BBSUCT1004 Environmental Sciences

Appendix 4.1

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| --- | --- | --- | --- | --- | --- | --- |
| Course Handout | | | | | | |
| 1 | Course details | | | | | |
| Faculty name | Dr. Diwakar Chauhan | | | | |
| Programme | B.Tech | | | | |
| Semester | II | | | | |
| Section | 03, 14, 16 | | | | |
| Course code | BBSUCT1004 | | | | |
| Course title | Environmental Sciences | | | | |
| 2 | Vision of the School of Computing Science and Engineering | | | | | |
| To be known globally as a premier school for value-based education, multidisciplinary research and innovation | | | | | |
| 3 | Mission of the School of Computing Science and Engineering | | | | | |
| M1 | Create a strong foundation on fundamentals of SCSE through OB-TLP | | | | |
|  | M2 | Establish state-of-the-art facilities for Analysis, Design and Implementation to develop sustainable ethical solutions | | | | |
|  | M3 | Conduct multidisciplinary research for developing innovative solutions | | | | |
|  | M4 | Involve the students in group activity including that of professional bodies to develop leadership and communication skills | | | | |
| 4 | Programme educational objectives(PEOs) | | | | | |
| PEO1 | Graduates of Computer Science and Engineering will be globally competent and provide sustainable solutions for interdisciplinary problems as team players. | | | | |
| PEO2 | Graduates of Computer Science and Engineering will engage in professional activities with ethical practices in the field of Computer Science & Engineering to enhance their own stature to contribute society. | | | | |
| PEO3 | Graduates of Computer Science and Engineering will acquire specialize knowledge in trending technologies for research, innovation and product development. | | | | |
| 5 | Programme outcomes Knowledge level | | | | | |
| PO1 | Engineering Knowledge K3 | | | | |
| PO2 | Problem analysis K4,K6 | | | | |
| PO3 | Design and development of solutions K6 | | | | |
| PO4 | Investigations of problems K4,K5,K6 | | | | |
| PO5 | Modern tool usage K3,K6 | | | | |
| PO6 | Engineer and society K3 | | | | |
| PO7 | Environment and sustainability K2 | | | | |
| PO8 | Ethics K3 | | | | |
| PO9 | Individual and teamwork K2 | | | | |
| PO10 | Communication K2 | | | | |
| PO11 | Project management and Finance K2 | | | | |
| PO12 | Life long learning K2 | | | | |
| 6 | Programme specifics outcome(PSO) (if any) | | | | | |
| PSO1 | To train students in trending technologies like Machine Learning, Artificial Intelligence, and Augmented reality. | | | | |
| PSO2 | To develop insights for problem solving in Data Analytics and Ubiquitous Computing. | | | | |
| 7 | Course outcomes (COs) | | | | | |
| CO1 | Understand various methods of water treatment for domestic and industrial use | | | | |
| CO2 | Differentiate various categories of waste and its disposal techniques | | | | |
| CO3 | Identify various batteries and recognize its commercial applications | | | | |
| CO4 | Understand different tools of Green Chemistry towards generating a zero waste environment | | | | |
| CO5 | Apply the knowledge of environmental pollution and degradation to solve related problems | | | | |
| 8 | Evaluation Component | Duration | **Marks** | Date &Time | Nature of Component | Scale down Marks |
| CAT-1 | 90 mins | 30 | As per Academic Calendar | Closed Book | 15 |
| CAT-2 | 90 mins. | 30 | As per Academic Calendar | Closed Book |
| CAT-3 / Presentation (Seminar/mini-project/poster) | 5 -15 minutes/ student | 30 | As per Academic Calendar | Open Book |
| (IA-1 to IA-4)  Quiz / Assignments / surprising tests. etc. | 10-20 mins for each | 4 x 5 = 20 | As per Academic Calendar | Closed Book | 10 |
| IA-5 | During the session | 5 | During the session | Co-Curricular Activity |
| IA-6 | During the session | 5 | During the session | Extra- Curricular Activity |
|  | End Term Examination (ETE) | 180 mins. | 50 | As per Academic Calendar | Closed Book | 25 |
| 9 | List of teaching –learning pedagogy  Chalk and Talk method, PPT, Lesson Plan and course handout, LMS-Moodle, Student’s seminar, Self learning (NPTEL) | | | | | |
| 10 | Open hour for students  As per the type of topic and completion of the modules**–** Interactive discussion, PPT. | | | | | |
| 11 | Link address for course materials  Datewise uploading of coursematerial of each module on iCloud | | | | | |
| 12 | Recommended list of e-books.   1. <https://www.erforum.net/2016/01/engineering-chemistry-by-jain-and-jain-pdf-free-ebook.html> 2. <https://www.scribd.com/doc/278434466/Shashi-Chawla-Engineering-Chemistry-PDF> | | | | | |
| 13 | Recommended list of online courses like SWAYYAM/NPTEL/MOOCS etc  Hardness of water  <https://nptel.ac.in/content/storage2/courses/105104102/index.htm>  Corrosion  <https://nptel.ac.in/content/storage2/courses/122101001/downloads/lec-25.pdf>  Environment science and Environmental Pollution  www.nptelvideos.in/2012/12/fundamentals-of-environmental-pollution.html | | | | | |
| 14 | Recommended list of mini projects / projects/ technical training etc. | | | | | |
| 15 | Students’ Presentation  As per schedule | | | | | |
| 18 | Content beyond Syllabus | | | | | |
| 19 | List of mini projects/projects | | | | | |

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| --- | --- | --- | --- |
| **12** | **Detail academic calendar of lecture topics** | | |
| **Lecture No.** | **Date** | **Topics to be covered** | **Learning outcomes of each topic** |
| **Unit-1 Water Technology:** | | | |
| 1 | L1 | Syllabus discussin, Introduction and Purification of Domestic water part 1 | To understand the types of impurities in water and purification of water |
| 2 | L2 | Boiler troubles 1 | To understand the basic process of boiler and troubles in industries |
| 3 | L3 | Boiler troubles 2 | To understand the basic process of boiler and troubles in industries |
| 4 | L4 | softening methods of industrial water part 1 | To understand various softening methods of industrial water |
| 5 | L5 | softening methods of industrial water part 2 | To understand various softening methods of industrial water |
| **Unit-2 Solid Waste Management and treatment Technology** | | | |
| 6 | L6 | Introduction to E-Waste, Biomedical waste | To understand the different types of waste |
| 7 | L7 | Solid waste Treatment: Collection, segregation, transportation and its disposal techniques part | To understand about different types of solid waste, various steps involved in any waste management and problems |
| **Unit – III: Battery Technology & Sustainable Energy Sources** | | | |
| 8 | L8 | Introduction to Battery, reversible and irreversible batteries | To understand various types of batteries |
| 9 | L9 | Lead-acid battery, Nickel-Cadmium Battery | To understand various types of batteries |
| 10 | L10 | Lithium ion battery and fuel cell | To understand various types of batteries and fuel cell |
| 11 | L11 | Conventional and Non-Conventional sources - Hydro Electric, Fossil Fuel based, Nuclear | To understand various types ofConventional and Non-Conventional sources of energy |
| 12 | L12 | Solar, Biomass and Geothermal energy and Bio-gas. | To understand various types ofConventional and Non-Conventional sources of energy |
| **Unit – IV Green Chemistry** | | | |
| 13 | L13 | Introduction, Basic principles of green technology | To understand the concepts of green chemistry |
| 14 | L14 | Concept of Atom economy, Tools of Green technology, zero waste technology | To understand the concepts of green chemistry, different tools of Green technology, concepts of Zero Waste |
| **Unit V: Environmental Pollution & Current Environmental Issues** | | | |
| 15 | L15 | Air pollution- Urban air quality standards as per WHO, its sources and controlling methods. | To understand thequality standards of Air and Water |
| 16 | L16 | Water pollution- water quality index as per WHO, its sources and controlling methods, | To understand the types of water pollution, effects and control measures of pollution. |
| 17 | L17 | Climate Change and Global warming: Effects, Acid Rain | To understand the effects burning issues such as Climate Change and Global warming: Effects, Acid Rain |
| 18 | L18 | Ozone Layer depletion, Photochemical Smog | To understand the effects burning issues such as Climate Change and Global warming: Effects, Acid Rain |

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| --- | --- | --- | --- | --- | --- |
| **Course Code** | **Course Name** | **L** | **T** | **P** | **C** |
| **BBSUCT1004** | **Environmental Sciences** | **2** | **0** | **0** | **0** |

**Course Contents:**

|  |  |  |
| --- | --- | --- |
| **Unit** | **Contents** | **Hours** |
| I | **Water Technology:** Purification of Domestic water, Boiler troubles, softening methods of industrial water. | 5 |
| II | **Solid Waste Management and treatment Technology:** Introduction to E-Waste, Biomedical waste and Solid waste. Treatment: Collection, segregation, transportation and its disposal techniques | 2 |
| III | **Battery Technology & Sustainable Energy Sources:** Introduction to Battery, reversible and irreversible batteries. Examples: Lead-acid battery, Nickel-Cadmium Battery, Lithium ion battery and fuel cell  Conventional and Non-Conventional sources - Hydro Electric, Fossil Fuel based, Nuclear, Solar, Biomass and Geothermal energy and Bio-gas. | 5 |
| IV | **Green Chemistry**  Introduction, Basic principles of green technology, concept of Atom economy, Tools of Green technology, zero waste technology. | 2 |
| V | **Environmental Pollution & Current Environmental Issues:** Air pollution- Urban air quality standards as per WHO, its sources and controlling methods. Water pollution- water quality index as per WHO, its sources and controlling methods, Climate Change and Global warming: Effects, Acid Rain, Ozone Layer depletion, Photochemical Smog, | 4 |

**Suggest Teaching-Learning Materials:**

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| --- | --- | --- |
| Text  Books | 1. | Text Book of Engineering Chemistry, S. S. Dara, S. Chand & company,2013, 11th Edition |
| 2. | Engineering Chemistry, Jain &Jain, Dhanpatrai&Dhanpatrai,2015,  sixteenth edition |
| 3. | A Test Book of Environmental Chemistry & Pollution Control, S.S. Dara, S. Chand & Co., 2006, 11th edition |
| 4 | Environmental Studies, Ranu Gadi, Sunita Rattan, Sushmita Mohapatra, S.K. Kataria and Sons, 2008, ISBN: 81-89757-98-9. |
| E books | 1 | Water purification, Alexandru Grumezescu, First edition |
| 2 | Solid waste management by Stephen Burnley, Willey publication,2014 |
| 3 | Air Pollution, [S. K. Agarwal](https://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22S.+K.+Agarwal%22), APH Publishing, 2005 |
| Reference Books | 1. | Environmental Chemistry, B.K. Sharma & H. Kaur, Goel Publishing House,2014, 14th edition |
| 2. | Environmental Studies, R. Rajgopalan, Oxford Publication,2016, 3rd edition |
| 3. | Environmental Studies , Benny Joseph , Tata McGraw Hill Education Private Limited, 2009, ISBN: 987-0-07-064813-5. |
| Online TL Material | 1 | Introduction to Household Water Treatment and Safe Storage,<https://www.coursera.org/learn/water-treatment/home/welcome> |
| 2. | Electronic waste Management-Issues and challenges by Dr. Brajesh Kumar Dubey, <http://nptel.ac.in/courses/120108005/> |
| 3 | Integrated Waste Management for a Smart City, <https://onlinecourses.nptel.ac.in/noc19_ce31/course> |
| 4 | Air pollution-Global threat to our Health <https://www.coursera.org/learn/air-pollution-health-threat/home/welcome> |

**Course Contents:**

|  |  |  |
| --- | --- | --- |
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| II | **Solid Waste Management and treatment Technology:** Introduction to E-Waste, Biomedical waste and Solid waste. Treatment: Collection, segregation, transportation and its disposal techniques | 4 |
| III | **Battery Technology & Sustainable Energy Sources:** Introduction to Battery, reversible and irreversible batteries. Examples: Lead-acid battery, Nickel-Cadmium Battery, Lithium ion battery and fuel cell  Conventional and Non-Conventional sources - Hydro Electric, Fossil Fuel based, Nuclear, Solar, Biomass and Geothermal energy and Bio-gas. | 4 |
| IV | **Green Chemistry**  Introduction, Basic principles of green technology, concept of Atom economy, Tools of Green technology, zero waste technology. | 4 |
| V | **Environmental Pollution & Current Environmental Issues:** Air pollution- Urban air quality standards as per WHO, its sources and controlling methods. Water pollution- water quality index as per WHO, its sources and controlling methods, Climate Change and Global warming: Effects, Acid Rain, Ozone Layer depletion, Photochemical Smog, | 4 |

**Continuous Assessment Pattern:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Mode/ Category** | **Internal Assessment (IA)** | **CAT** | **End Term Exam (ETE)** | **Total Marks**  **(100)** |
| Theory | 10 | 15 | 25 | 50 |

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| --- | --- |
| Course Outcomes | Upon successful completion of this course, student will be able to: |
| **CO1:** Understand various methods of water treatment for domestic and industrial use |
| **CO2:** Differentiate various categories of waste and its disposal techniques |
| **CO3:** Identify various batteries and recognize its commercial applications |
| **CO4:** Understand different tools of Green Chemistry towards generating a zero waste environment |
| **CO5:** Apply the knowledge of environmental pollution and degradation to solve related problems |

**Mapping of Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Outcomes** | **Program Outcomes** | | | | | | | | | | | |
| **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| CO1 | **1** |  |  |  |  |  | **2** |  |  |  |  | **1** |
| CO2 | **1** |  |  |  |  |  | **3** |  |  |  |  | **1** |
| CO3 | **1** |  |  |  |  |  | **2** |  |  |  |  | **1** |
| CO4 | **1** |  |  |  |  |  | **2** |  |  |  |  | **1** |
| CO5 | **1** |  |  |  |  |  | **3** |  |  | **3** | **3** | **1** |

**Appendix 4.3: Compliance report**

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| **School of Basic and applied sciences** | | | | | | | | |
| **Programme** | | **B.Tech** | | | | | | |
| **Programme Chair** | |  | | | | | | |
| **Compliance report of course handout** | | | | | | | | |
| **Sl No** | **Course code** | | **Course title** | **Section** | **Taught by faculty** | **Course**  **coordinator** | **Course handout Submission date** | **Remarks by PC if any** |
| **1** | BBSUCT1004 | | **Environmental Science** | **3, 14, 16** | **Dr. Diwakar Chauhan** | **Dr. Diwakar Chauhan** | **08-March-22** |  |

**Sigature of PC:**

**Signature of Dean:**

**Review by IQAC:**