**Theory - 01 Credit Course**                                                 **BENGK106-206**
# Communicative English

| Course Title: | Communicative English | | |
|---|---|---|---|
| Course Code: | **BENGK106-206** | CIE Marks | 50 |
| Course Type (Theory/Practical /Integrated) | Theory | SEE Marks | 50 |
| | | Total Marks | 100 |
| Teaching Hours/Week (L:T:P: S) | 1:0:0:0 | Exam Hours | 01 Theory |
| Total Hours of Pedagogy | 15 hours | Credits | 01 |

**Course objectives:** The course Communicative English (22ENG16) will enable the students,
1. To know about Fundamentals of Communicative English and Communication Skills in general.
2. To train to identify the nuances of phonetics, intonation and enhance pronunciation skills for better Communication skills.
3. To impart basic English grammar and essentials of important language skills.
4. To enhance with English vocabulary and language proficiency for better communication skills.
5. To learn about Techniques of Information Transfer through presentation.

**Teaching-Learning Process :**
These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective:
Teachers shall adopt suitable pedagogy for effective teaching - learning process. The pedagogy shall involve the combination of different methodologies which suit modern technological tools and software's to meet the present requirements of the Global employment market.
    (i) Direct instructional method ( Low/Old Technology), (ii) Flipped classrooms (High/advanced Technological tools), (iii) Blended learning (Combination of both), (iv) Enquiry and evaluation based learning,
    (v) Personalized learning, (vi) Problems based learning through discussion, (vii) Following the method of expeditionary learning Tools and techniques, (viii) Use of audio visual methods through language Labs in teaching of of LSRW skills.
Apart from conventional lecture methods, various types of innovative teaching techniques through videos, animation films may be adapted so that the delivered lesson can progress the students In theoretical applied and practical skills in teaching of communicative skills in general.

**Language Lab :** To augment LSRW, grammar and Vocabulary skills (Listening, Speaking, Reading, Writing and Grammar, Vocabulary) through tests, activities, exercises etc., comprehensive web-based learning and assessment systems can be referred as per the AICTE / VTU guidelines.

| **Module-1** | **(03 hours of pedagogy)** |
|---|---|

**Introduction to Communicative English :** Communicative English, Fundamentals of Communicative English, Process of Communication, Barriers to Effective Communicative English, Different styles and levels in Communicative English. Interpersonal and Intrapersonal Communication Skills.

| **Module-2** | **(03 hours of pedagogy)** |
|---|---|

**Introduction to Phonetics :** Phonetic Transcription, English Pronunciation, Pronunciation Guidelines to consonants and vowels, Sounds Mispronounced, Silent and Non silent Letters, Syllables and Structure. Word Accent, Stress Shift and Intonation, Spelling Rules and Words often Misspelt. Common Errors in Pronunciation.

| **Module-3** | **(03 hours of pedagogy)** |
|---|---|

**Basic English Communicative Grammar and Vocabulary PART - I :** Grammar: Basic English Grammar and Parts of Speech, Articles and Preposition. Question Tags, One Word Substitutes, Strong and Weak forms of words, Introduction to Vocabulary, All Types of Vocabulary – Exercises on it.

| **Module-4** | **(03 hours of pedagogy)** |
|---|---|

**Basic English Communicative Grammar and Vocabulary PART - II:** Words formation - Prefixes and Suffixes, Contractions and Abbreviations. Word Pairs (Minimal Pairs) – Exercises, Tense and Types of tenses, The Sequence of Tenses (Rules in use of Tenses) and Exercises on it.

| **Module-5** | **(03 hours of pedagogy)** |
|---|---|

**Communication Skills for Employment :** Information Transfer:Oral Presentation and its Practice. Difference between Extempore/Public Speaking, Communication Guidelines. Mother Tongue Influence (MTI), Various Techniques for Neutralization of Mother Tongue Influence. Reading and Listening Comprehensions – Exercises.

**Course outcome (Course Skill Set)**

At the end of the course Communicative English (22ENG16) the student will be able to:

| CO1 | Understand and apply the Fundamentals of Communication Skills in their communication skills. |
|-----|------|
| CO2 | Identify the nuances of phonetics, intonation and enhance pronunciation skills. |
| CO3 | To impart basic English grammar and essentials of language skills as per present requirement. |
| CO4 | Understand and use all types of English vocabulary and language proficiency. |
| CO5 | Adopt the Techniques of Information Transfer through presentation. |

## Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). The minimum passing mark for the SEE is 35% of the maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

**Continuous Internal Evaluation(CIE):**

**Two Unit Tests each of 30 Marks (duration 01 hour)**

- First test after the completion of 30-40 % of the syllabus
- Second test after completion of 80-90% of the syllabus

One Improvement test before the closing of the academic term may be conducted if necessary. However best two tests out of three shall be taken into consideration

**Two assignments each of 20 Marks**

The teacher has to plan the assignments and get them completed by the students well before the closing of the term so that marks entry in the examination portal shall be done in time. Formative (Successive) Assessments include Assignments/Quizzes/Seminars/ Course projects/Field surveys/ Case studies/ Hands-on practice (experiments)/Group Discussions/ others..   The Teachers shall choose the types of assignments depending on the requirement of the course and plan to attain the Cos and POs.  (to have a less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE.   Each method of CIE should have a different syllabus portion of the course).  CIE methods /test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

**The sum of two tests, two assignments, will be out of 100 marks and will be scaled down to 50 marks**

**Semester End Examinations (SEE)**

SEE paper shall be set for **50 questions, each of the 01 mark**. The pattern of the **question paper is MCQ** (multiple choice questions). The time allotted for SEE is **01 hour.** The student must secure a minimum of 35% of the maximum marks for SEE.

## Suggested Learning Resources:

**Textbook:**

1) **Communication Skills** by Sanjay Kumar & Pushp Lata, Oxford University Press India Pvt Ltd - 2019.
2) **A Textbook of English Language Communication Skills,** (ISBN-978-81-955465-2-7), Published by Infinite Learning Solutions, Bengaluru - 2022.

**Reference Books:**

1. **Technical Communication** by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
2. **English for Engineers** by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
3. **English Language Communication Skills – Lab Manual cum Workbook,** Cengage learning India Pvt Limited [Latest Revised Edition] – (ISBN-978-93-86668-45-5), 2019.
4. **A Course in Technical English – D Praveen Sam, KN Shoba,** Cambridge University Press – 2020.
5. **Practical English Usage** by Michael Swan, Oxford University Press – 2016.

## Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ✓ Contents related activities (Activity-based discussions)
- ✓ For active participation of students instruct the students to prepare Flowcharts and Handouts
- ✓ Organising Group wise discussions Connecting to placement activities
- ✓ Quizzes and Discussions, Seminars and assignments

**Theory - 01 Credit Course**                                                      **BPWSK206-106**
# Professional Writing Skills in English

| Course Title: | Professional Writing Skills in English | | |
|---|---|---|---|
| Course Code: | BPWSK206-106 | CIE Marks | 50 |
| Course Type (Theory/Practical /Integrated) | Theory | SEE Marks | 50 |
| | | Total Marks | 100 |
| Teaching Hours/Week (L:T:P: S) | 1:0:0:0 | Exam Hours | 01 Theory |
| Total Hours of Pedagogy | 15 hours | Credits | 01 |

**Course objectives:**
The course Professional Writing Skills in English (22PWS26) will enable the students,
1. To Identify the Common Errors in Writing and Speaking of English.
2. To Achieve better Technical writing and Presentation skills for employment.
3. To read Technical proposals properly and make them to write good technical reports.
4. To Acquire Employment and Workplace communication skills.
5. To learn about Techniques of Information Transfer through presentation in different level.

**Teaching-Learning Process**
These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective: Teachers shall adopt suitable pedagogy for effective teaching - learning process. The pedagogy shall involve the combination of different methodologies which suit modern technological tools and software's to meet the present requirements of the Global employment market.

   (i) Direct instructional method ( Low/Old Technology), (ii) Flipped classrooms (High/advanced Technological tools),  (iii) Blended learning (Combination of both),  (iv) Enquiry and evaluation based learning,

   (v) Personalized learning, (vi) Problems based learning through discussion, (vii) Following the method of expeditionary learning Tools and techniques, (viii) Use of audio visual methods through language Labs in teaching of of LSRW skills.

Apart from conventional lecture methods, various types of innovative teaching techniques through videos, animation films may be adapted so that the delivered lesson can progress the students In theoretical applied and practical skills in teaching of communicative skills in general.

**Language Lab :** To augment LSRW, grammar and Vocabulary skills (Listening, Speaking, Reading, Writing and Grammar, Vocabulary) through tests, activities, exercises etc., comprehensive web-based learning and assessment systems can be referred as per the AICTE / VTU guidelines.

| Module-1 | (03 hours of pedagogy) |
|---|---|

**Identifying Common Errors in Writing and Speaking English :** Common errors identification in parts of speech, Use of verbs and phrasal verbs, Auxiliary verbs and their forms, Subject Verb Agreement (Concord Rules), Common errors in Subject-verb agreement, Sequence of Tenses and errors identification in Tenses. Words Confused/Misused.

| Module-2 | (03 hours of pedagogy) |
|---|---|

**Nature and Style of sensible writing: Organizing** Principles of Paragraphs in Documents, Writing Introduction and Conclusion, Importance of Proper Punctuation, Precise writing and Techniques in Essay writing, Sentence arrangements and Corrections activities. Misplaced modifiers, Contractions, Collocations, Word Order, Errors due to the Confusion of words.

| Module-3 | (03 hours of pedagogy) |
|---|---|

**Technical Reading and Writing Practices:** Technical writing process, Introduction to Technical Reports writing, Significance of Reports, Types of Reports. Introduction to Technical Proposals Writing, Types of Technical Proposals, Characteristics of Technical Proposals. Scientific Writing Process. Grammar – Voices and Reported Speech, Spotting Error & Sentence Improvement, Cloze Test and Theme Detection Exercises.

| Module-4 | (03 hours of pedagogy) |
|---|---|

**Professional Communication for Employment:** Listening Comprehension, Types of Listening, Listening Barriers, Improving Listening Skills. Reading Comprehension, Tips for effective reading. Job Applications, Types of official/employment/business Letters, Resume vs. Bio Data, Profile, CV. Writing effective resume for employment, Emails, Blog Writing and Memos.

| Module-5 | (03 hours of pedagogy) |
|---|---|

**Professional Communication at Workplace**: Group Discussion and Professional Interviews, Characteristics and Strategies of a GD and PI's, Intra and Interpersonal Communication Skills at workplace, Non-Verbal Communication Skills and its importance in GD and Interview. Presentation skills and Formal Presentations by Students, Strategies of Presentation Skills.

| **Course outcome (Course Skill Set)** | |
| --- | --- |
| At the end of the course the student will be able to: | |
| CO1 | To understand and identify the Common Errors in Writing and Speaking. |
| CO2 | To Achieve better Technical writing and Presentation skills. |
| CO3 | To read Technical proposals properly and make them to Write good technical reports. |
| CO4 | Acquire Employment and Workplace communication skills. |
| CO5 | To learn about Techniques of Information Transfer through presentation in different level. |

## Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). The minimum passing mark for the SEE is 35% of the maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

**Continuous Internal Evaluation(CIE):**

**Two Unit Tests each of 30 Marks (duration 01 hour)**

- First test after the completion of 30-40 % of the syllabus
- Second test after completion of 80-90% of the syllabus

One Improvement test before the closing of the academic term may be conducted if necessary. However best two tests out of three shall be taken into consideration

**Two assignments each of 20 Marks**

The teacher has to plan the assignments and get them completed by the students well before the closing of the term so that marks entry in the examination portal shall be done in time. Formative (Successive) Assessments include Assignments/Quizzes/Seminars/ Course projects/Field surveys/ Case studies/ Hands-on practice (experiments)/Group Discussions/ others.  The Teachers shall choose the types of assignments depending on the requirement of the course and plan to attain the Cos and POs.  (To have a less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE.  Each method of CIE should have a different syllabus portion of the course).  CIE methods /test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

**The sum of two tests, two assignments, will be out of 100 marks and will be scaled down to 50 marks**

**Semester End Examinations (SEE)**

SEE paper shall be set for **50 questions, each of the 01 mark**. The pattern of the **question paper is MCQ** (multiple choice questions). The time allotted for SEE is **01 hour.** The student must secure a minimum of 35% of the maximum marks for SEE.

## Suggested Learning Resources:

### Textbook:

1) **"Professional Writing Skills in English"** published by Fillip Learning – Education (ILS), Bangalore – 2022.
2) **"Functional English"** (As per AICTE 2018 Model Curriculum) (ISBN-978-93-5350-047-4)  Cengage learning India  Pvt Limited [Latest Edition 2019].

### Reference Books:

1) **English for Engineers** by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
2) **Technical Communication** by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
3) **Technical Communication** – Principles and Practice, Third Edition by Meenakshi Raman and Sangeetha Sharma, Oxford University Press 2017.
4) **High School English Grammar & Composition** by Wren and Martin, S Chandh  & Company Ltd – 2015.
5) **Effective Technical Communication** – Second Edition by M Ashraf Rizvi, McGraw Hill Education (India) Private

### Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ✓ Contents related  activities (Activity-based  discussions)
- ✓ For active participation of students instruct the students to prepare Flowcharts and Handouts
- ✓ Organising Group wise discussions Connecting to placement activities
- ✓ Quizzes and Discussions,  Seminars and assignments

**Theory  - 01 Credit Course**
# Indian Constitution

| Course Title: | Indian Constitution | | |
|---|---|---|---|
| Course Code: | BICOK107-207 | CIE Marks | 50 |
| Course Type (Theory/Practical /Integrated) | Theory | SEE Marks | 50 |
| | | Total Marks | 100 |
| Teaching Hours/Week (L:T:P: S) | 1:0:0:0 | Exam Hours | 01 Theory |
| Total Hours of Pedagogy | 15 hours | Credits | 01 |

## Course objectives :

The course **INDIAN CONSTITUTION (22ICO17 / 27)** will enable the students,

1. To know about the basic structure of Indian Constitution.
2. To know the Fundamental Rights (FR's), DPSP's and Fundamental Duties (FD's) of our constitution.
3. To know about our Union Government, political structure & codes, procedures.
4. To know the State Executive &  Elections system of India.
5. To learn the Amendments and Emergency Provisions, other important provisions given by the constitution.

## Teaching-Learning Process

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective: Teachers shall adopt suitable pedagogy for effective teaching - learning process. The pedagogy shall involve the combination of different methodologies which suit modern technological tools.

(i) Direct instructional method ( Low/Old Technology), (ii) Flipped classrooms (High/advanced Technological tools), (iii) Blended learning (Combination of both),  (iv) Enquiry and evaluation based learning, (v) Personalized learning, (vi) Problems based learning through discussion.

(ii) Apart from conventional lecture methods, various types of innovative teaching techniques through videos, animation films may be adapted so that the delivered lesson can progress the students In theoretical applied and practical skills.

| Module-1 | (03 hours of pedagogy) |
|---|---|

Indian Constitution: Necessity of the Constitution, Societies before and after the Constitution adoption. Introduction to the Indian constitution, Making of the Constitution, Role of the Constituent Assembly.

| Module-2 | (03 hours of pedagogy) |
|---|---|

Salient features of India Constitution. Preamble of Indian Constitution & Key concepts of the Preamble. Fundamental Rights (FR's) and its Restriction and limitations in different Complex Situations.  building.

| Module-3 | (03 hours of pedagogy) |
|---|---|

Directive  Principles  of  State  Policy (DPSP's) and its  present  relevance  in  Indian  society. Fundamental Duties and its Scope and significance in Nation, Union Executive : Parliamentary System, Union Executive – President, Prime Minister, Union Cabinet.

| Module-4 | (03 hours of pedagogy) |
|---|---|

Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Judicial System of India, Supreme Court of India and other Courts, Judicial Reviews and Judicial Activism.

| Module-5 | (03 hours of pedagogy) |
|---|---|

State Executive and Governer, CM, State Cabinet, Legislature - VS & VP, Election Commission, Elections & Electoral Process. Amendment to Constitution, and  Important Constitutional  Amendments till today. Emergency Provisions.

## Course outcome (Course Skill Set)

At the end of the course 22ICO17/27 the student will be able to:

| CO1 | Analyse the basic structure of Indian Constitution. |
|---|---|
| CO2 | Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution. |
| CO3 | know about our Union Government, political structure & codes, procedures. |
| CO4 | Understand our State Executive &  Elections system of India. |
| CO5 | Remember the Amendments and Emergency Provisions, other important provisions given by the constitution. |

**Assessment Details (both CIE and SEE)**

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). The minimum passing mark for the SEE is 35% of the maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

**Continuous Internal Evaluation(CIE):**

**Two Unit Tests each of 30 Marks (duration 01 hour)**

- First test after the completion of 30-40 % of the syllabus
- Second test after completion of 80-90% of the syllabus

One Improvement test before the closing of the academic term may be conducted if necessary. However best two tests out of three shall be taken into consideration

**Two assignments each of 20 Marks**

The teacher has to plan the assignments and get them completed by the students well before the closing of the term so that marks entry in the examination portal shall be done in time. Formative (Successive) Assessments include Assignments/Quizzes/Seminars/ Course projects/Field surveys/ Case studies/ Hands-on practice (experiments)/Group Discussions/ others..   The Teachers shall choose the types of assignments depending on the requirement of the course and plan to attain the Cos and POs.  (to have a less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE.   Each method of CIE should have a different syllabus portion of the course).  CIE methods /test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

**The sum of two tests, two assignments, will be out of 100 marks and will be scaled down to 50 marks**

**Semester End Examinations (SEE)**

SEE paper shall be set for **50 questions, each of the 01 mark**. The pattern of the **question paper is MCQ** (multiple choice questions). The time allotted for SEE is **01 hour.** The student must secure a minimum of 35% of the maximum marks for SEE.

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**Suggested Learning Resources:**

**Textbook:**

1. **"Constitution of India" (for Competitive Exams)** - Published by Naidhruva Edutech Learning Solutions, Bengaluru. – 2022.
2. "**Introduction to the Constitution of India**", (Students Edition.) by Durga Das Basu (**DD Basu**): Prentice –Hall, 2008.

**Reference Books:**

1. **"Constitution of India, Professional Ethics and Human Rights"** by Shubham Singles, Charles E. Haries, and et al: published by Cengage Learning India, Latest Edition – 2019.
2. **"The Constitution of India"** by Merunandan K B: published by Merugu Publication, Second Edition, Bengaluru.
3. **"Samvidhana Odu" - for Students & Youths by Justice HN Nagamohan Dhas,  Sahayana, kerekon.**
4. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, "**Engineering Ethics**", Prentice –Hall, 2004.

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**Activity Based Learning (Suggested Activities in Class)/ Practical Based learning**

- ✓ Contents related  activities (Activity-based  discussions)
- ✓ For active participation of students instruct the students to prepare Flowcharts and Handouts
- ✓ Organising Group wise discussions Connecting to placement activities
- ✓ Quizzes and Discussions
- ✓ Seminars and assignments

**I Semester**

<table>
<tr><td colspan="4" align="center">**INNOVATION and DESIGN THINKING**</td></tr>
<tr><td>Course Code</td><td align="center">BIDTK158/258</td><td>CIE Marks</td><td align="center">50</td></tr>
<tr><td>Teaching Hours/Week (L: T:P: S)</td><td align="center">1:0:0</td><td>SEE Marks</td><td align="center">50</td></tr>
<tr><td>Total Hours of Pedagogy</td><td align="center">15</td><td>Total Marks</td><td align="center">100</td></tr>
<tr><td>Credits</td><td align="center">01</td><td>Exam Hours</td><td align="center">01</td></tr>
</table>

**Course Category:** Foundation

**Preamble:** This course provides an introduction to the basic concepts and techniques of engineering and reverses engineering, the process of design, analytical thinking and ideas, basics and development of engineering drawing, application of engineering drawing with computer aide.

**Course objectives:**
- To explain the concept of design thinking for product and service development
- To explain the fundamental concept of innovation and design thinking
- To discuss the methods of implementing design thinking in the real world.

**Teaching-Learning Process (General Instructions)**

These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes.

1. Lecturer method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Show Video/animation films to explain concepts
3. Encourage collaborative (Group Learning) Learning in the class
4. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotes critical thinking
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develops thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
6. Topics will be introduced in multiple representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.

<table>
<tr><td colspan="2" align="center">**Module-1**</td></tr>
<tr><td colspan="2">**PROCESS OF DESIGN**<br>**Understanding Design thinking**<br>Shared model in team-based design – Theory and practice in Design thinking – Explore presentation signers across globe – MVP or Prototyping</td></tr>
<tr><td>**Teaching-Learning Process**</td><td>Introduction about the design thinking: Chalk and Talk method<br>Theory and practice through presentation<br>MVP and Prototyping through live examples and videos</td></tr>
<tr><td colspan="2" align="center">**Module-2**</td></tr>
<tr><td colspan="2">**Tools for Design Thinking**<br>Real-Time design interaction capture and analysis – Enabling efficient collaboration in digital space – Empathy for design – Collaboration in distributed Design</td></tr>
<tr><td>**Teaching-Learning**</td><td>Case studies on design thinking for real-time interaction and analysis</td></tr>
</table>

| Process | Simulation exercises for collaborated enabled design thinking |
|---|---|
| | Live examples on the success of collaborated design thinking |

| Module-3 | |
|---|---|

**Design Thinking in IT**

Design Thinking to Business Process modelling – Agile in Virtual collaboration environment – Scenario based Prototyping

| Teaching-Learning Process | Case studies on design thinking and business acceptance of the design |
|---|---|
| | Simulation on the role of virtual eco-system for collaborated prototyping |

| Module-4 | |
|---|---|

**DT For strategic innovations**

Growth – Story telling representation – Strategic Foresight - Change – Sense Making - Maintenance Relevance – Value redefinition - Extreme Competition – experience design - Standardization – Humanization - Creative Culture – Rapid prototyping, Strategy and Organization – Business Model design.

| Teaching-Learning Process | Business model examples of successful designs |
|---|---|
| | Presentation by the students on the success of design |
| | Live project on design thinking in a group of 4 students |

| Module-5 | |
|---|---|

Design thinking workshop

Design Thinking Work shop Empathize, Design, Ideate, Prototype and Test

| Teaching-Learning Process | 8 hours design thinking workshop from the expect and then presentation by the students on the learning from the workshop |
|---|---|

**Course Outcomes:**

Upon the successful completion of the course, students will be able to:

| CO Nos. | Course Outcomes | Knowledge Level (Based on revised Bloom's Taxonomy) |
|---|---|---|
| CO1 | Appreciate various design process procedure | K2 |
| CO2 | Generate and develop design ideas through different technique | K2 |
| CO3 | Identify the significance of reverse Engineering toUnderstand products | K2 |
| CO4 | Draw technical drawing for design ideas | K3 |

## Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). The minimum passing mark for the SEE is 35% of the maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

**Continuous Internal Evaluation (CIE):**

- Two Tests (preferably in MCQ pattern ) each of **30 Marks;** The first test after the completion of the 40 -50% syllabus of the course. A second test after the completion of 90-100% of the syllabus of the course.

- Two Assignments/two quizzes/two seminars/one field survey and report presentation/one-course project totaling **40 marks**

Total Marks scored (test + assignments) out of 100 shall be scaled down to **50 marks**

At the beginning of the semester, the instructor/faculty teaching the course has to announce the methods of CIE for the course.

The Teachers shall choose the types of assignments depending on the requirement of the course and plan to attain the Cos and POs.  (to have a less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE.   Each method of CIE should have a different syllabus portion of the course).  CIE methods /test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

**Semester-End Examination:**

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for subject

SEE paper will be set for 50 questions of each of 01 marks. The pattern of the question paper is MCQ. The time allotted for SEE is **01 hour**

**Suggested Learning Resources:**

**Text Books :**
1. John.R.Karsnitz, Stephen O'Brien and John P. Hutchinson, "Engineering Design",Cengage learning (International edition) Second Edition, 2013.
2. Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage", Harvard Business Press , 2009.
3. Hasso Plattner, Christoph Meinel and Larry Leifer (eds), "Design Thinking: Understand – Improve – Apply", Springer, 2011
4. Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School", John Wiley & Sons 2013.

**References**:

5. Yousef Haik and Tamer M.Shahin, "Engineering Design Process", CengageLearning, Second Edition, 2011.
6. Book - Solving Problems with Design Thinking - Ten Stories of What Works (Columbia Business School Publishing) Hardcover – 20 Sep 2013 by Jeanne Liedtka (Author), Andrew King (Author), Kevin Bennett (Author).

**Web links and Video Lectures (e-Resources):**

1. www.tutor2u.net/business/presentations/. /**productlifecycle**/default.html
2. https://docs.oracle.com/cd/E11108_02/otn/pdf/. /E11087_01.pdf
3. www.bizfilings.com › Home › Marketing › Product Developmen
4. https://www.mindtools.com/brainstm.html
5. https://www.quicksprout.com/. /how-to-**reverse**-**engineer**-your-competit
6. www.vertabelo.com/blog/documentation/**reverse**-**engineering**
   https://support.microsoft.com/en-us/kb/273814
7. https://support.google.com/docs/answer/179740?hl=en
8. https://www.youtube.com/watch?v=2mjSDIBaUlM
   thevirtualinstructor.com/foreshortening.html
    https://dschool.stanford.edu/.../designresources/.../ModeGuideBOOTCAMP2010L.pdf
   https://dschool.stanford.edu/use-our-methods/ 6. https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking-process 7. http://www.creativityatwork.com/design-thinking-strategy-for-innovation/ 49 8. https://www.nngroup.com/articles/design-thinking/ 9. https://designthinkingforeducators.com/design-thinking/ 10. www.designthinkingformobility.org/wp-content/.../10/NapkinPitch_Worksheet.pdf

**Activity Based Learning (Suggested Activities in Class)/ Practical Based learning**

- http://dschool.stanford.edu/dgift/

https://onlinecourses.nptel.ac.in/noc19_mg60/preview

**Theory - 01 Credit Course**                                                                                  **BSFHK158/258**
# Scientific Foundations of Health

| Course Title: | Scientific Foundations of Health | | |
|---|---|---|---|
| Course Code: | **BSFHK158/258** | CIE Marks | 50 |
| Course Type (Theory/Practical /Integrated) | Theory | SEE Marks | 50 |
| | | Total Marks | 100 |
| Teaching Hours/Week (L:T:P: S) | 1:0:0:0 | Exam Hours | 01 Theory |
| Total Hours of Pedagogy | 15 hours | Credits | 01 |

**Course objectives**
The course Scientific Foundations of Health (22SFH18/28) will enable the students,
1. To know about Health and wellness (and its Beliefs) & It's balance for positive mindset.
2. To Build the healthy lifestyles for good health for their better future.
3. To Create a Healthy and caring relationships to meet the requirements of good/social/positive life.
4. To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future
5. To Prevent and fight against harmful diseases for good health through positive mindset

**Teaching-Learning Process**
These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective:
Teachers shall adopt suitable pedagogy for effective teaching - learning process. The pedagogy shall involve the combination of different methodologies which suit modern technological tools.
   (i) Direct instructional method ( Low/Old Technology), (ii) Flipped classrooms (High/advanced Technological tools),
   (iii) Blended learning (Combination of both), (iv) Enquiry and evaluation based learning,
   (v) Personalized learning, (vi) Problems based learning through discussion, (vii) Following the method of expeditionary learning Tools and techniques, (viii) Use of audio visual methods.
Apart from conventional lecture methods, various types of innovative teaching techniques through videos, animation films may be adapted so that the delivered lesson can progress the students In theoretical applied and practical skills.

| **Module-1** | **(03 hours of pedagogy)** |
|---|---|

**Good Health & It's balance for positive mindset:** Health -Importance of Health, Influencing factors of Health, Health beliefs, Advantages of good health, Health & Behavior, Health & Society, Health & family, Health & Personality, Psychological disorders-Methods to improve good psychological health, Changing health habits for good health.

| **Module-2** | **(03 hours of pedagogy)** |
|---|---|

**Building of healthy lifestyles for better future:** Developing healthy diet for good health, Food & health, Nutritional guidelines for good health, Obesity & overweight disorders and its management, Eating disorders, Fitness components for health, Wellness and physical function, How to avoid exercise injuries.

| **Module-3** | **(03 hours of pedagogy)** |
|---|---|

**Creation of Healthy and caring relationships :** Building communication skills, Friends and friendship - Education, the value of relationship and communication skills, Relationships for Better or worsening of life, understanding of basic instincts of life (more than a biology), Changing health behaviours through social engineering.

| **Module-4** | **(03 hours of pedagogy)** |
|---|---|

**Avoiding risks and harmful habits :** Characteristics of health compromising behaviors, Recognizing and avoiding of addictions, How addiction develops, Types of addictions, influencing factors of addictions, Differences between addictive people and non addictive people & their behaviors. Effects of addictions Such as..., how to recovery from addictions.

| **Module-5** | **(03 hours of pedagogy)** |
|---|---|

**Preventing & fighting against diseases for good health:** How to protect from different types of infections, How to reduce risks for good health, Reducing risks & coping with chronic conditions, Management of chronic illness for Quality of life, Health & Wellness of youth :a challenge for upcoming future, Measuring of health & wealth status.

**Course outcome (Course Skill Set) :**

At the end of the course Scientific  Foundations  of  Health (22SFH18/28) the student will be able to:

| | |
|---|---|
| CO1 | To understand and analyse about Health and wellness (and  its Beliefs) & It's balance for positive mindset. |
| CO2 | Develop the healthy lifestyles for good health for their better future. |
| CO3 | Build a Healthy and caring relationships to meet the requirements of good/social/positive life. |
| CO4 | To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future. |
| CO5 | Prevent and fight against harmful diseases for good health through positive mindset. |

## Assessment Details (both CIE and SEE) :

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). The minimum passing mark for the SEE is 35% of the maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

**Continuous Internal Evaluation(CIE) :**

**Two Unit Tests each of 30 Marks (duration 01 hour)**

- First test after the completion of 30-40 % of the syllabus
- Second test after completion of 80-90% of the syllabus

One Improvement test before the closing of the academic term may be conducted if necessary. However best two tests out of three shall be taken into consideration.

**Two assignments each of 20 Marks**

The teacher has to plan the assignments and get them completed by the students well before the closing of the term so that marks  entry  in  the  examination  portal  shall  be  done  in  time.  Formative  (Successive)  Assessments  include Assignments/Quizzes/Seminars/ Course projects/Field surveys/ Case studies/ Hands-on practice (experiments)/Group Discussions/ others..   The Teachers shall choose the types of assignments depending on the requirement of the course and plan to attain the Cos and POs.  (to have a less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE.   Each method of CIE should have a different syllabus portion of the course). CIE methods /test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

**The sum of two tests, two assignments, will be out of 100 marks and will be scaled down to 50 marks**

**Semester End Examinations (SEE)**

SEE paper shall be set for **50 questions, each of the 01 mark**. The pattern of the **question paper is MCQ** (multiple choice questions). The time allotted for SEE is **01 hour.** The student must secure a minimum of 35% of the maximum marks for SEE.

## Suggested Learning Resources:

## Textbook:

1. **"Scientific  Foundations  of  Health" – Study Material Prepared by Dr. L Thimmesha, Published in VTU - University Website.**
2. **"Scientific Foundations of Health",** (ISBN-978-81-955465-6-5) published by Infinite Learning Solutions, Bangalore – 2022.
3. **Health Psychology - A Textbook,** FOURTH EDITION by Jane Ogden McGraw Hill Education (India) Private Limited - Open University Press.

## Reference Books:

1. **Health Psychology** (Second edition) by Charles Abraham, Mark Conner, Fiona Jones and Daryl O'Connor – Published by  Routledge 711 Third Avenue, New York, NY 10017.
2. **HEALTH PSYCHOLOGY (Ninth Edition)** by SHELLEY E. TAYLOR - University of California, Los Angeles, McGraw Hill Education (India) Private Limited - Open University Press.
3. **SWAYAM / NPTL/ MOOCS/ We blinks/ Internet sources/ YouTube videos** and other materials / notes.
4. **Scientific  Foundations  of  Health (Health & Welness) - General Books** published for university and colleges references by popular authors and published by the reputed publisher.

## Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ✓ Contents related  activities (Activity-based  discussions)
- ✓ For active participation of students instruct the students to prepare Flowcharts and Handouts
- ✓ Organising Group wise discussions Connecting to placement activities
- ✓ Quizzes and Discussions, Seminars and assignments

| RENEWABLE ENERGY SOURCES | | | |
|---|---|---|---|
| Course Code: | **BETCK105E/205E** | CIE Marks | 50 |
| Course Type (Theory/Practical/Integrated ) | Theory | SEE Marks | 50 |
| | | Total Marks | 100 |
| Teaching Hours/Week (L:T:P: S) | 3:0:0:0 | Exam Hours | 03 |
| Total Hours of Pedagogy | 40 hours | Credits | 03 |

**Course objectives**
- To understand energy scenario, energy sources and theirutilization.
- To explore society's present needs and future energy demands.
- To Study the principles of renewable energy conversionsystems.
- To exposed to energy conservation methods.

**Teaching-Learning Process**
These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective
1. Use pie chart showing distribution of renewable energy sources
2. Use wind turbine models
3. Use sun path diagrams

### Module-1 (08 hours)

**Introduction**: Principles of renewable energy; energy and sustainable development, fundamentals and social implications. worldwide renewable energy availability, renewable energy availability in India, brief descriptions on solar energy, wind energy, tidal energy, wave energy, ocean thermal energy, biomass energy, geothermal energy, oil shale. Introduction to Internet of energy (IOE).

### Module-2 (08 hours)

**Solar Energy:**Fundamentals; Solar Radiation; Estimation of solar radiation on horizontal and inclined surfaces; Solar radiation Measurements- Pyrheliometers, Pyrometer, Sunshine Recorder.Solar Thermal systems: Flat plate collector; Solar distillation; Solar pond electric power plant.

**Solar electric power generation**- Principle of Solar cell, Photovoltaic system for electric power generation, advantages, Disadvantages and applications of solar photovoltaic system.

### Module-3(08 hours)

**Wind Energy**: Properties of wind, availability of wind energy in India, wind velocity and power from wind; major problems associated with wind power, Basic components of wind energy conversion system (WECS); Classification of WECS- Horizontal axis- single, double and muliblade system. Vertical axis- Savonius and darrieus types.

**Biomass Energy**: Introduction; Photosynthesis Process; Biofuels; Biomass Resources; Biomass conversion technologies-fixed dome; Urban waste to energy conversion; Biomass gasification (Downdraft) .

### Module-4(08 hours)

**Tidal Power**: Tides and waves as energy suppliers and their mechanics; fundamental characteristics of tidal power, harnessing tidal energy, advantages and limitations.
**Ocean Thermal Energy Conversion:** Principle of working, OTEC power stations in the world, problems associated with OTEC.

### Module-5 (08 hours)

**Green Energy**: Introduction, Fuel cells: Classification of fuel cells – $H_2$; Operating principles, ZeroenergyConcepts.Benefits of hydrogen energy, hydrogen production technologies (electrolysis method only), hydrogen energy storage, applications of hydrogen energy, problem associated with hydrogen energy.

**Course outcome (Course Skill Set)**

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

| | |
|---|---|
| CO1 | Describe the environmental aspects of renewable energy resources. In Comparison with various conventional energy systems, their prospects and limitations. |
| CO2 | Describe the use of solar energy and the various components used in the energy production with respect to applications like-heating, cooling, desalination, power generation. |
| CO3 | Understand the conversion principles of wind and tidal energy |
| CO4 | Understand the concept of biomass energy resources and green energy. |
| CO5 | Acquire the basic knowledge of ocean thermal energy conversion and hydrogen energy. |

## Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). The minimum passing mark for the SEE is 35% of the maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

**Continuous Internal Evaluation(CIE):**

Three Tests each of 20 Marks;

- 1st, 2nd, and 3rd tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively.

- Assignments/Seminar/quiz/group discussion /field survey & report presentation/ course project/Skill development activities, suitably planned to attain the COs and POs for a total of 40 Marks.

  If the nature of the courses requires assignments/Seminars/Quizzes/group discussion two evaluation components shall be conducted. If course project/field survey/skill development activities etc then the evaluation method shall be one.

Total CIE marks (out of 100 marks) shall be scaled down to 50 marks

**Semester End Examination (SEE):**

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

- The question paper shall be set for 100 marks. The medium of the question paper shall be English). The duration of SEE is 03 hours.
- The question paper will have 10 questions. Two questions per module. Each question is set for 20 marks. The students have to answer 5 full questions, selecting one full question from each module. The student has to answer for 100 marks and **marks scored out of 100 shall be proportionally reduced to 50 marks**.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

**Semester End Examination(SEE):**

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

- The question paper shall be set for 100 marks. The medium of the question paper shall be English/Kannada). The duration of SEE is 03 hours.

## Suggested Learning Resources:

**Text Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)**

1. Nonconventional Energy sources, G D Rai, Khanna Publication, Fourth Edition,
2. Energy Technology, S.Rao and Dr. B.B. Parulekar, Khanna Publication.Solarenergy, SubhasPSukhatme, TataMcGrawHill, 2nd Edition,1996.

**Reference Books:**

1. Principles of Energy conversion, A. W. Culp Jr.,, McGraw Hill, 1996
2. Non-Convention EnergyResources, Shobh Nath Singh, Pearson, 2018

**Web links and Video Lectures (e-Resources):**

- E-book URL:https://www.pdfdrive.com/non-conventional-energy-sources-e10086374.html
- E-book URL:https://www.pdfdrive.com/non-conventional-energy-systems-nptel-d17376903.html
- E-book URL: https://www.pdfdrive.com/renewable-energy-sources-and-their-applications- e33423592.html
- E-book URL: https://www.pdfdrive.com/lecture-notes-on-renewable-energy-sources-e34339149.html
- https://onlinecourses.nptel.ac.in/noc18_ge09/preview

**Activity Based Learning (Suggested Activities in Class)/ Practical Based learning**

- Poster presentation on the theme of renewable energy sources
- Industry Visit

**COs and POs Mapping (Individual teacher has to fill up)**

|     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 |     |     |     |     |     |     |     |     |     |      |      |      |
| CO2 |     |     |     |     |     |     |     |     |     |      |      |      |
| CO3 |     |     |     |     |     |     |     |     |     |      |      |      |
| CO4 |     |     |     |     |     |     |     |     |     |      |      |      |
| CO5 |     |     |     |     |     |     |     |     |     |      |      |      |

**Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0- Not Mapped**

| B. E. MECHANICAL ENGINEERING | | | |
|---|---|---|---|
| **Choice Based Credit System (CBCS) and Outcome Based Education (OBE)** | | | |
| Open Elective-B   (Semester VII) | | | |
| **ENERGY AND ENVIRONMENT** | | | |
| Course Code | **18ME751** | CIE Marks | 40 |
| Teaching Hours / Week (L:T:P) | 3:0:0 | SEE Marks | 60 |
| Credits | 03 | Exam Hours | 03 |

**Course  Learning Objectives:**

- To understand the fundamentals of energy sources, energy use, energy efficiency, and resulting environmental implications of various energy supplies.
- To introduce various aspects of environmental pollution and its control.
- To understand the causes and remedies related to social issues like global warming, ozone layer depletion, climate change etc.
- To introduce various acts related to prevention and control of pollution of water and air, forest protection act, wild life protection act etc.

**Module-1**

Basic Introduction to Energy: Energy and power, forms of energy, primary energy sources, energy flows, world energy production and consumption, Key energy trends in India: Demand, Electricity, Access to modern energy, Energy production and trade, Factors affecting India's energy development: Economy and demographics Policy and institutional framework, Energy prices and affordability, Social and environmental aspects, Investment.

**Module-2**

Energy storage systems: Thermal energy storage methods, Energy saving, Thermal energy storage systems
Energy Management: Principles of Energy Management, Energy demand estimation, Energy pricing
Energy Audit: Purpose, Methodology with respect to process Industries, Characteristic method employed in Certain Energy Intensive Industries

**Module-3**

Environment: Introduction, Multidisciplinary nature of environmental studies- Definition, scope and importance, Need for public awareness.
Ecosystem: Concept, Energy flow, Structure and function of an ecosystem. Food chains, food webs and ecological pyramids, Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystems, Ecological succession.

**Module-4**

Environmental Pollution: Definition, Cause, effects and control measures of - Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution and Nuclear hazards, Solid waste Management, Disaster management Role of an individual in prevention of pollution, Pollution case studies.

**Module-5**

Social Issues and the Environment: 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 legislation.

**Group assignments:**

Assignments related to e-waste management; Municipal solid waste management; Air pollution control systems; Water treatment systems; Wastewater treatment plants; Solar heating systems; Solar power plants; Thermal power plants; Hydroelectric power plants; Biofuels; Environmental status assessments; Energy status assessments etc.

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

| | |
|---|---|
| CO1: Understand energy scenario, energy sources and their utilization. | |
| CO2: Understand various methods of energy storage, energy management and economic analysis. | |
| CO3: Analyse the awareness about environment and eco system. | |
| CO4: Understand the environment pollution along with social issues and acts. | |

**Question paper pattern:**

- The question paper will have ten full questions carrying equal marks.
- Each full question will be for 20 marks.
- There will be two full questions (with a maximum of four sub- questions) from each module.
- Each full question will have sub- question covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module.

| Sl. No. | Title of the Book | Name of the Author/s | Name of the Publisher | Edition and Year |
|---|---|---|---|---|
| **Textbook/s** | | | | |
| 1 | Textbook for Environmental Studies for Undergraduate Courses of all Branches of Higher Education | | University grant commission and Bharathi Vidyapeeth Institute of environment education and Research, Pune | |
| 2 | Energy Management Audit & Conservation- for Module 2 | Barun Kumar De | Vrinda Publication | 2nd Edition 2010 |
| **Reference Books** | | | | |
| 1 | Energy Management Hand book | Turner, W. C., Doty, S. and Truner, W. C | Fairmont Press | 7th Edition 2009 |
| 2 | Energy Management | Murphy, W. R | Elsevier | 2007 |
| 3 | Energy Management Principles | Smith, C. B | Pergamum | 2007 |
| 4 | Environment pollution control Engineering | C S Rao | New Age International | reprint 2015, 2nd edition |
| 5 | Environmental studies | Benny Joseph | Tata McGraw Hill | 2nd edition 2008 |