

COURSE OF STUDY
B.Tech. First Year-2019 batch



National Institute of Technology Srinagar

National Institute of Technology

1st Semester (Group A)

Electrical / Electronics & Comm. / Computer Science / Information Technology

S. No.	Course Code	Course Title	Department Offering	Credit	Contact Hours			
					L	T	P	Total
1	EEL100	Basic Electrical Engineering	Electrical	4	3	1	0	4
2	HUL100	Basic English and Communication Skills	Humanities	3	2	1	0	3
3	ITL100	Computer Programming	Information Technology	3	2	1	0	3
4	CYL100	Engineering Chemistry	Chemistry	4	3	1	0	4
5	CIP100	Engineering Drawing	Civil	4	1	0	6	7
6	MAL100	Mathematics I	Mathematics	4	3	1	0	4
7	ELP100	Basic Electrical Engineering Laboratory	Electrical	1	0	0	2	2
8	CYP100	Chemistry Laboratory	Chemistry	1	0	0	2	2
9	ITP100	Computer Programming Laboratory	Information Technology	1	0	0	2	2
		Total		25	14	5	12	31

1st Semester (Group B)

Civil/ Mechanical / Chemical / Mett & Mat Science

S. No.	Course Code	Course Title	Department Offering	Credit	Contact Hours			
					L	T	P	Total
1	MEL100	Elements of Mechanical Engg.	Mechanical	3	2	1	0	3
2	PHL100	Engineering Physics	Physics	4	3	1	0	4
3	CIL100	Engineering Mechanics	Civil	4	3	1	0	4
4	HUL100	Basic English and Communication Skills	Humanities	3	2	1	0	3
5	CYL101	Environmental Studies	Chemistry	3	2	1	0	3
6	MAL100	Mathematics I	Mathematics	4	3	1	0	4
7	HUP100	Language Laboratory	Humanities	1	0	0	2	2
8	PHP100	Physics Laboratory	Physics	1	0	0	2	2
9	WSP100	Work shop Practice	Work shop	2	0	0	5	5
		Total		25	15	6	9	30

National Institute of Technology

2nd Semester (Group A)

Electrical / Electronics & Comm. / Computer Science / Information Technology

S. No.	Course Code	Course Title	Department Offering	Credit	Contact Hours			
					L	T	P	Total
1	HUL101	Advanced English Comm. Skills & Organizational Behavior	Humanities	3	2	1	0	3
2	PHL100	Engineering Physics	Physics	4	3	1	0	4
3	CIL100	Engineering Mechanics	Civil	4	3	1	0	4
4	MEL100	Elements of Mechanical Engg.	Mechanical	3	2	1	0	3
5	CYL101	Environmental Studies	Chemistry	3	2	1	0	3
6	MAL101	Mathematics II	Mathematics	4	3	1	0	4
7	HUP100	Language Laboratory	Humanities	1	0	0	2	2
8	PHP100	Physics Laboratory	Physics	1	0	0	2	2
9	WSP100	Work shop Practice	Work shop	2	0	0	5	5
		Total		25	15	6	8	30

2nd Semester (Group B)

Civil/ Mechanical / Chemical / Mett & Mat Science

S. No.	Course Code	Course Title	Department Offering	Credit	Contact Hours			
					L	T	P	Total
1	HUL101	Advanced English Comm. Skills & Organizational Behavior	Humanities	3	2	1	0	3
2	EEL100	Basic Electrical Engineering	Electrical	4	3	1	0	4
3	ITL100	Computer Programming	Information Technology	3	2	1	0	3
4	CYL100	Engineering Chemistry	Chemistry	4	3	1	0	4
5	CIP100	Engineering Drawing	Civil	4	1	0	6	7
6	MAL101	Mathematics II	Mathematics	4	3	1	0	4
7	ELP100	Basic Electrical Engineering Laboratory	Electrical	1	0	0	2	2
8	CYP100	Chemistry Laboratory	Chemistry	1	0	0	2	2
9	ITP100	Computer Programming Laboratory	Information Technology	1	0	0	2	2
		Total		25	14	5	12	31



DEPARTMENT OF ELECTRICAL ENGINEERING NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR

Subject: Basic Electrical Engineering (ELE-301)	Syllabus for B.Tech:- 1stYear(1stSem) ELE/ECE/CSE/IT		Total CourseCredit:4		
Mid-Term	Class Assessment	Final-Term	L	T	P
30 (Marks)	10 (Marks)	60 (Marks)	3	1	0

Course Objective: To acquaint the students with the behavior of electric circuits with different excitations and to learn different techniques of AC and DC circuit analysis.

Course Outcomes (COs) : Upon successful completion of the course , student should be able to:

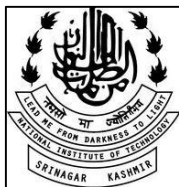
- CO1:** Analyze the behavior of different electric circuit parameters and have a thorough understanding of different types of energy sources.
- CO2:** Analyze the different configurations of DC circuits using basic circuit laws like KVL, KCL and tools like mesh analysis and nodal analysis.
- CO3:** Apply network analysis theorems like Superposition theorem, Thevenin's theorem, Norton's theorem and Maximum Power Transfer theorem to DC circuits and networks.
- CO4:** Use phasor representation for steady state analysis of sinusoidally excited AC circuits and apply different network techniques for their analysis.
- CO5:** Understand the concept of active, reactive power and power factor correction in AC circuits.
- CO6:** Analyze various configurations of 3-phase AC circuits.

UNIT-I	<p>Basic Concepts and Electric Circuit Parameters:</p> <p>Review of electric circuit concepts, terminology, basic laws, and electric circuit parameters.</p> <p>ENERGY SOURCES: Ideal and practical voltage and current sources and their transformation, Independent and dependent sources.</p>
UNIT-II	<p>D.C. Circuit Analysis:</p> <p>Power and energy relations, Analysis of series parallel D.C. Circuits, Loop and nodal methods of analysis, Delta-star(Δ-Y) transformation, Superposition theorem, Thevenin's and Norton's theorems, Maximum power transfer theorem.</p>

UNIT-III	<p>Sinusoidal Steady State Analysis of AC Circuits:</p> <p>Basic terminology and definitions, Phasor and complex number representation solutions of sinusoidally excited AC circuits, Power and energy relations in A.C. circuits, Applications of network theorems to A.C. circuits, Resonance in series and parallel circuits.</p>
UNIT-IV	<p>AC Power Analysis</p> <p>Power and energy relations in AC circuits, Instantaneous power and apparent power, Average power, Concept of power factor, Active and reactive power, Complex power, Maximum power transfer theorem, Power factor corrections.</p>
UNIT-V	<p>Steady State Three- Phase AC Circuits:</p> <p>Characteristics of 3 phase systems, Current and voltage relationships in Δ-Y & Y-Δ configurations, Balanced / un-balanced systems.</p>

Books Recommended:

Text Books	<ol style="list-style-type: none"> 1. Alexander & Sadiku: Fundamentals of Electric Circuits, 6th Edition McGraw Hill Education. 2. Irwin & Nelms: Basic Engineering Circuit Analysis, 7th Edition, John Wiley and Sons Ltd. 3. Vincent Del Toro: Electric Engineering Fundamentals, 2nd Edition, Pearson Education India.
Reference Books	<ol style="list-style-type: none"> 4. Sergio Franco: Electric Circuit Fundamentals, Oxford University Press 5. Johnson & Hilburn: Basic Electric Circuit Analysis, 5th Edition, John Wiley & Sons Ltd. 6. Hayt & Kimmerly: Engineering Circuit Analysis, 8th Edition, McGraw Hill Education.



DEPARTMENT OF ELECTRICAL ENGINEERING NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR

Subject: Basic Electrical Engineering (ELE-301)	Syllabus for B.Tech: 1stYear(2ndSem) CIV/MECH/MET/CHEM		Total CourseCredit:4		
Mid-Term	Class Assessment	Final-Term	L	T	P
30 (Marks)	10 (Marks)	60 (Marks)	3	1	0

Course Objective: To acquaint the students with the behavior of electric circuits with different excitations and to learn different techniques of AC and DC circuit analysis.

Course Outcomes (COs) : Upon successful completion of the course , student should be able to:

- CO1:** Analyze the behavior of different electric circuit parameters and have a thorough understanding of different types of energy sources.
- CO2:** Analyze the different configurations of DC circuits using basic circuit laws like KVL, KCL and tools like mesh analysis and nodal analysis.
- CO3:** Apply network analysis theorems like Superposition theorem, Thevenin's theorem, Norton's theorem and Maximum Power Transfer theorem to DC circuits and networks.
- CO4:** Use phasor representation for steady state analysis of sinusoidally excited AC circuits and apply different network techniques for their analysis.
- CO5:** Understand the concept of active, reactive power and power factor correction in AC circuits.
- CO6:** Understand the working and application of DC and AC electric machines, and transformers.

UNIT-I	<p>Basic Concepts and Electric Circuit Parameters</p> <p>Review of electric circuit concepts, terminology, basic laws, and electric circuit parameters.</p> <p>ENERGY SOURCES: Ideal and practical voltage and current sources and their transformation, Independent and dependent sources.</p>
UNIT-II	<p>D.C. Circuit Analysis:</p> <p>Power and energy relations, Analysis of series parallel D.C. Circuits, Loop and nodal methods of analysis, Delta-star(Δ-Y) transformation, Superposition theorem, Thevenin's and Norton's theorems, Maximum power transfer theorem.</p>

UNIT-III	<p>Sinusoidal Steady State Analysis of AC Circuits:</p> <p>Basic terminology and definitions, Phasor and complex number representation solutions of sinusoidally excited AC circuits, Power and energy relations in A.C. circuits, Applications of network theorems to A.C. circuits, Resonance in series and parallel circuits.</p>
UNIT-IV	<p>AC Power Analysis</p> <p>Power and energy relations in AC circuits, Instantaneous power and apparent power, Average power, Concept of power factor, Active and reactive power, Complex power, Maximum power transfer theorem, Power factor corrections.</p>
UNIT-V	<p>Electric Machines and Transformers:</p> <p>Principle of operation, Construction and working of i) DC machines ii) AC machines iii) Single phase transformers.</p>

Books Recommended:

Text Books	<ol style="list-style-type: none"> 1. Alexander & Sadiku: Fundamentals of Electric Circuits, 6th Edition McGraw Hill Education. 2. Irwin & Nelms: Basic Engineering Circuit Analysis, 7th Edition, John Wiley and Sons Ltd. 3. Vincent Del Toro: Electric Engineering Fundamentals, 2nd Edition, Pearson Education India 4. Nagarath, I.J & Kothari: Electric Machines, 4th Edition, Tata McGraw-Hill Company
Reference Books	<ol style="list-style-type: none"> 5. Sergio Franco: Electric Circuit Fundamentals, Oxford University Press 6. Johnson & Hilburn: Basic Electric Circuit Analysis, 5th Edition, John Wiley & Sons Ltd. 7. Vincent Del Toro: Basic Electric Machines, Prentice Hall.

Course for B. Tech Semester 1

Course Title: Basic English and Communication Skills

Course Code: HUL 100

Credit Hours: 03

Programme: B. Tech Semester 1

Course Description: The course is designed to develop basic reading, writing, speaking, and listening skills of the students. It is organized in a manner that the reading, vocabulary, grammar, and writing exercises are interconnected, contextual as well as non-contextual. It helps them to learn effective reading techniques enabling them to identify main ideas and to glean details from a text. The course facilitates an understanding of word structure and thereby enrichment in vocabulary. It also assists the students to acquire knowledge on formal writing skills. The presentation skills taught through the course intends to enhance the expressive skills of the students such that they are able to express their feelings, thoughts, and expressions effectively to the listeners.

Course Objectives: The course intends to help the students do the following:

1. Learn the techniques of effective reading and good comprehension.
2. Develop an understanding of word structure and word formation.
3. Enrich their vocabulary by learning antonyms, synonyms and the meaning and applications of words pertaining to various parts of speech.
4. Use grammatical elements such as articles, prepositions, tenses, modifiers and noun-pronoun and subject-verb agreement correctly.
5. Learn the structure and style of sentences and paragraphs.
6. Study the nature and style of formal letters.
7. Learn the nature and style of formal writing.
8. Focus on the sound system in English and learn correct pronunciation.
9. Focus and learn stress, rhythm, and intonation in English.
10. Develop their presentation skills.

Syllabus Components:

Unit 1: Reading and Comprehension Skills - I

1. Importance and techniques of effective reading
Essay 1: The Raman Effect + Supplementary Reading Passages
2. Improving Comprehension skills, techniques for good comprehension
Essay 2: Ancient Architecture in India + Supplementary Reading Passages
3. Skimming and scanning
Essay 3: Blue Jeans + Supplementary Reading Passages

Unit 2: Vocabulary - I

1. Word formation, use of prefixes and suffixes
2. Synonyms and antonyms
3. Prefixes and Suffixes from foreign languages, words from foreign languages

Unit 3: Grammar

1. Articles and Prepositions
2. Noun-pronoun agreement and subject-verb agreement
3. Tenses and Misplaced modifiers

Unit 4: Formal Writing Skills

1. Sentences and Paragraphs: Sentence structures, phrases and clauses, techniques for writing precisely, paragraph writing, organising principles of paragraphs in documents
2. Letter writing: Formal letters, letter of complaint, requisition letter
3. Formal writing: Nature and style of formal writing; Use of topic sentences and thesis statements.

Unit 5: Basic Presentation and Speaking Skills

An overview of the sound system in English: Vowels and Consonants
IPA (International Phonetic Alphabet) symbols
Pronunciation (Activities based on audio tapes)
Stress, Rhythm, Intonation
Accent: British English and American English
Presentation Skills

Course Outcomes: Upon completion of this course the student will have reliably demonstrated basic reading, writing, listening, and speaking abilities.

CO1. Given an academic reading passage the student will be able to:

1. Identify the main idea(s) in the text
2. Identify specific details

CO2. Given questions on vocabulary, the students will be able to:

1. Form words using prefixes and suffixes
2. Define and use antonyms and synonyms
3. Define and use words of foreign origin
4. Demonstrate a significant increase in word knowledge

CO3. Given questions on grammar, the student will be able to:

1. Produce accurate grammatical forms of articles and prepositions
2. Recognize and incorporate proper grammatical forms of verb tense, modifiers, noun-pronoun and subject-verb agreement.

CO4. Given a writing prompt, the student will be able to:

1. Use a variety of accurate sentence structures
2. Write a paragraph with a topic sentence, supporting and concluding sentence
3. Produce coherent and unified paragraphs
4. Write a thesis statement that addresses the writing prompt
5. Write formal letters

CO5. Given questions on English phonetics and presentation prompts, the student will be able to:

1. Demonstrate phonemic awareness
2. Recognize all vowel and consonant sounds in spoken English through the help of IPA (International Phonetic Alphabet) symbols
3. Perceive and generate syllable stress within words and word stress within phrases
4. Identify stressed and unstressed syllables in multi-syllabic words
5. Detect rhythm in phrases and sentences
6. Employ the rules and patterns of intonation

7. Exhibit British and American Accent
8. Given a topic to present, the student will be able to give an oral presentation in class using effective delivery strategies

Reference Books:

1. *English for Engineers*. By N. P. Sudharshana and C. Savitha. Cambridge University Press, 2018.
2. *Oxford Guide to Effective Writing and Speaking Skills*. By John Seely. Oxford University Press, Indian Edition, 2008.
3. *Professional Speaking Skills*. By ArunaKoneru. Oxford University Press, 2015.
4. *Intermediate English Grammar: Reference and Practice for South Asian Students*. By Raymond Murphy. Cambridge University Press, 1994.

Syllabus for B. Tech Semester 2

Course Title: Advanced English Communication Skills and Organizational Behaviour

Course Code: HUL 101

Credit Hours: 03

Programme: B. Tech Semester 2

Course Description: The course is designed to augment the reading, writing, and speaking skills of the students. It graduates from the basic level course offered in the previous semester to an advanced level. The reading, vocabulary, grammar, and writing exercises are interconnected, contextual as well as non-contextual. It also intends to teach them the norms of academic and research writing along with job-application and project proposal writing. It trains the students to speak grammatically correct English fluently and confidently in everyday as well as professional situations such as group discussions and job interviews. The course also enable the students to understand the concept of organization, organizational structure, and organizational behavior and its relevance in today's business environment. Students will be acquainted with the concepts of motivation and leadership.

Course Objectives: The course aims to help the students do the following:

1. Improve reading comprehension skills through intensive and extensive reading
2. Summarize and paraphrase information in a text
3. Identify author's purpose and tone
4. Recognize and rectify common errors in grammar
5. Use punctuation to the best purpose
6. Make use of modals and active and passive voice appropriately
7. Learn the norms of academic and research writing
8. Learn the steps in report writing, along with the types and outline of reports
9. Get acquainted with the APA and MLA referencing styles
10. Familiarize with the standards of email writing
11. Get accustomed with the structure of job cover letters
12. Learn the structure and contents of résumé
13. Learn the essentials of successful project proposal
14. Speak grammatically correct English fluently and confidently in everyday as well as professional situations
15. Understand the basic concept of organisation, its need importance and process.
16. Know the organisational structure and different types of organisations
17. Understand the relevance of organizational behaviour in today's business world.
18. Gain knowledge about various theories of motivation and leadership in an organisation.

Syllabus Components:

Unit 1: Advanced Reading and Comprehension Skills

1. Intensive and extensive reading
Essay 1: What Should You Be Eating?+ Supplementary Reading Passages
2. Improving Comprehension skills, techniques for good comprehension
Essay 2: How a Chinese Billionaire Build Her Fortune + Supplementary Reading Passages

Unit 2: Grammar

1. Common errors in Grammar
2. Punctuation

3. Use of modals
4. Active and Passive Voice

Unit 3: Academic and research writing skills

1. Introduction to Academic and Research writing.
2. Precautions in Academic and research writing.
3. Report writing: Steps in report writing; Types of reports, business and technical reports.
4. Referencing styles (APA and MLA Styles)

Unit 4: Successful job-application and project-proposal writing

1. Professional email writing.
2. Structure and content of Job Cover letters.
3. Structure and contents of Résumé.
4. Essentials of a successful project proposal.

Unit 5: Advanced Presentation and Speaking Skills

1. Body Language and Barriers to Communication
2. Greetings, Introductions, Small Talks
3. Expressing Opinions, Agreement and Disagreement.
4. Group discussions and job interviews.

Unit 6: Organization

1. Organization: Introduction, definition, need and importance, principles and process of organizing
2. Organizational structure and its types, span of control, authority, Centralization and decentralization of authority.

Unit 7: Organizational Behavior

1. Organizational Behavior: Introduction, definition, goals and importance of OB, approaches to OB and its relevance in today's Business Environment.
2. Meaning and Concept of Motivation, Types and theories of Motivation, Personality, Leadership and Interpersonal Skills.

Course Outcomes: Upon completion of this course the student will have reliably demonstrated basic reading, writing, listening, and speaking abilities.

CO1. Given an academic reading passage, the student will be able to:

1. Distinguish main idea(s) from supporting details and distinguish fact from opinion
2. Identify author's purpose and tone
3. Summarize and paraphrase information in a text

CO2. Given questions on grammar, the student will be able to

1. Recognize and rectify common errors in grammar
2. Use punctuation to the best purpose
3. Use modals correctly
4. Identify active and passive voice in sentences and transform a sentence in one voice into another

CO3. Given a writing prompt, the student will be able to:

1. Produce an academic research essay

2. Write a formal report
3. Write bibliography accurately as per the APA and MLA styles of referencing

CO4. Given a writing prompt, the student will be able to:

1. Write a professional email
2. Write a job cover letter
3. Write a résumé with its essential elements
4. Write a project proposal with its essential elements.

CO5. Given directions to communicate orally, the student will be able to:

1. Greet others, introduce him/herself, and initiate small talks fluently and confidently.
2. Express opinions and effectively show agreement and disagreement with the opinions of others
3. Participate and be sufficiently understood in group discussions
4. Prepare for interviews by demonstrating learning and verbal and non-verbal communication skills during mock interviews.

CO6. The students will be able to:

1. Define and explain the term organisation, and its need
2. Discuss importance and steps involved in organisation
3. Describe organisational structure and various types of organisation

CO7. The students will be able to:

1. Demonstrate the relevance of organisational behaviour in today's business environment with different theories of Organizational Behaviour.

Reference Books:

1. *English for Engineers*. By N. P. Sudharshana and C. Savitha. Cambridge University Press, 2018.
2. *Oxford Guide to Effective Writing and Speaking Skills*. By John Seely. Oxford University Press, Indian Edition, 2008.
3. *Professional Speaking Skills*. By Aruna Koneru. Oxford University Press, 2015.
4. *Intermediate English Grammar: Reference and Practice for South Asian Students*. By Raymond Murphy. Cambridge University Press, 1994.
5. *Organisational Behaviour*. By Robins. Prentice Hall.
6. *Organisational behaviour*. By Fred Luthans. McGraw Hill
7. *Leadership for Engineers: The Magic Mindset*. By George Runcie. McGraw Hill Higher Education.

Books for supplementary readings:

1. Robins. P. S, Judge. A. T and Vohra. N, 2017 "Organisational Behaviour", Pearson. Rs. 500
2. Khanka. S. S, 2006 "Organisational Behaviour" S Chand Rs. 499
3. Sing. C and Khatri. A, 2016, "Principle and practices of management and Organisational Behaviour" Rs. 450
4. Northhouse. G. P, 2014, "Leadership: Theory and Practices", Sage Publications India Ltd Rs.509

Language Lab Course (HUP100)

The course is designed for students who need to develop better listening, speaking, and presentation skills in English language. This course is specifically targeted towards those students for whom English is not their first language. Audio-video interaction and exercises based on language lab software will improve listening and pronunciation skills of the students such that they will be able to interpret and replicate what they hear in English. The course instructor will encourage and help students to speak grammatically correct English with fluency and confidence. The presentation skills taught through the course intends to enhance the expressive skills of the students such that they are able to express their feelings, thoughts, and expressions effectively to the listeners.

Course Objectives: The course intends to help the students do the following:

11. Learn and use the sound system in English and learn and use correct pronunciation.
12. Learn and use stress, rhythm, intonation, British and American English.
13. Develop an understanding of word structure and word formation.
14. Speak grammatically correct English fluently and confidently in everyday as well as professional situations
15. Develop their presentation skills.

Syllabus Components

Unit 1: Speaking, Listening, and Pronunciation

Phonetics: An overview of the sound system in English: Vowels and Consonants
Listening Comprehension
Syllable Structure and Syllable Break-up
Pronunciation
Stress, Rhythm, Intonation
Accent: British English and American English

Unit 2: Communication and Presentation Skills

Situational Dialogues, Role Play
Self introduction and Introducing others
Greetings, Expressing opinion, agreement and disagreement
Practice in Group Discussions, Interview Practices, Presentation Skills

Course Outcomes:

Upon successful completion of this course the student will reliably demonstrate basic listening, speaking, and presentation abilities.

CO1. Given prompts and questions on English phonetics, the student will be able to:

9. Demonstrate phonemic awareness
10. Recognize all vowel and consonant sounds in spoken English
11. Answer questions based on audio recordings of native speakers of English.
12. Perceive and generate syllable stress within words and word stress within phrases
13. Identify stressed and unstressed syllables in multi-syllabic words
14. Detect rhythm in phrases and sentences
15. Employ the rules and patterns of intonation
16. Exhibit British and American Accent

CO2. Given directions to communicate orally, the student will be able to:

5. Greet others, introduce him/herself, and initiate small talks fluently and confidently.
6. Express opinions and effectively show agreement and disagreement with the opinions of others
7. Participate and be sufficiently understood in group discussions
8. Prepare for interviews by demonstrating learning and verbal and non-verbal communication skills during mock interviews.
9. Give an oral presentation in class using effective delivery strategies

Suggested Readings:

1. *Professional Speaking Skills*. By ArunaKoneru. Oxford University Press, 2015.
2. *Oxford Guide to Effective Writing and Speaking Skills*. By John Seely. Oxford University Press, Indian Edition, 2008.
3. *Developing Communication Skills*. 2nd Edition. By Krishna Mohan and MeenaBanerji. Published by Macmillan, 1990, 2009.
4. *Effective Business Communication*. 7th Edition-Special Indian Edition. By Herta A Murphy, Herbert W Hildebrandt, Jane P Thomas. Published by McGraw Hill Education. 1997, 2018.

Web and Software Resources:

1. Lessons and Exercises based on Words Worth English Language Lab Software
2. Lessons and Exercises based on British Council English Learning web resources

Subject : Computer Programming
Semester : 1st
Department : Information Technology
Course No. : ITL 100
Credits : 3
L T P : 3 0 0

Course Outcomes:

CO1	To provide exposure to problem solving through programming.
CO2	To understand the Syntax and Semantics of the 'C' language.
CO3	To understand the basics of programming including the most common library functions and the usage of the pre-processor.
CO4	To understand the concept of loops and to learn how to write a program in C using loops.
CO5	To understand the data types offered by the C language including complex data types: arrays, structures and pointers.
CO6	To understand the concept of strings in programming.
CO7	To understand the concept of file handling in programming.

Course Details:

Introduction to C Programming: Engineering problem solving methodology, Flow charts, Tracing flow charts, Algorithms, Need for computer Languages, computer languages, High-level languages, History of C, A simple C Program.

C Language preliminaries: Program structure, C character set, Identifiers and keywords, Data types, Declarations, Expressions, statements symbolic constants, Library functions, preprocessors, # include, #define

Input-Output: getchar, putchar, scanf, printf, gets, puts and other related input output functions.

Operators and expressions: operators in C, arithmetic ,unary, logical, bit-wise, assignment and conditional operators.

Control statements: if else, switch, break, Continue, and goto statements, While, do-while, for statements, nested loops, loops using goto. comma operators and variants of above control structure.

Functions: Defining and accessing, passing arguments, Function prototypes, Recursion, Library functions, Static functions

Arrays: Defining and processing, Passing arrays to a function, matrices as 2D arrays, Multi dimensional arrays.

Pointers: Declarations, Passing pointers to a function, Operations on pointers, Pointer Arithmetic, Pointers and arrays, Arrays of pointers and function pointers. Dynamic memory allocation of arrays and higher dimensional arrays using malloc() function.

Strings Fundamentals: of character and strings, string handling library functions, pointer to strings, dynamic allocation for strings.

Structures and Unions:Defining and accessing structure, structure as function arguments, array of structures, pointers to structures, defining and accessing union.

File Handling:Files, ascii files , binary files,File operation such as storing , retrieving and updating a file.

Text Books:

1. Schaums outline of Theory and Problems of programming with C: Gottfried
2. Mastering C by Venugopal, Prasad – TMH
3. Programming in ANSI C, Balaguruswamy
4. C How to Program, P. J. Deitel and H. Deitel

Other Books Recommended:

1. Complete reference with C Tata McGraw Hill
2. Engineering Problem Solving with ANSI C, Delores M. Etter, Prentice Hall
3. C Programming, Ivor Horton, Wrox Press Limited
4. The C programming language :Kernighan and Ritchie

Subject : Computer Programming Lab Semester : 1st Department : Information Technology Course No. : ITP100 Credits : 1 L T P : 0 0 2
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Course Outcomes:

CO1	To provide exposure to problem solving through programming.
CO2	To understand the concept of various tools available in C and to learn how to solve the problems using the code.
CO3	To understand the basics of programming including the most common library functions.
CO4	To learn how to write a program in C using loops, functions, pointers etc.

Lab Details:

1. Programs to understand how integers, characters, and strings are stored and represented in C.
2. Programs to understand the ASCII character encoding.
3. Programs to understand how to use different operators available in C.
4. Programs to understand differences between a logical and arithmetic operators.
5. Programs to understand differences between a logical and bitwise operators.
6. Programs to obtain a full understanding of signed, unsigned, long and short numbers in C.
7. Programs to understand exactly how numbers are represented in computers(octal,hexadecimal and binary numbers systems) .
8. Programs to evaluate algebraic expressions in C.
9. Programs to understand printing of various data types using different output functions.
10. Programs to exercise all flags in printf() functions.
11. Programs to understand printing of display patterns of numbers and asterisks.
12. Programs to understand taking input from user using different input functions.
13. Programs to exercise all flags in scanf() functions.
14. Programs to understand how arrays work in C, how to use them, and how they are stored in memory.
15. Programs to understand searching in an array.
16. Programs to understand sorting techniques using arrays.

17. Programs to understand pointers in C.
18. Programs to understand the relationship between array indexing and pointer arithmetic.
19. Programs to understand dynamic memory allocation especially with respect to 1D and 2D arrays.
20. Programs to understand modularize of code using functions.
21. Programs to implement function with/without arguments and with/without return types.
22. Programs to understand direct and indirect recursions using functions.
23. Programs to use pointer to pass the address of data and arrays to functions.
24. Programs to understand static data types and static functions.
25. Programs to understand creating, accessing and using structures.
26. Programs to understand use of arrays of structures.
27. Programs to understand pointers to structures and pointers as structures members.
28. Programs to understand creating, accessing and using unions.
29. Programs to understand creating, reading, writing a file.
30. Programs to understand taking input through arguments to main() function.



DEPARTMENT OF MATHEMATICS
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR

Subject: Mathematics-I (Code-MAL-100)	Syllabus for B.Tech.-1st Semester Common for all branches		Total Course Credit:4		
Mid-Term	Class Assessment	Final-Term	L	T	P
30 (Marks)	10 (Marks)	60 (Marks)	3	1	0

Course Objective: To Acquire basic knowledge of Differential Calculus , Ordinary differential equations and apply them to various Engineering problems.

Course Outcomes (COs):

CO1: Able to apply Leibnitz theorem and Taylor’s theorem.

CO2: Able to find Tangents and normals, Partial differentiation, Euler’s theorem, Double points, Asymptotes, Curvature and their applications.

CO3: Able to use the concepts of Limits, Continuity and differentiability functions of several variables, extrema of functions of two or more variables and their applications.

CO4: Able to solve ordinary differential equations by different methods and their applications.

CO5: Able to apply various methods for solving Cubic and Biquadratic algebraic equations.

UNIT-I	<p>Differential Calculus: (20Hrs) Leibnitz Theorem, Taylor’s Theorem, Tangent and normal, Partial differentiation, Euler’s Theorem , Double points, Asymptotes, Curvature and tracing of Curves. Limits, Continuity and differentiability of functions of two variables, extrema of functions of two or more variables using method of Lagrange’s multipliers.</p>
UNIT-II	<p>Ordinary Differential Equations: (15Hrs) Exact differential equations, Reducible to exact differential equations, Linear differential equations and equations reducible to linear form, Nonlinear differential equation, Linear differential equations of second and higher order with constant and variable coefficients, Simultaneous differential equations, Simultaneous differential equations of the form $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$, Applications of ordinary differential equations.</p>
UNIT-III	<p>Algebraic Equations:(05Hrs) Elements of the theory of polynomial equations, Fundamental theorem of Algebra, Relation between the roots and coefficients of an equation, Transformation of equations, Solution of Cubic and Bi-quadratic equations.</p>

Books Recommended:

Text Books	<ol style="list-style-type: none">1. G. Prasad, Differential Calculus, Pothishala Private Limited.2. S. Narayan, Integral Calculus. S. Chand and Co.3. H. T. H Piaggio, Differential Equations and its applications, Orient Longman Limited.
Reference Books	<ol style="list-style-type: none">1. E. Kreyszig, Advanced Engineering Mathematics, New Age International Limited.2. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, Narosa-2001.3. M. D. Raisinghania, Ordinary and partial equations, S. Chand & Co.



DEPARTMENT OF MATHEMATICS
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR

Subject: Mathematics-II (Code-MAL101)	Syllabus for B.Tech.-2nd Semester Common for all branches		Total Course Credit: 4		
Mid-Term	Class Assessment	Final-Term	L	T	P
30 (Marks)	10 (Marks)	60 (Marks)	3	1	0

Course Objective: To acquire the knowledge of Partial differential equations, Fourier series, Integral calculus, Matrices and apply them to various engineering Problems.

Course Outcomes (Cos):

CO1: Able to learn various methods for solving Partial differential equations of second and higher orders.

CO2: Able to apply partial differential equations for solving Heat equation and Wave equation.

CO3: Able to expand the given periodic function defined in the given range in terms of sine and cosine multiple of terms as a Fourier series.

CO4: Able to evaluate multiple integrals and improper integrals and Problems related to finding areas and volumes.

CO5: Able to find eigen values, eigen vector, Rank of matrix, index, signature of the quadratic forms, Solution of linear equations using rank.

UNIT-I	<p>Partial Differential Equations: (22Hrs) Partial differential equations of first order, Lagrange's linear equations, Standard forms, Partial differential equations of second and higher order, Homogeneous partial differential linear equations with constant coefficients, Non-homogeneous linear differential equations, Applications of partial differential equations, vibration of a stretched flexible string, Heat flow equation, Wave equation, Solution by the methods of separation of variables. Series solution of ordinary differential equations – Frobenius Method, Fourier series, Series solution.</p>
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UNIT-II	<p style="text-align: right;">(06Hrs)</p> <p>Integral Calculus: Differentiation under the sign of integration, Double and triple integrals, Change of order of integration, Change of variables, Beta and Gamma functions.</p>
UNIT-III	<p style="text-align: right;">(12Hrs)</p> <p>Matrices: Partitioning of Matrices, Hermitian and Skew- Hermitian Matrices, Orthogonal and Unitary matrices, Triangular matrices, Rank of a matrix, Equivalent matrices, elementary transformations, Inverse of a matrix, Solution of simultaneous equations by elementary operations, normal form, Eigen values and Eigen vectors of a matrix, Cayley- Hamilton theorem, Quadratic forms</p>

Books Recommended:

Text Books	<ol style="list-style-type: none"> 1. H. T. H Piaggio, Differential Equations and its applications, Orient Longman Limited. 2. S. Narayan, Integral Calculus. 3. S.C .Malik and S. Arora, Mathematical Analysis, New Age International Limited. 4. Kenneth Hoffmann and Ray Kunze, Linear Algebra, Prentice Hall of India, 2003.
Reference Books	<ol style="list-style-type: none"> 1. E. Kreyszig, Advanced Engineering Mathematics 2. Applied Mathematics for Engineers by P. N. Wartikar 3. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, Narosa-2001. 4. M. D. Raisinghania, Ordinary and partial equations, S. Chand & Co. 5. Greenberg, Advanced Engineering Mathematics, 2/e Pearson Education, 2004.



DEPARTMENT OF PHYSICS
NATIONAL INSTITUTE OF TECHNOLOGY
HAZRATBAL, SRINAGAR, KASHMIR – 190 006 (J&K).

Subject: Engineering Physics. Code: PHL100	Common Syllabus for B.Tech. 1 st and 2 nd Semester of All Engineering Branches.		Total Course Credits: 04.			
Mid-Term	Class Assessment	Final-Term	Contact Hours			
			L	T	P	Total
[30 Marks]	[10 Marks]	[60 Marks]	3	1	0	4

Course Outcomes (COS)

CO1: Students will remember the concepts of vector calculus and will be able to apply in electrodynamics.

CO2: Students will understand basic quantum mechanics and will be able to evaluate related problems.

CO3: Students will understand the concepts of Theory of Relativity.

CO4: Students will understand and apply the working principle of lasers and optical fibers in various applications in science & technology. .

CO5: Students will understand and apply the concepts of semiconductor physics in solid state electronics devices.

Unit-I: VECTOR CALCULUS AND ELECTRODYNAMICS: (8 Hours)

Gradient, Divergence, curl and their physical significance. Laplacian in rectangular, cylindrical and spherical coordinates, vector integration, line, surface and volume integrals of vector fields, Gauss-divergence theorem, Stoke's theorem and Green Theorem of vectors. Maxwell equations, electromagnetic wave in free space and its solution in one dimension, energy and momentum of electromagnetic wave, Poynting vector, Problems.

UNIT-II: QUANTUM MECHANICS (8 Hours)

Origin of the quantum Mechanics, Interpretation of Wave function, Normalization, Schrodinger time-independent & time-dependent equations, basic postulates of the quantum Mechanics, Probability Current Density, Expectation values, Operators, Hermitian operators, Commutation relation between

Position & Momentum operators; Applications of Schrödinger equation in Particle in a box, Single step barrier, Harmonic Oscillator, Problems.

UNIT-III: SPECIAL THEORY OF RELATIVITY

(8 Hours)

Inertial Frames Of Reference, Galilian And Lorentz Transformations, Postulates of Relativity, Time Dilation, Twin Paradox, Length Contraction, Relativistic Mass, Energy and Momentum, Equivalence of Mass And Energy, Doppler Effect In Light And Its Application in Expanding of Universe, Problems.

UNIT-IV: LASER & FIBER OPTICS

(8Hours)

Introduction; Absorption and Emission, Einstein's coefficients & equations; Metastable states, Population inversion, Pumping (three and four level laser schemes), Basic parts of a Laser, Characteristics of Laser Radiations; Classification of Lasers, Ruby Laser, He-Ne Laser, GaAs Laser; Applications of lasers in holography. Basics of optical fiber, Total Internal Reflection, Acceptance angle, Numerical Aperture; Modes of Propagation, Single Mode Step Index Optical Fiber, Multimode Step Index Optical Fiber, Graded Index Fiber, Losses, Dispersion in Optical Fiber, Intermodal and intramodal dispersion, Applications of optical fiber; Problems.

Unit-V: SEMICONDUCTOR PHYSICS

(8 Hours)

Introduction to semiconductors; Intrinsic and extrinsic semiconductors; Direct and in-direct band gap semiconductors; Carrier concentration in semiconductors; mechanism of current conduction in semiconductors; Dependence of Fermi level on carrier-concentration, carrier generation and recombination; carrier transport: diffusion and drift; fabrication, mechanism and I-V characteristics of p-n junction; Zener diode; measurement of conductivity-four probe, , Hall effect; Problems.

BOOKS RECOMMENDED:

1. Introduction to Electrodynamics by David J. Griffith (Prentice- Hall of India Private limited).
2. Introduction to Classical Mechanics by R. G. Takwale and P.S. Puranik (Tata-McGraw Hill Publishing Co).
3. Concept of Modern Physics by Arthur Besier, Shobhit Mahajan & S. Rai Choudhury (McGraw Hill Education).
4. Quantum Mechanics by G. Aruldas (PHI learning).
5. Quantum Physics by H C Verma (Surya Publications, Ghaziabad).
6. Introduction to Special Relativity by Robert Resnick (Wiley).
7. LASERS (Theory and Application) by K. Thyagarajan & A.K. Ghatak (Macmillan).
8. Semiconductor Physics and Devices by Neamen Donald (McGraw Hill).
9. Physics of Semiconductor Devices by Kwok K. Ng & S. M. Sze (Wiley).



DEPARTMENT OF PHYSICS
NATIONAL INSTITUTE OF TECHNOLOGY
HAZRATBAL, SRINAGAR, KASHMIR – 190 006 (J&K).

Subject: Physics laboratory. Code: PHP-100	Common Syllabus for B.Tech. 1 st and 2 nd Semester of All Engineering Branches.	Total Course credits: 01.		
Mid-Term	Final-Term	L	T	P
[40 Marks]	[60 Marks]	0	0	2

Course Outcomes (COS)

CO1- Students will be able to understand the basic principle of designed experiments through simple scientific tools.

CO2- Students will be able to evaluate and interpret scientific data.

CO3- Students will be able to create different experiments based on scientific understanding.

List of Experiments

(Perform any Ten Experiments)

1. Determine the value of 'g' by bar pendulum.
2. Determine the value of 'g' by Kater's pendulum.
3. Determine the reduction factor of a tangent galvanometer.
4. To study the variation of magnetic field along the axis of current carrying circular coil.
5. Determination of the value of Stefan' constant.
6. Determination of young's modulus of elasticity by bending of beam.
7. Determination of refractive index of liquid using laser source.
8. Determination of absorption coefficient of liquid.
9. Determination of standing waves on a string by Melde' experiment.
10. Determine of wavelength of a monochromatic light by Newton's rings method.
11. Determine the wavelength of monochromatic light with Fresnel's biprism.
12. Determination of refractive index of prism by spectrometer.
13. Determination of specific charge using Magnetron valve/ helical method..
14. Determination of specific rotation of optically active substance by Polarimeter.
15. Study the Hall Effect and determine Hall coefficient, carrier density and carrier mobility of a given semiconductor.
16. Determine the band gap of a given semiconductor material.
17. Determination of a Planck's constant by measuring radiation in a fixed spectral range.
18. Determine the coefficient of viscosity of glycerin by falling sphere method.

19. Study of the characteristics of a G.M. Counter and to study of the statistical nature of radioactive decay.
20. To study the characteristics of a solar cell.

BOOKS RECOMMENDED:

1. Practical Physics by Gupta & Kumar (Pragati Prakashan Meerut).
1. Sharma Saroj, "Physics Experiments for Engineers" (Oscar publications, New Delhi).
2. Singh, Devraj, "Engineering Physics" (Dhanpat Rai & Co., New Delhi).
3. Thiruvadigal, J. D., Ponnusamy, S., Sudha. D and Krishnamohan M., "Physics for Technologists" (Vibrant Publication, Chennai).
4. Shukla R. K., and Srivastava Anchal, "Practical *Physics*", (New Age International (P) Ltd, New Delhi).
5. Arora C.L., "B.Sc. Practical Physics" (S. Chand & Company Limited).
6. Souires G. L., "Practical *Physics*" (Cambridge University, UK).
7. Chattopadhyay D., Rakshit P. C., and Saha B., "An Advanced Course in Practical Physics", (Books & Allied Ltd., Calcutta).



DEPARTMENT OF CHEMISTRY
NATIONAL INSTITUTE OF TECHNOLOGY, SRINAGAR

Subject: Engineering Chemistry (Code-CYL100)	Syllabus for B.Tech.-1 st Year Common for all branches		Total Course Credit:4		
	Mid-Term	Class Assessment	Final-Term	L	T
30 (Marks)	10 (Marks)	60 (Marks)	3	1	0

Course Objective: To impart the knowledge of engineering chemistry and their applications in different engineering disciplines.

Course Outcomes (COs)

- CO1:** To learn the basic concepts of water chemistry and softening methods.
- CO2:** To understand the properties and uses of polymeric materials.
- CO3:** To gain knowledge about fuels, types of lubricants and their uses.
- CO4:** To learn fundamentals of corrosion and its prevention techniques.

UNIT-I	High Polymers (10 Hrs) Introduction, classification, types of polymerization, mechanisms of polymerization (free radical, cationic, anionic), coordination polymerization and its mechanism, synthesis and applications of some important engineering polymers (Polyethylene, PVC, Polystyrene, Teflon, Polyesters, polyamides, Bakelite and silicones), conducting polymers; classifications, properties and applications in engineering field.
UNIT-II	Water Chemistry (10 Hrs) Introduction, sources of water, impurities in water, hard water, units of hardness, determination of hardness and alkalinity, softening of hard water; Lime-Soda process, Zeolite process and Ion Exchange process, numerical problems based on hardness, alkalinity and LS process, municipal treatment of water for drinking purposes; removal of suspended, dissolved and biological impurities-sterilization by chlorination (Effective and break-point chlorination).
UNIT-III	Fuels and Lubricants (10 Hrs) Fuels: Introduction, classification of fuels, characteristics of a good fuel calorific value; HCV and LCV, Dulong's formula, Determination of calorific value by Bomb Colorimeter, Numerical problems. Coal: analysis of coal - proximate and ultimate analysis, significance of the analysis. Lubricants: Introduction, mechanisms of lubrication, hydrodynamic, boundary and extreme pressure lubrication, classification of lubricants: liquid, semi solid

	and solid lubricants. Lubricating oils; fatty oils, mineral oils, blended oils, properties of lubricating oils with special reference to flash point, aniline point, viscosity and viscosity index.
UNIT-IV	Corrosion and its Prevention (10 Hrs) Introduction, types of corrosion: Dry and wet corrosion (pitting corrosion, crevice corrosion, stress corrosion, inter-granular corrosion), corrosion prevention and control by proper design and material selection, cathodic protection, anodic protection, protective coatings.

Books Recommended:

Text Books	<ol style="list-style-type: none"> 1. P. C. Jain: Engineering Chemistry, 16th. Edition, Dhanpat Rai Publishing Company, India. 2. Dara S.S., A Text Book of Engineering Chemistry, 12th. Edition, S. Chand and Company, India. 3. J. C. Kuriacose and J Rajaraman; Chemistry in engineering and Technology, Volumes I and II, Tata Mc Graw Hill Publishing Co. Limited, New Delhi
Reference Books	<ol style="list-style-type: none"> 1. V. R. Gowriker, N.V. Viswanathan and jayadev Sreedhar: Polymer Science, Wiley Eastern Limited, New Delhi. 2. C.V. Agarwal: Chemistry of Engineering Materials (Tata Publishing Works, Varsnasi). 3. R. M. E. Diamand: Applied Chemistry for engineers (Pitman).



DEPARTMENT OF CHEMISTRY
NATIONAL INSTITUTE OF TECHNOLOGY, SRINAGAR

ENGINEERING CHEMISTRY LAB COURSE

Subject: Engineering Chemistry Lab Code-CYP-100	Syllabus for B.Tech-1 st Year Common for all branches		Course Credit: 01		
	Mid-Term	Final-Term	Total	L	T
30 (Marks)	70 (Marks)	100 (Marks)	0	0	2

Sr. No.	Experiments
1.	To determine the total, permanent and temporary hardness of water by EDTA method.
2.	To determine alkalinity of given water samples/alkali mixtures by warder's Method.
3.	To estimate percentage of available chlorine (free chlorine) in bleaching powder/water.
4.	Synthesis of Phenol formaldehyde resin.
5.	Synthesis of Urea formaldehyde resin.
6.	Proximate analysis of coal.
7.	To determine the acid value of given lubricating oils.
8.	To determine the aniline point of given lubricating oils.



DEPARTMENT OF CHEMISTRY
NATIONAL INSTITUTE OF TECHNOLOGY, SRINAGAR

Subject: Environmental Studies CYL101	Syllabus for B.Tech.-1stYear Common for all branches		Total Course Credit: 3		
Mid-Term	Class Assessment	Final-Term	L	T	P
30 (Marks)	10 (Marks)	60 (Marks)	2	1	0

Course Objective: To impart the knowledge and awareness for the environmental protection for real-time contribution during an execution of engineering practices in the society.

Course Outcomes (COs)

- CO1:** To understand the basic concepts of environmental studies and natural resources.
- CO2:** To learn about the eco-systems, biodiversity and its conservation.
- CO3:** To gain knowledge about different types of environmental pollutions and their control measures.
- CO4:** To learn the fundamentals of social issues, population and the environment.

Course Contents:

Unit 1: The Multidisciplinary nature of environmental studies

Definition, scope and importance, Need for public awareness.

Unit 2: Natural Resources

Renewable and non renewable resources:

Natural resources and associated problems

Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction, mining, dams and their effects on forests and tribal people.

Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems.

Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. Food Resources: World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizers- pesticides problems, water logging, salinity,

case studies. Energy Resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies. Land Resources: Land as a resource, land degradation, man induces landslides, soil erosion, and desertification. Role of individual in conservation of natural resources. Equitable use of resources for sustainable life styles.

Unit 3: Eco Systems

Concept of an eco-system, Structure and function of an eco-system. Producers, consumers, decomposers. Energy flow in the eco systems. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following eco systems:

- i. Forest ecosystem
- ii. Grass land ecosystem
- iii. Desert ecosystem.
- iv. Aquatic eco systems (ponds, streams, lakes, rivers, oceans, estuaries)

T 4: Biodiversity and it's Conservation

Introduction-Definition: genetics, species and ecosystem diversity. Biogeographically classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, national and local level. India as a mega diversity nation. Hot-spots of biodiversity. Threats to biodiversity: habitats loss, poaching of wild life, man wildlife conflicts. Endangered and endemic spaces of India. Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

UNIT 5: Environmental Pollution

Definition Causes, effects and control measures of:

Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards

Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies, Disaster management: Floods, earth quake, cyclone and land slides

Unit 6: Social issues and the Environment

Form unsustainable to sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, water shed management, Resettlement and rehabilitation of

people; its problems and concerns, case studies, Environmental ethics: issues and possible solutions, Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.

Wasteland reclamation, Consumerism and waste products, Environment protection Act

Air (prevention and control of pollution) Act, Water (prevention and control of pollution) Act, Wildlife protection act, Forest conservation act, Issues involved in enforcement of environmental legislations, Public awareness.

Unit 7: Human population and the environment

Population growth and variation among nations, Population explosion- family welfare program, Environment and human health, Human rights, Value education, HIV/AIDS, Women and child welfare, Role of information technology in environment and human health, Case studies

Unit 8: Field work

Visit to a local area to document environment assets river/forest/grassland/ hill/mountain. Visit to a local polluted site-urban/rural/industrial/agricultural. Study of common plants, insects, birds. Study of simple ecosystems-pond, river, hills lopes, etc (field work equal to 5 lecture works)

Recommended Books:

1. Textbook of Environmental studies, Erach Bharucha, UGC
2. Fundamental concepts in Environmental Studies, D D Mishra, S Chand & Co Ltd

Course Title: Elements of Mechanical Engineering

Course Code: MEL 100

L-T-P: 3-0-0,

Total Credits: 3

Offered to: First Year Engineering Students

Course Objective:

This course is intended to enlighten the first year undergraduate students about some of the technical issues that mechanical engineering addresses, and identify its impact in solving global, social, environmental, and economic problems.

Course Outcomes: With this course the student should specifically be able to:

1. Identify and select materials and manufacturing processes for fabricating prototypes and engineering products.
2. Explain the significance of thermodynamic processes in energy conversion and conservation.
3. Explain the significance of fluids engineering to energy conversion, and to diverse fields as aerodynamics, medicine, etc.
4. Identify and select various motion and power transmission elements for a particular application.

Materials and Manufacturing Techniques: Recent advances in mechanical engineering, Role of Computer Aided Design, Simulation and 3D printing. Units and measurements. Engineering Materials and Materials Response. Basic manufacturing processes, conventional and non-conventional fabrication processes.

Thermal and Energy Systems: System and Surroundings, Thermodynamic processes, First and Second law of thermodynamics, Concept of Entropy. Engine Cycles and Efficiency. Basic idea of internal combustion engines. Heat transfer through conduction, convection and radiation. Heat exchangers. Energy conservation and conversion.

Fluid Properties and their Applications: General properties of fluids, Fluid statics, Pressure measurement. Equation of fluid motion, Bernoulli's Equation. Viscous Effects: Viscosity, Laminar and Turbulent Flows. Introduction to hydraulic machines: turbines, pumps, their types and applications in energy conversion.

Motion and Power Transmission: Rotational motion, Design application: Gears, Speed, torque and power in gear sets. Simple and compound gear trains, Design application: Belt and Chain drives.

Recommended Texts:

1. An introduction to Mechanical Engineering by Jonathan Wickert, and Kemper Lewis, Fourth Edition, Cengage Learning, 2017.

Other resources:

1. Basics of Mechanical Engineering; Integrating Science Technology and Common Sense by Paul D Ronney, USC.
<http://ronney.usc.edu/ame101/>

**Central Workshop National
Institute of Technology
Hazratbal, Srinagar-190006, Kashmir**

**Syllabus
Of
Workshop Practice
B. Tech First Year**

Central Workshop

General Workshop Practice

The field of engineering continues to grow rapidly, transcending disciplines & driving economic growth. Workshop practices have become significant in the industrial environment to manufacture products for the service of the mankind. Workshop Practice is a core subject & is highly essential for all engineers & technocrats for formalizing themselves with the latest techniques & concepts of manufacturing & is the basic requirement for all the engineering students. In addition to introduction of various tools, processes & materials, the student has to acquire practical knowledge & skills of using machines & equipment, Various Cutting, measuring & marking tools, performing main operations through simple exercises.

Manual abilities to handle engineering materials with hand tools need to be developed in the students. They will be using different types of tools/ equipments in different engineering trades for fabrication purposes. Before developing the necessary skills, the students will appreciate the importance of quality & safety measures.

Detailed Contents

1. The students are supposed to be in proper workshop dress prescribed by the institute.
2. Wearing shoes in the workshop is compulsory.
3. Importance of safety measures, cleanliness & up keep of tools, equipment in each of the following engineering trades should be explained & practised.
4. The student should prepare the sketches of various tool/ jobs in their practical note book. The practical academic activities of various semesters are carried out in the following seven engineering trades.
 - a) Machining Section (Machinist trade & turning trade)
 - b) Sheet metal & Spray painting section
 - c) Fitting & Bench work section
 - d) Welding section
 - e) Foundry & Casting section
 - f) Smithy & Forging section
 - g) Carpentry & Pattern making section

**NATIONAL INSTITUTE OF TECHNOLOGY
SRINAGAR**

Central Workshop

Course title: Workshop Practices (WSP100)

Year: First Year (All Branches)

Credit: 2

Course No: - WSP100

L-T-P: - 0-0-5

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

CO1	Perform the operations of plain turning, taper turning, facing, knurling, grooving, drilling on a given cylindrical Mild steel work piece using various cutting, measuring & machine tools.
CO2	Distinguish between various tools & joints. Design & develop different components like cylinder, funnel of a galvanized iron sheet work piece using various operations such as marking cutting, measuring, soldering etc.
CO3	Recognize suitable tools to design a single & split piece pattern moulds & casting of these moulds using Aluminum & Lead. Define various testing processes of molding sand. Identify & selection of various tools to perform different operations of forging.
CO4	Develop various joints such as butt joint, lap joint, corner joint using different welding processes such as electrical arc welding, MIG welding & TIG Welding. Understand different welding electrodes & other welding processes such as resistance welding, submerged arc welding.
CO5	Identify & apply suitable hand tools & holding equipments to perform basic operations to make a square plate, snap joint, cross joint of a Mild Steel Work Piece.
CO6	Recognize suitable wood working hand tools & equipments to make various joints like half lap cross joint, mortise-tenon joint & bridle joint of soft wood (Deodar). Understand various pattern making techniques.

Machining Trade

(Machinist Trade & Turning Section)

(a) Theoretical Instructions:

Safety Precautions, Introduction of machine tools such as lathe, Drilling machine & other related metal cutting tools. Parts of lathe & basic metal cutting operations. Introduction of various types of cutting tools (Nomenclature) and their material.

(a) Practical Demonstrations:

Demonstration on Lathe & basic operations such as drilling, facing, turning, taper turning, step turning, knurling, chamfering etc. Demonstration of basic measuring instruments.

**Job No. 1: TO MANUFACTURE THE JOBS ON THE CENTRE
LATHE AS PER GIVEN DRAWING.**

**Job No. 2: TO PERFORM ADDITIONAL OPERATIONS SUCH AS
GROOVING, DRILLING, KNURLING on Job No. 1.**

Sheet Metal & Spray Painting section

(a) Theoretical Instructions:

Safety precautions, brief introduction of sheet metal, various tools, joints & operations. Soldering, brazing, & shearing, Fluxes & their applications. Introduction of different machines and pattern development in detail. Brief description of paints & varnishes

(b) Practical Demonstrations:

Demonstration of all basic hand tools & equipments. Fabrication of simple joints and jobs. Preparation & painting of surfaces for varnish & painting etc.

Job No. 1: TO DEVELOP A CYLINDRICAL JOB.

**Job No. 2: TO DEVELOP A SQUARE ELBOW WITH
SOLDERING AS PER THE DRAWING.**

Fitting & Bench Work section

(a) Theoretical Instructions:

Safety precautions, introduction to fitting & bench work. Demonstration of basic hand tools, holding devices and basic fitting operations such as measuring, marking, filing, sawing, drilling, tapping, buffing.

(b) Practical Demonstrations:

Demonstration of all basic hand tools/ measuring tools & equipments. Demonstration of simple operations such as marking, punching, filing, sawing, scrapping, drilling.

Job No. 1: TO FABRICATE A SQUARE PLATE OF MILD STEEL WORK PIECE 50X50X7 mm.

Job No. 2: TO ASSEMBLE THE MILD STEEL WORK PIECE WITH SNAP FITTING.

Welding Section

(a) Theoretical Instructions:

Safety Precautions, Introduction of welding processes like electric arc welding, Gas Welding, MIG Welding, TIG welding, Submerged arc welding & spot welding.. Various Fluxes & electrodes used in welding. Introduction of ac & dc welding and its applications.

(b) Practical Demonstrations:

Demonstration of all basic tools & personal protective equipments. Demonstration of different types of joints by using arc welding & gas welding etc.

Job No. 1 : TO MAKE A SINGLE-V BUTT JOINT OF MILD STEEL 80x50x8mm Job

No. 2 : TO MAKE A LAP JOINT OF MILD STEEL 85x35x6mm

Smithy & Forging section

(a) Theoretical Instructions:

Safety precautions, introduction of forging tools .Materials & their heat treatments. Description of all forging operations such as hand forging, upsetting, drawing & punching. Introduction of various forging methods. Comparison of hot & cold working.

(b) Practical Demonstrations:

Demonstration & practice of different smithy operations like forging, cutting, punching, bending etc. Demonstration & practice of MS rod into forged MS ring & octagonal cross section.

Job No. 1: TO PREPARE MS-SQUARE 20X20MM FROM MS ROUND BY USING DIFFERENT FORGING HAND TOOLS.

Job No. 2: TO PREPARE A SQUARE HEADED BOLT FROM MS-ROUND 60x30mm

Carpentry & Pattern Making section

(a) Theoretical Instructions:

Safety Precautions, Introduction of carpentry & joinery, different tools used in carpentry. Seasoning of wood and defects of wood. Various types of joints. Brief description of wood working machines and pattern making.

(b) Practical Demonstrations:

Demonstration & practice of different carpentry operation like Planning, sawing & chiseling and joints. Demonstration of pattern making tools & materials.

Job No. 1: TO PREPARE HALF LAP CROSSJOINT.

Job No. 2: TO PREPARE A BRIDLE JOINT

Foundry & Casting Section

(a) Theoretical Instructions:

Safety precautions, Brief Introduction to foundry. Different casting processes. hand tools, gating system. Molding sands & its properties. Types of pattern, allowances, gates. Selection of pattern. Core Sand & Core making. Defects & remedies. Cupola furnace. Molding sand tests. Melting temperature of different metals.

(b) Practical Demonstrations:

Demonstration & practice of mould making & metal pouring. use of split patterns & cores, sand preparation & testing . Use of hand tools to prepare the mould.

Job No. 1: TO PREPARE A GREEN SAND MOULD BY USING SINGLE PIECE PATTERN.

Job No. 2: TO PREPARE A CASTING OF SINGLE PIECE PATTERN.

List of recommended books:-

- 1) Workshop Technology by Chapman.
- 2) Workshop Technology by Hajra Chowdhary
- 3) Workshop Technology by Swarn Singh
- 4) Workshop Technology by Virender narula