hardness of water by complexometric method and related numerical problems. Potable water and its specifications - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and break - point chlorination. Defluoridation Determination of F^- ion by ion- selective electrode method. Boiler troubles: Sludges, Scales and Caustic embrittlement. Internal treatment of Boiler feed water - Calgon conditioning - Phosphate conditioning - Colloidal conditioning, External treatment

methods - Softening of water by ion- exchange processes. Desalination of water — Reverse osmosis.

UNIT – II Battery Chemistry & Corrosion [8]

Introduction - Classification of batteries- primary, secondary and reserve batteries with examples. Basic requirements for commercial batteries. Construction, working and applications of: Zn-air and Lithium ion battery, Applications of Li-ion battery to electrical vehicles. Fuel Cells- Differences between battery and a fuel cell, Construction and applications of Methanol Oxygen fuel cell and Solid oxide fuel cell. Solar cells - Introduction and applications of Solar cells.

Corrosion: Causes and effects of corrosion — theories of chemical and electrochemical corrosion — mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection — Sacrificial anode and impressed current methods.

UNIT - III: Polymeric materials: [8]

Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples — Nylon 6:6, Terylene **Plastics:** Definition and characteristics- thermoplastic and thermosetting plastics, Preparation,Properties and engineering applications of PVC and Bakelite, Teflon, Fiber reinforced plastics (FRP). **Rubbers:** Natural rubber and its vulcanization.

Elastomers: Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokolrubber.

Conducting polymers: Characteristics and Classification with examples-mechanism of conduction intrans-polyacetylene and applications of conducting polymers.

Biodegradable polymers: Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications.

UNIT - IV: Energy Sources: [8]

Introduction, Calorific value of fuel – HCV, LCV- Dulongs formula. Classification-solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG, Biodiesel — Transesterification, advantages.

UNIT - V: Engineering Materials: [8]

Cement: Portland cement, its composition, setting and hardening.

Smart materials and their engineering applications

Shape memory materials- Poly L- Lactic acid. Thermoresponse materials- Polyacryl

amides, Poly vinylamides
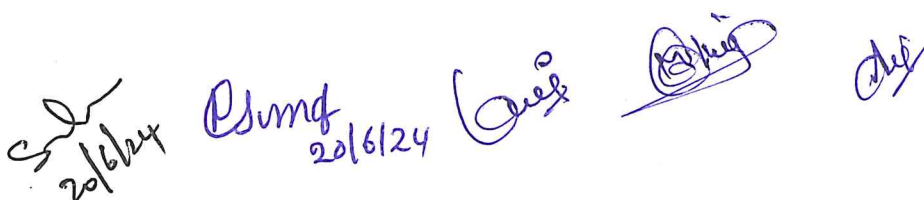
Lubricants: Classification of lubricants with examples-characteristics of a good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point, pour point, flash point and fire point.

TEXT BOOKS:

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016
3. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K. Shashikala, Pearson Publications, 2021.
4. Textbook of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications.

REFERENCE BOOKS:

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)

ENGINEERING CHEMISTRY LAB

Credits distribution:

S.No	Course Name	No. of Credits allotted
1	Engineering Chemistry Lab	1
	Total credits for the Lab	1

Course Objectives: The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:
- Estimation of hardness of water to check its suitability for drinking purpose.
- Students are able to perform estimations of acids and bases using conductometry, potentiometry and pH metry methods.
- Students will learn to prepare polymers such as Bakelite and nylon-6 in the laboratory.
- Students will learn skills related to the lubricant properties such as saponification value, surface tension and viscosity of oils.

Course Outcomes: The experiments will make the student gain skills on:

- Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions.
- Able to perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases.
- Students are able to prepare polymers like bakelite and nylon-6.
- Estimations saponification value, surface tension and viscosity of lubricant oils.

List of Experiments:

I. **Volumetric Analysis:** Estimation of Hardness of water by EDTA Complexometry method.

II. **Conductometry:** Estimation of the concentration of an acid by Conductometry.

III. **Potentiometry:** Estimation of the amount of Fe^{+2} by Potentiomentry.

IV. **pH Metry:** Determination of an acid concentration using pH meter.

V. **Preparations:**
   1. Preparation of Bakelite.
   2. Preparation Nylon – 6.

VI. **Lubricants:**
   1. Estimation of acid value of given lubricant oil.
   2. Estimation of Viscosity of lubricant oil using Ostwald's Viscometer.

VII. **Corrosion:** Determination of rate of corrosion of mild steel in the presence and absence of inhibitor.

VIII. **Virtual lab experiments**
   1. Construction of Fuel cell and its working.

2. Smart materials for Biomedical applications
3. Batteries for electrical vehicles.
4. Functioning of solar cell and its applications.

REFERENCE BOOKS:

1. Lab manual for Engineering chemistry by B. Ramadevi and P. Aparna, S Chand Publications, New Delhi (2022)
2. Vogel's text book of practical organic chemistry 5th edition
3. Inorganic Quantitative analysis by A.I. Vogel, ELBS Publications.
4. College Practical Chemistry by V.K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007).

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Department of English

Board of studies – First meeting on 19/06/2024

AGENDA

Item-1: Welcoming the distinguished members of the Board of studies for the BOS meeting by the Head of the Department.

Item- 2: Review / Approval of the Academic Regulation for the B.Tech Program.

Item-3: Review / Approval of the Course Structure of B.Tech Program.

Item-4: Review / Approval of the detailed syllabus of English theory. *and*

Item-5: Review / Approval of the detailed syllabus of English Language Communication Skills Lab.

Item-6: Any other suggestions to the Department.

Item-7: Vote of thanks.

PRINCIPAL
Annamacharya Institute of
Technology & Sciences
Piglipur (V), Batasingaram (Post)
Abdullapurmet (M), R.R. Dist. HYD-501 512

G. Kiran Kumar

Chairperson of BOS, HOD H & S

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Department of English

BOS Members

S.NO	NAME	DESIGNATION	POSITION
1	Dr. P. V. Krishna Murthy	Principal, AITS, Hyderabad	Special Invitee
2	G. Kiran Kumar	HOD, H & S	Chairperson
3	Dr. N.V.S.N.Lakshmi	Assoc. Professor of English, JNTUH UCESTH	University Nominee
4	Dr. B. Bala Nagender Prasad	Assoc. Professor, AITS Rajampet	Subject Expert
5	Dr. M. Praveena	Asst. Professor, AITS Rajampet	Subject Expert
6	B. Naga Bhavani	Asst. Professor, AITS, Hyderabad	Member
7	Ch.Sumathi	Asst. Professor, AITS, Hyderabad	Member
8	T. Naresh	Asst. Professor, AITS, Hyderabad	Member
9	D. Yuvarani	Asst. Professor, AITS, Hyderabad	Member

PRINCIPAL
Annamacharya Institute of
Technology & Sciences
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Aodullapurmet (M), R.R. Dist. HYD-901 512

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Department of English

Board of Studies – First meeting on 19/06/2024

<u>Minutes of Meeting</u>

Suggestions made by **Dr. N. V. S. N. Lakshmi**, University Nominee , **Dr. B. Bala Nagender Prasad** and **Dr. M. Praveena**, Subject Experts .

1. The committee members approved R-22 Academic Regulation for the B.Tech Program.
2. Agreed with Course Structure of B.Tech Programs:
   a. English for Skill Enhancement
   b. English Language and Communication Skills Lab
3. After the detailed discussion on JNTUH'S R-22 Syllabi of English for Skill Enhancement and English Language and Communication Skills Lab, it is decided to follow the same syllabus.

The following members attended for BoS meeting:

S.NO	NAME	DESIGNATION	POSITION	SIGNATURE
1	Dr. P. V. Krishna Murthy	Principal, AITS, Hyderabad	Special Invitee	
2	G. Kiran Kumar	HOD, H & S	Chairperson	
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8	T. Naresh	Asst. Professor, AITS, Hyderabad	Member	
9	D. Yuvarani	Asst. Professor, AITS, Hyderabad	Member	

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES, HYDERABAD
(AUTONOMOUS)
ENGLISH FOR SKILL ENHANCEMENT
B.Tech. I Year I & II Sem (Common to all branches)
Credits distribution:

S.No	Course Name	No. of Credits allotted
1	**English for Skill Enhancement**	02
	Total credits for the subject	02

Course Objectives: This course will enable the students to:

1. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
2. Develop study skills and communication skills in various professional situations.
3. Equip students to study engineering subjects more effectively and critically using the theoretical and practical components of the syllabus.

Course Outcomes: Students will be able to:

1. Understand the importance of vocabulary and sentence structures.
2. Choose appropriate vocabulary and sentence structures for their oral and writtencommunication.
3. Demonstrate their understanding of the rules of functional grammar.
4. Develop comprehension skills from the known and unknown passages.
5. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.
6. Acquire basic proficiency in reading and writing modules of English.

UNIT - I

Chapter entitled '*Toasted English*' by R.K.Narayan from *"English: Language, Context andCulture"* published by Orient BlackSwan, Hyderabad.

Vocabulary: The Concept of Word Formation -The Use of Prefixes and Suffixes - Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives - Synonyms and Antonyms

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.

Reading: Reading and Its Importance- Techniques for Effective Reading.

Writing: Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for Writing precisely - Paragraph Writing - Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT - II

Chapter entitled '**Appro JRD**' by Sudha Murthy from *"English: Language, Context and Culture"published* by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Misspelt - Homophones, Homonyms and Homographs

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

Reading: Sub-Skills of Reading - Skimming and Scanning - Exercises for Practice

Writing: Nature and Style of Writing- Defining /Describing People, Objects, Places and Events - Classifying- Providing Examples or Evidence.

UNIT - III

Chapter entitled '**Lessons from Online Learning**' by F.Haider Alvi, Deborah Hurst et al from

Dr. NVSN. Lakshmi
20/6/2024

"English: Language, Context and Culture" published by Orient BlackSwan, Hyderabad. **Vocabulary**: Words Often Confused - Words from Foreign Languages and their Use in English.**Grammar**: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-Skills of Reading - Intensive Reading and Extensive Reading - Exercises for Practice.

Writing: Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, Email Etiquette, Job Application with CV/Resume.

UNIT - IV
Chapter entitled **'Art and Literature'** by Abdul Kalam from *"English: Language, Context andCulture"* published by Orient BlackSwan, Hyderabad.

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Survey, Question, Read, Recite and Review (SQ3R Method) - Exercises for Practice

Writing: Writing Practices- Essay Writing-Writing Introduction and Conclusion -Précis Writing.

UNIT - V
Chapter entitled **'Go, Kiss the World'** by Subroto Bagchi from *"English: Language, Context andCulture"* published by Orient BlackSwan, Hyderabad.

Vocabulary: Technical Vocabulary and their Usage

Grammar: Common Errors in English (*Covering all the other aspects of grammar which were notcovered in the previous units*)

Reading: Reading Comprehension-Exercises for Practice

Writing: Technical Reports- Introduction - Characteristics of a Report - Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

Note: Listening and Speaking Skills which are given under Unit-6 in AICTE Model Curriculum are covered in the syllabus of ELCS Lab Course.

➢ **Note: 1**. As the syllabus of English given in AICTE *Model Curriculum-2018 for B.Tech First Year is Open-ended,* besides following the prescribed textbook, it is required to prepare teaching/learning materials **by the teachers collectively** in the form of handouts based on theneeds of the students in their respective colleges for effective teaching/learning in the class.

➢ **Note: 2**.Based on the recommendations of NEP2020, teachers are requested to be flexible toadopt Blended Learning in dealing with the course contents .They are advised to teach 40 percent of each topic from the syllabus in blended mode.

TEXT BOOK:
1. "English: Language, Context and Culture" by Orient BlackSwan Pvt. Ltd, Hyderabad. 2022. Print.

REFERENCE BOOKS:
1. Effective Academic Writing by Liss and Davis (OUP)
2. Richards, Jack C. (2022) Interchange Series. Introduction, 1,2,3. Cambridge University Press
3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
4. Chaudhuri, Santanu Sinha. (2018). Learn English: A Fun Book of Functional Language,Grammar and Vocabulary. (2nd ed.,). Sage Publications India Pvt. Ltd.
5. (2019). Technical Communication. Wiley India Pvt. Ltd.
6. Vishwamohan, Aysha. (2013). English for Technical Communication for Engineering Students.Mc Graw-Hill Education India Pvt. Ltd.
7. Swan, Michael. (2016). Practical English Usage. Oxford University Press. Fourth Edition.

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY

S.No	Course Name	No. of Credits allotted
1	English Language And Communication Skills Laboratory	1.5
	Total credits for the lab	1.5

The **English Language and Communication Skills (ELCS) Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:
- ✓ To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
- ✓ To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
- ✓ To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- ✓ To improve the fluency of students in spoken English and neutralize the impact ofdialects.
- ✓ To train students to use language appropriately for public speaking, group discussionsand interviews

Course Outcomes: Students will be able to:

- ✓ Understand the nuances of English language through audio- visual experience and group activities
- ✓ Neutralise their accent for intelligibility
- ✓ Speak with clarity and confidence which in turn enhances their employability skills

Syllabus: English Language and Communication Skills Lab (ELCS) shall have two parts:
a. **Computer Assisted Language Learning (CALL) Lab**
b. **Interactive Communication Skills (ICS) Lab**

Listening Skills:

Objectives
1. To enable students develop their listening skills so that they may appreciate the role in the LSRWskills approach to language and improve their pronunciation
2. To equip students with necessary training in listening, so that they can comprehend the speechof people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills:
Objectives
1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts
- Oral practice
- Describing objects/situations/people

- Role play - Individual/Group activities
- Just A Minute (JAM) Sessions

The following course content is prescribed for the **English Language and Communication Skills Lab**.

Exercise – I
CALL Lab:
Understand: Listening Skill- Its importance - Purpose- Process- Types- Barriers- Effective Listening.
Practice: Introduction to Phonetics - Speech Sounds - Vowels and Consonants - Minimal Pairs-Consonant Clusters- Past Tense Marker and Plural Marker- *Testing Exercises*
ICS Lab:
Understand: Spoken vs. Written language- Formal and Informal English.
Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues - Greetings - Taking Leave -Introducing Oneself and Others.

Exercise – II
CALL Lab:
Understand: Structure of Syllables - Word Stress- Weak Forms and Strong Forms - Stress pattern in sentences – Intonation.
Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Stress pattern insentences – Intonation - *Testing Exercises*
ICS Lab:
Understand: Features of Good Conversation - Strategies for Effective Communication.
Practice: Situational Dialogues - Role Play- Expressions in Various Situations -Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III
CALL Lab:
Understand: Errors in Pronunciation-Neutralising Mother Tongue Interference (MTI).
Practice: Common Indian Variants in Pronunciation – Differences between British and AmericanPronunciation -*Testing Exercises*

ICS Lab:
Understand: Descriptions- Narrations- Giving Directions and Guidelines - Blog Writing
Practice: Giving Instructions - Seeking Clarifications - Asking for and Giving Directions - Thanking andResponding - Agreeing and Disagreeing - Seeking and Giving Advice - Making Suggestions.

Exercise – IV
CALL Lab:
Understand: Listening for General Details.

Practice: Listening Comprehension Tests - *Testing Exercises*

ICS Lab:
Understand: Public Speaking – Exposure to Structured Talks - Non-verbal Communication-Presentation Skills.
Practice: Making a Short Speech - Extempore- Making a Presentation.

Exercise – V
CALL Lab:
Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests -*Testing Exercises*

ICS Lab: *Introduction to*
Understand: Group Discussion

Practice: ~~Intr~~ Group Discussion

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:
The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

System Requirement (Hardware component):
Computer network with LAN facility (minimum 40 systems with multimedia) with the followingspecifications:

    i)   Computers with Suitable Configuration
    ii)   High Fidelity Headphones

2. Interactive Communication Skills (ICS) Lab :
The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio- visual aids with a Public Address System, a T. V. or LCD, a digital stereo –audio & video system and camcorder etc.

Source of Material (Master Copy):
- *Exercises in Spoken English. Part 1,2,3.* CIEFL and Oxford University Press

Note: Teachers are requested to make use of the master copy and get it tailor-made to suit the contents of the syllabus.

Suggested Software:
- Cambridge Advanced Learners' English Dictionary with CD.
- Grammar Made Easy by Darling Kindersley.
- Punctuation Made Easy by Darling Kindersley.
- Oxford Advanced Learner's Compass, 10th Edition.
- English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
- English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge UniversityPress.
- English Vocabulary in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).
- Digital All
- Orell Digital Language Lab (Licensed Version)

REFERENCE BOOKS:
1. (2022). *English Language Communication Skills – Lab Manual cum Workbook.* Cengage Learning India Pvt. Ltd.
2. Shobha, KN & Rayen, J. Lourdes. (2019). *Communicative English – A workbook.* Cambridge University Press
3. Kumar, Sanjay & Lata, Pushp. (2019). *Communication Skills: A Workbook.* Oxford UniversityPress
4. Board of Editors. (2016). *ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities.* Orient Black Swan Pvt. Ltd.
5. Mishra, Veerendra et al. (2020). *English Language Skills: A Practical Approach.* Cambridge University Press.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES
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Department of Physics

Board of studies – First meeting on 18/06/2024

AGENDA

Item-1: Welcoming the distinguished members of the Board of studies for the BoS meeting by the Head of the Department.

Item-2: Review / Approval of the Academic Regulation for the B.Tech Program.

Item-3: Review / Approval of the Course Structure of B.Tech Program.

Item-4: Review / Approval of the detailed syllabus of Applied Physics theory.

Item-5: Review / Approval of the detailed syllabus of Applied Physics lab.

Item-6: Any other suggestions to the Department.

Item-7: Vote of thanks.

PRINCIPAL
Annamacharya Institute of
Technology & Sciences
Piglipur (V), Batasingaram (Post)
Abdullaoormet (M), R.R. Dist. HYD-501 512

G. Kiran Kumar

Chairperson of BoS, HOD H & S

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Department of Physics

BoS Members

S.NO	NAME	DESIGNATION	POSITION
1	Dr. P. V. Krishna Murthy	Principal, AITS, Hyderabad	Special Invitee
2	G. Kiran Kumar	HOD, H & S	Chairperson
3	Dr. K. Venkateswara Rao	Professor of Nano Technology, JNTUH UCESTH	University Nominee
4	Dr. T Ravindra Reddy	Professor, AITK, Kadapa.	Subject Expert
5	Dr. L. Obulapathi	Assoc Prof, AITS, Rajampet	Subject Expert
6	M .Amaranath	Asst. Professor, AITS	Member
7	K. Saidevi	Asst. Professor, AITS	Member
8	T. Alekya	Asst. Professor, AITS	Member

PRINCIPAL
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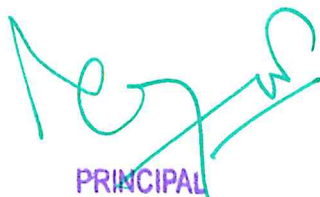
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Department of Physics

Board of Studies – First meeting on 18/06/2024

Minutes of Meeting

Suggestions made by **Dr. K. Venkateswara Rao**, University Nominee and **Dr. T Ravindra Reddy** and **Dr. L. Obulapathi** Subject Experts.

1. The committee members approved R-22 Academic Regulation for the B.Tech Program.
2. Agreed with Course Structure of B.Tech Programs:
   a. Applied Physics Theory
   b. Applied Physics Lab
3. After the detailed discussion on JNTUH'S R-22 Syllabi of Applied Physics Theory and Applied Physics Lab, it is decided to follow the same syllabus.

The following members attended for BOS meeting:

S.NO	NAME	DESIGNATION	POSITION	SIGNATURE
1	Dr. P. V. Krishna Murthy	Principal, AITS, Hyderabad	Special Invitee	
2	G. Kiran Kumar	HOD, H & S	Chairperson	
3	Dr. K. Venkateswara Rao	Professor of Nano Technology, JNTUH UCESTH	University Nominee	
4	Dr. T Ravindra Reddy	Professor, AITK, Kadapa	Subject Expert	
5	Dr. L. Obulapathi	Assoc Prof, AITS, Rajampet	Subject Expert	
6	M .Amaranath	Asst. Professor, AITS	Member	
7	K. Saidevi	Asst. Professor, AITS	Member	
8	T. Alekya	Asst. Professor, AITS	Member	

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES, HYDERABAD
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APPLIED PHYSICS

B.Tech. I Year I Sem & II Sem (Common to all branches)   L T P C

3 1 0 4

Credits distribution:

S.No	Course Name	No. of Credits allotted
1	Applied Physics	04
	Total credits for the subject	04

Course Objectives: The objectives of this course for the student are to:

1. Understand the basic principles of quantum physics and band theory of solids.
2. Understand the underlying mechanism involved in construction and working principles of various semiconductor devices.
3. Study the fundamental concepts related to the dielectric, magnetic and energy materials.
4. Identify the importance of nanoscale, quantum confinement and various fabrications techniques.
5. Study the characteristics of lasers and optical fibres.

Course Outcomes: At the end of the course the student will be able to:

1. Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.
2. Identify the role of semiconductor devices in science and engineering Applications.
3. Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
4. Appreciate the features and applications of Nanomaterials.
5. Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.

UNIT - I: QUANTUM PHYSICS AND SOLIDS

Quantum Mechanics: Introduction to quantum physics, blackbody radiation – Stefan-Boltzmann's law, Wein's and Rayleigh-Jean's law, Planck's radiation law - photoelectric effect - Davisson and Germer experiment –Heisenberg uncertainty principle - Born interpretation of the wave function — time independent Schrodinger wave equation -

particle in one dimensional potential box.

Solids: Symmetry in solids, free electron theory (Drude & Lorentz, Sommerfeld) - Fermi-Dirac distribution - Bloch's theorem -Kronig-Penney model – E-K diagram- effective mass of electron-origin of energy bands- classification of solids.

UNIT - II: SEMICONDUCTORS AND DEVICES

Intrinsic and extrinsic semiconductors — Hall effect - direct and indirect band gap semiconductors - construction, principle of operation and characteristics of P-N Junction diode, Zener diode and bipolar junction transistor (BJT)–LED, PIN diode, avalanche photo diode (APD) and solar cells, their structure, materials, working principle and characteristics.

UNIT - III: DIELECTRIC, MAGNETIC AND ENERGY MATERIALS

Dielectric Materials: Basic definitions- types of polarizations (qualitative) - ferroelectric, piezoelectric, and pyroelectric materials – applications – liquid crystal displays (LCD) and crystal oscillators.

Magnetic Materials: Hysteresis - soft and hard magnetic materials - magnetostriction, magnetoresistance - applications - bubble memory devices, magnetic field sensors and multiferroics. Energy Materials: Conductivity of liquid and solid electrolytes- superionic conductors - materials and electrolytes for super capacitors - rechargeable ion batteries, solid fuel cells.

UNIT - IV: NANOTECHNOLOGY

Nanoscale, quantum confinement, surface to volume ratio, bottom-up fabrication: sol-gel, precipitation, combustion methods — top-down fabrication: ball milling - physical vapor deposition (PVD) - chemical vapor deposition (CVD) - characterization techniques - XRD, SEM &TEM - applications of nanomaterials.

UNIT - V: LASER AND FIBER OPTICS

Lasers: Laser beam characteristics-three quantum processes-Einstein coefficients and their relations- lasing action - pumping methods- ruby laser, He-Ne laser , CO2 laser, Argon ion Laser, Nd:YAG laser-semiconductor laser-applications of laser.

Fiber Optics: Introduction to optical fiber- advantages of optical Fibers - total internal reflection- construction of optical fiber - acceptance angle - numerical aperture- classification of optical fibers- losses in optical fiber - optical fiber for communication system - applications.

TEXT BOOKS:

1. M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy" A Text book of Engineering Physics"- S. Chand Publications, 11th Edition 2019.
2. Engineering Physics by Shatendra Sharma and Jyotsna Sharma, Pearson Publication, 2019
3. Semiconductor Physics and Devices- Basic Principle — Donald A, Neamen, Mc Graw Hill, 4th Edition, 2021.
4. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2nd Edition, 2022.
5. Essentials of Nanoscience & Nanotechnology by Narasimha Reddy Katta, Typical Creatives NANO DIGEST, 1st Edition, 2021.

REFERENCE BOOKS:

1. Quantum Physics, H.C. Verma, TBS Publication, 2nd Edition 2012.
2. Fundamentals of Physics — Halliday, Resnick and Walker, John Wiley & Sons, 11th Edition, 2018.
3. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019.
4. Elementary Solid State Physics, S.L. Gupta and V. Kumar, Pragathi Prakashan, 2019.
5. A.K. Bhandhopadhya - Nano Materials, New Age International, 1st Edition, 2007.
6. Energy Materials a Short Introduction to Functional Materials for Energy Conversion and Storage Aliaksandr S. Bandarenka, CRC Press Taylor & Francis Group
7. Energy Materials, Taylor & Francis Group, 1st Edition, 2022.

APPLIED PHYSICS LAB

S.No	Course Name	No. of Credits allotted
1	Applied Physics lab	1.5
	Total credits for the lab	1.5

APPLIED PHYSICS LABORATORY

Course Objectives: The objectives of this course for the student to

1. Capable of handling instruments related to the Hall effect and photoelectric effect experiments and their measurements.
2. Understand the characteristics of various devices such as PN junction diode, Zener diode, BJT, LED, solar cell, lasers and optical fiber and measurement of energy gap and resistivity of semiconductor materials.
3. Able to measure the characteristics of dielectric constant of a given material.
4. Study the behavior of B-H curve of ferromagnetic materials.
5. Understanding the method of least squares fitting.

Course Outcomes: The students will be able to:

1. Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment.
2. Appreciate quantum physics in semiconductor devices and optoelectronics.
3. Gain the knowledge of applications of dielectric constant.
4. Understand the variation of magnetic field and behavior of hysteresis curve.
5. Carried out data analysis.

LIST OF EXPERIMENTS:
1. Determination of work function and Planck's constant using photoelectric effect.
2. Determination of Hall co-efficient and carrier concentration of a given semiconductor.
3. Characteristics of series and parallel LCR circuits.
4. V-I characteristics of a p-n junction diode and Zener diode
5. Input and output characteristics of BJT (CE, CB & CC configurations)
6. a) V-I and L-I characteristics of light emitting diode (LED)
   b) V-I Characteristics of solar cell
7. Determination of Energy gap of a semiconductor.
8. Determination of the resistivity of semiconductor by two probe method.
9. Study B-H curve of a magnetic material.
10. Determination of dielectric constant of a given material

Department of Mathematics

Board of studies – First meeting on 19/06/2024

AGENDA

Item-1: Welcoming the distinguished members of the Board of studies for the BoS meeting by the Head of the Department.

Item-2: Review / Approval of the academic regulation for the B.Tech Program.

Item-3: Review / Approval of the course structure of B.Tech Program.

Item-4: Review / Approval of the detailed syllabus of Mathematics I-I, I-II and II-I Semesters.

Item-5: Any other suggestions to the Department.

Item-6: Vote of thanks.

G. Kiran Kumar

Chairperson of BoS, HOD H & S

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Department of Mathematics

BoS Members

S.No	Name	Position	Designation In BoS
1	Dr. P. V. Krishna Murthy	Principal, AITS, Hyderabad	Special Invitee
2	G. Kiran Kumar	HOD, H & S	Chairperson
3	Dr. Y. Rajasekhar Reddy	Asst. Professor in Mathematics, JNTUH UCEJ	University Nominee
4	Dr. K V Nageswara Reddy	Professor, AITK, Kadapa	Subject Expert
5	Dr. L. Hari Krishna	Assoc. Prof, AITS, Rajampet	Subject Expert
6	A. Kavitha	Asst. Professor, AITS, Hyderabad	Member
7	B. Sailaja	Asst. Professor, AITS, Hyderabad	Member
8	M. Yakanna	Asst. Professor, AITS, Hyderabad	Member

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Department of Mathematics

Board of Studies – First meeting on 19/06/2024

<u>Minutes of Meeting</u>

Suggestions made by **Dr. Y. Rajasekhar Reddy**, University Nominee, **Dr. K V Nageswara Reddy** and **Dr. L. Hari Krishna** Subject Experts.

1. The committee members approved R-22 Academic Regulation for the B.Tech Program.
2. Agreed with Course Structure of B.Tech Programs:
   a. Matrices And Calculus
   b. Ordinary Differential Equations And Vector Calculus
3. After the detailed discussion on JNTUH'S R-22 Syllabi of Matrices And Calculus and Ordinary Differential Equations And Vector Calculus, it is decided to follow the same syllabus.

The following members attended for BOS meeting:

S.NO	NAME	DESIGNATION	POSITION	SIGNATURE
1	Dr. P. V. Krishna Murthy	Principal, AITS, Hyderabad	Special Invitee	
2	G. Kiran Kumar	HOD, H & S	Chairperson	
3	Dr. Y. Rajasekhar Reddy	Asst. Professor in Mathematics, JNTUH UCEJ	University Nominee	
4	Dr. K V Nageswara Reddy	Professor, AITK, Kadapa	Subject Expert	
5	Dr. L. Hari Krishna	Assoc Prof, AITS, Rajampet	Subject Expert	
6	A. Kavitha	Asst. Professor, AITS, Hyderabad	Member	
7	B. Sailaja	Asst. Professor, AITS, Hyderabad	Member	
8	M. Yakanna	Asst. Professor, AITS, Hyderabad	Member	

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, HYDERABAD
(AUTONOMOUS)

MATRICES AND CALCULUS

B.Tech. I Year I Sem (Common to all branches)   **L T P C**

                                                                     3 1 0 4

Credits distribution:

S.No	Course Name	No. of Credits allotted
1	MATRICES AND CALCULUS	04
	Total credits for the subject	04

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives: To learn

- Types of matrices and their properties.
  - Concept of a rank of the matrix and applying this concept to know the consistency and solvingthe system of linear equations.
  - Concept of eigen values and eigenvectors and to reduce the quadratic form to canonical form.
  - Geometrical approach to the mean value theorems and their application to the mathematicalproblems
  - Evaluation of surface areas and volumes of revolutions of curves.
  - Evaluation of improper integrals using Beta and Gamma functions.
  - Partial differentiation, concept of total derivative
  - Finding maxima and minima of function of two and three variables.
  - Evaluation of multiple integrals and their applications

Course outcomes: After learning the contents of this paper the student must be able to
- ☐ Write the matrix representation of a set of linear equations and to analyse the solution of thesystem of equations
- ☐ Find the Eigen values and Eigen vectors
- ☐ Reduce the quadratic form to canonical form using orthogonal transformations.
- ☐ Solve the applications on the mean value theorems.
- ☐ Evaluate the improper integrals using Beta and Gamma functions
- ☐ Find the extreme values of functions of two variables with/ without constraints.
- ☐ Evaluate the multiple integrals and apply the concept to find areas, volumes

UNIT - I: Matrices   **10 L**

Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-

Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Gauss Seidel Iteration Method.

UNIT - II: Eigen values and Eigen vectors   10 L

Linear Transformation and Orthogonal Transformation: Eigenvalues, Eigenvectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT - III: Calculus   10 L

Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem, Taylor's Series.
Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT - IV: Multivariable Calculus (Partial Differentiation and applications)   10 L

Definitions of Limit and continuity.
Partial Differentiation: Euler's Theorem, Total derivative, Jacobian, Functional dependence & independence. Applications: Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

UNIT-V: Multivariable Calculus (Integration)   8 L

Evaluation of Double Integrals (Cartesian and polar coordinates), change of order of integration (only Cartesian form), Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and(Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals.
Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Editon, 2016.

REFERENCE BOOKS:

1. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9[th]Edition,Pearson, Reprint,2002.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications,Reprint, 2008.
4. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and CompanyLimited, New Delhi.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, HYDERABAD (AUTONOMOUS)

ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

B.Tech. I Year I Sem (Common to all branches)   **L T P C**

                                                            3 1 0 4

Credits distribution:

S.No	Course Name	No. of Credits allotted
1	ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	04
	Total credits for the subject	04

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives: To learn

- ☐ Methods of solving the differential equations of first and higher order.
- ☐ Concept, properties of Laplace transforms
- ☐ Solving ordinary differential equations using Laplace transforms techniques.
- ☐ The physical quantities involved in engineering field related to vector valued functions
- ☐ The basic properties of vector valued functions and their applications to line, surface and volume integrals

Course outcomes: After learning the contents of this paper the student must be able to
- ☐ Identify whether the given differential equation of first order is exact or not
- ☐ Solve higher differential equation and apply the concept of differential equation to real world problems.
- ☐ Use the Laplace transforms techniques for solving ODE's.
- ☐ Evaluate the line, surface and volume integrals and converting them from one to another

UNIT-I: First Order ODE   8 L
Exact differential equations, Equations reducible to exact differential equations, linear and Bernoulli's equations, Orthogonal Trajectories (only in Cartesian Coordinates). Applications: Newton's law of cooling, Law of natural growth and decay.

UNIT-II: Ordinary Differential Equations of Higher Order   **10**   **L**   Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax}, sin ax , cos ax, polynomials in x, $e^{ax}V(x)$ and $x\ V(x)$, method of variation of parameters, Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation. Applications: Electric Circuits

UNIT-III: Laplace transforms   **10 L**
Laplace Transforms: Laplace Transform of standard functions, First shifting theorem, Second shifting theorem, Unit step function, Dirac delta function, Laplace transforms of functions when they are multiplied and divided by 't', Laplace transforms of derivatives and integrals of function, Evaluation of integrals by Laplace transforms, Laplace transform of periodic functions, Inverse Laplace transform by different methods, convolution theorem (without proof). Applications: solving Initial value problems by Laplace Transform method.

UNIT-IV: Vector Differentiation   **10 L**
Vector point functions and scalar point functions, Gradient, Divergence and Curl, Directional derivatives, Tangent plane and normal line, Vector Identities, Scalar potential functions, Solenoidal and Irrotational vectors.

UNIT-V: Vector Integration   **10 L**
Line, Surface and Volume Integrals, Theorems of Green, Gauss and Stokes (without proofs) and their applications.

TEXT BOOKS:
1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. .K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Edition, 2016.

REFERENCE BOOKS:
1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
3. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

COMPUTER ORIENTED STATISTICAL METHODS (CSE & CSE - DS)

B.Tech. II Year I Sem.   L   T   P   C

                                                                 3   1   0   4

Pre-requisites: Mathematics courses of first year of study.

Course Objectives: To learn

- ☐ The theory of Probability, Probability distributions of single and multiple random variables
- ☐ The sampling theory, testing of hypothesis and making statistical inferences
- ☐ Stochastic process and Markov chains.

Course outcomes: After learning the contents of this paper the student must be able to

- ☐ Apply the concepts of probability and distributions to case studies.
- ☐ Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.
- ☐ Apply concept of estimation and testing of hypothesis to case studies.
- ☐ Correlate the concepts of one unit to the concepts in other units.

UNIT - I: Probability   10 L

Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Baye's Rule,
Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions.

UNIT - II: Expectation and discrete distributions   10 L

Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem.
Discrete Probability Distributions: Binomial Distribution, Poisson distribution.

UNIT - III: Continuous and Sampling Distributions   10 L

Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial Distributions.

Fundamental Sampling Distributions: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, t - Distribution, F- Distribution.

UNIT - IV: Sample Estimation & Tests of Hypotheses   10 L

Introduction, Statistical Inference, Classical Methods of Estimation, Single Sample: Estimating the mean, standard error of a point estimate, prediction interval. Two sample: Estimating the difference between two means, Single sample: Estimating a proportion, Two samples: Estimating the difference between two proportions, Two samples: Estimating the ratio of two variances.

Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Single sample: Tests concerning a single mean, Two samples: tests on two means, One sample: test on a single proportion. Two samples: tests on two proportions, Two-sample tests concerning variances.

UNIT-V: Stochastic Processes and Markov Chains   8L

Introduction to Stochastic processes- Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, n-step transition probabilities, Markov chain, Steady state condition, Markov analysis.

TEXT BOOKS:

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics For Engineers & Scientists, 9th Ed. Pearson Publishers.

2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.

3. S.D.Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi.

REFERENCE BOOKS:

1. T.T. Soong, Fundamentals of Probability and Statistics For Engineers, John Wiley & Sons, Ltd, 2004.

2. Sheldon M Ross, Probability and statistics for Engineers and scientists, academic press.

3. Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, Pearson Educations.

PROBABILITY AND STATISTICS (CIVIL)

B.Tech. II Year I Sem.
L T P C
3 1 0 4

Pre-requisites: Mathematics courses of first year of study.

Course Objectives: To learn
☐ The theory of Probability, and probability distributions of single and multiple random variables
☐ The sampling theory and testing of hypothesis and making statistical inferences

Course outcomes: After learning the contents of this paper the student must be able to
☐ Apply the concepts of probability and distributions to some case studies.
☐ Correlate the concepts of one unit to the concepts in other units.

UNIT - I: Probability 8 L
Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Baye's Rule. Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions.

UNIT - II: Expectation and discrete distributions 10 L
Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem. Discrete Probability Distributions: Binomial Distribution, Poisson distribution.

UNIT - III: Continuous Distributions and sampling 10 L
Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial Distributions. Fundamental Sampling Distributions: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, t –Distribution, FDistribution.

UNIT - IV: Estimation & Tests of Hypotheses 10 L
Introduction, Statistical Inference, Classical Methods of Estimation, Single Sample: Estimating the mean, standard error of a point estimate, prediction interval. Two sample: Estimating the difference between two means, Single sample: Estimating a proportion, Two samples: stimating the difference between two proportions, Two samples: Estimating the ratio of two variances. Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Single sample: Tests concerning a single mean, Two samples: tests on two means, One sample: test on a single proportion. Two samples: tests on two proportions, Two- sample tests concerning variances.

UNIT - V: Applied Statistics 10 L
Curve fitting by the method of least squares, fitting of straight lines, second degree parabolas and more general curves, Correlation and regression, Rank correlation.

TEXT BOOKS:
1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics for Engineers & Scientists, 9th Ed. Pearson Publishers.
2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.

REFERENCE BOOKS:
1. T. T. Soong, Fundamentals of Probability and Statistics for Engineers, John Wiley & Sons, Ltd, 2004.
2. Sheldon M Ross, Probability and statistics for Engineers and scientists, academic press.

NUMERICAL METHODS AND COMPLEX VARIABLES (EEE & ECE)

B.Tech. II Year I Sem.   **L T P C**
3 1 0 4

Pre-requisites: Mathematics courses of first year of study.

Course Objectives: To learn
☐ Expressing periodic function by Fourier series and a non-periodic function by Fourier transforms
☐ Various numerical methods to find roots of polynomial and transcendental equations.
☐ Concept of finite differences and to estimate the value for the given data using interpolation.
☐ Evaluation of integrals using numerical techniques
☐ Solving ordinary differential equations of first order using numerical techniques.
☐ Differentiation and integration of complex valued functions.
☐ Evaluation of integrals using Cauchy's integral formula and Cauchy's residue theorem.
☐ Expansion of complex functions using Taylor's and Laurent's series.

Course outcomes: After learning the contents of this paper the student must be able to
☐ Express any periodic function in terms of sine and cosine
☐ Find the root of a given polynomial and transcendental equations.
☐ Estimate the value for the given data using interpolation
☐ Find the numerical solutions for a given first order ODE's
☐ Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems
☐ Taylor's and Laurent's series expansions in complex function

UNIT-I: Fourier Series &Fourier Transforms: 10 L
Fourier series - Dirichlet's Conditions - Half-range Fourier series - Fourier Transforms: Fourier Sine and cosine transforms - Inverse Fourier transforms.

UNIT-II: Numerical Methods-I 10 L
Solution of polynomial and transcendental equations: Bisection method, Iteration Method, Newton- Raphson method and Regula-Falsi method. Jacobi and Gauss-Seidal iteration methods for solving linear systems of equations. Finite differences: forward differences, backward differences, central differences, symbolic relations and separation of symbols, Interpolation using Newton's forward and backward difference formulae. Central difference interpolation: Gauss's forward and backward formulae, Lagrange's method of interpolation.

UNIT-III: Numerical Methods-II 8 L
Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8th rules. Ordinary differential equations: Taylor's series, Picard's method, Euler and modified Euler's methods, Runge-Kutta method of fourth order for first order ODE

UNIT-IV: Complex Differentiation 10 L
Limit, Continuity and Differentiation of Complex functions. Cauchy-Riemann equations (without proof), Milne- Thomson methods, analytic functions, harmonic functions, finding harmonic conjugate, elementary analytic functions (exponential, trigonometric, logarithm) and their properties. (All theorems without Proofs), Conformal mappings, Mobius transformations.

UNIT-V: Complex Integration: 10 L
Line integrals, Cauchy's theorem, Cauchy's Integral formula, zeros of analytic functions, singularities, Taylor's series, Laurent's series, Residues, Cauchy Residue theorem.
and their properties. (All theorems without Proofs)

TEXT BOOKS:
1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.
REFERENCE BOOKS:
1. M. K. Jain, S.R.K. Iyengar, R.K. Jain, Numerical methods for Scientific and Engineering Computations, New Age International publishers.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Edition, Mc-Graw Hill,
2004.

PROBABILITY, STATISTICS & COMPLEX VARIABLES (MECH)

B.Tech. II Year I Sem.　　　⌊　　　　　　　　⌉　　　　　**L T P C**
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Pre-requisites: Mathematics courses of first year of study.

Course Objectives: To learn
☐ The ideas of probability and random variables and various discrete and continuous probability distributions and their properties.
☐ The basic ideas of statistics including measures of central tendency, correlation and regression.
☐ The statistical methods of studying data samples.
☐ Differentiation and integration of complex valued functions.
☐ Evaluation of integrals using Cauchy's integral formula and Cauchy's residue theorem.
☐ Expansion of complex functions using Taylor's and Laurent's series.

Course outcomes: After learning the contents of this paper the student must be able to
☐ Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.
☐ Apply concept of estimation and testing of hypothesis to case studies.

☐ Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems.
☐ Taylor's and Laurent's series expansions of complex function.

UNIT-I: Basic Probability 8 L
Probability spaces, conditional probability, independent events, and Baye's theorem.
Random variables: Discrete and continuous random variables, Expectation of Random Variables, Variance of random variables

UNIT-II: Probability distributions 10 L
Binomial, Poisson, evaluation of statistical parameters for these distributions, Poisson approximation to the binomial distribution, Continuous random variables and their properties, distribution functions and density functions, Normal and exponential, evaluation of statistical parameters for these distributions\

UNIT-III: Estimation & Tests of Hypotheses 10 L
Introduction, Statistical Inference, Classical Methods of Estimation.: Estimating the Mean, Standard Error of a Point Estimate, Prediction Intervals, Estimating a Proportion for single sample, Difference between Two Means, difference between two proportions for two Samples. Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Tests Concerning a Single Mean, Tests on Two Means, Test on a Single Proportion, Two Samples: Tests on Two Proportions.

UNIT-IV: Complex Differentiation 10 L
Limit, Continuity and Differentiation of Complex functions, Analyticity, Cauchy-Riemann equations (without proof), finding harmonic conjugate, elementary analytic functions (exponential, trigonometric, logarithm) and their properties, Conformal mappings, Mobius transformations.

UNIT-V: Complex Integration 10 L
Line integral, Cauchy's theorem, Cauchy's Integral formula, Zeros of analytic functions, Singularities, Taylor's series, Laurent's series, Residues, Cauchy Residue theorem (All theorems without Proof).

TEXT BOOKS:
1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2010.
2. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, keying Ye, Probability and statistics for engineers and scientists, 9th Edition, Pearson Publications.

REFERENCE BOOKS:
1. Fundamentals of Mathematical Statistics, Khanna Publications, S. C. Guptha and V. K. Kapoor.
2. Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, Pearson Educations.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
4. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Edition, Mc-Graw Hill,
2004.

MATHEMATICAL AND STATISTICAL FOUNDATIONS (CSE - AIML)

B.Tech. II Year I Sem.

L T P C
3 1 0 4

Prerequisites: Mathematics courses of first year of study.

Course Objectives:
☐ The Number Theory basic concepts useful for cryptography etc
☐ The theory of Probability, and probability distributions of single and multiple random variables
☐ The sampling theory and testing of hypothesis and making inferences
☐ Stochastic process and Markov chains.

Course Outcomes: After learning the contents of this course, the student must be able to
☐ Apply the number theory concepts to cryptography domain
☐ Apply the concepts of probability and distributions to some case studies
☐ Correlate the material of one unit to the material in other units
☐ Resolve the potential misconceptions and hazards in each topic of study.

UNIT - I
Greatest Common Divisors and Prime Factorization: Greatest common divisors, The Euclidean algorithm, The fundamental theorem of arithmetic, Factorization of integers and the Fermat numbers Congruences: Introduction to congruences, Linear congruences, The Chinese remainder theorem, Systems of linear congruences

UNIT - II
Simple Linear Regression and Correlation: Introduction to Linear Regression, The Simple Linear Regression Model, Least Squares and the Fitted Model, Properties of the Least Squares Estimators, Inferences Concerning the Regression Coefficients, Prediction, Simple Linear Regression Case Study Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions, Statistical Independence. Discrete Probability Distributions: Binomial Distribution, Poisson distribution.

UNIT - III
Continuous Probability Distributions: Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial Fundamental Sampling Distributions: Random Sampling, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, Sampling Distribution of S2, t–Distribution, FDistribution.

UNIT - IV
Estimation & Tests of Hypotheses: Introduction, Statistical Inference, Classical Methods of Estimation. Estimating the Mean, Standard Error of a Point Estimate, Prediction Intervals, Tolerance Limits, Estimating the Variance, Estimating a Proportion for single mean, Difference between Two Means, between Two Proportions for Two Samples and Maximum Likelihood Estimation.

UNIT - V

Stochastic Processes and Markov Chains: Introduction to Stochastic processes- Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, nstep transition probabilities, Markov chain, Steady state condition, Markov analysis.

TEXT BOOKS:

1. Kenneth H. Rosen, Elementary number theory & its applications, sixth edition, Addison-Wesley, ISBN 978 0-321-50031-1
2. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics for Engineers & Scientists, 9th Ed. Pearson Publishers.
3. S. D. Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi

REFERENCE BOOK:

1. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications
2. T.T. Soong, Fundamentals of Probability And Statistics For Engineers, John Wiley & Sons Ltd, 2004.
3. Sheldon M Ross, Probability and statistics for Engineers and scientists, Academic Press.