**Course Profile**

**Semester: Summer**

**Year: 2020**

**Level/Term:**

|  |  |
| --- | --- |
| **I. Course Code:** | EEE 449 |
| **II. Course Title:** | Power Plant Engineering |
| **III. Credit:** | 3 | **IV. Pre-Requisite:** | Courses upto L4T1 |
| **V. Contact Hours:** | Lecture- 3 hours/week |
| **VI. Course Objectives:** |
| **Aims and Objective:*** To introduce primary energy sources for power generation.
* To provide overview of global and Bangladesh power generation
* To provide general concepts of conventional and non-conventional power generation plants.
* To familiarize with important terms and factors associated with power plant economics.
* To introduce different power plants and their power generation principles.

**Course Key Objective**To develop the concept of primary energy sources, electricity generation, performance and characteristics of different power generation plants, and economics of power generation. |

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| **VII. Course Outcome (COs):** |
| **Sl. No.** | **Cos**(Upon successful completion of this course, students should be able to) | **Corresponding POs** | **Bloom’s taxonomy domain/level\*** | **Delivery Methods & activities** | **Assessment tools** |
| C | A | P |
| CO 449-1 | **Demonstrate** the concepts and phenomenon of different power generation | PO1 | 2 | - | - | Lectures,Tutorials | CT, Exam |
| CO 449-2 | **Analyze** power sharing amongst units for economic allocation  | PO2 | 4 | - | - | Lectures,Tutorials | CT, Exam,Assignments |
| CO 449-3 | **Design & organize** different types of power plant | PO3,PO7,PO8 | 6 | - | - | Lectures,Tutorials | CT, Exam,Project |
| CO 449-4 | **Analyze** different types of nonconventional energy resources | PO4 | 3 |  |  | Lectures | CT, Exam |

\* C: Cognitive, P: Psychomotor; A: Affective

**VIII. Course Plan with Detail Description:**

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| **Session** | **Contents** | **Cos** |
| **Week 1** | * Introduction to the course
* Various energy sources, concepts and phenomenon of power generation
 | 1 |
| **Week 2** | * Power station performance: connected load, demand factor, diversity factor, load factor, plant factor, utilization factor
* Details about base load and peak load power plants
* Economic Load Sharing between different types of power plants
* Related Mathematical problems
 | 2,3 |
| **Week 3** | * Plant performance and operating characteristics: incremental rate, heat rate, efficiency
* Economic Load Sharing between different units of a power plant
* Condition of maximum efficiency of a power plant
 | 2,3 |
| **Week 4** | * Station performance characteristics
* capacity scheduling, choice of power station and units
 | 1, 2,3 |
| **Week 5** | * Interconnected System: Capacity savings
* Power sharing amongst units for economic allocation
 | 2, 3 |
| **Week 6** | * Thermal power stations: equipment
* Thermal plant operation
 | 2, 3 |
| **Week 7** | * Energy Tariff: description, types and tariff in Bangladesh
* Tariff related problems
* Depreciation: types, derivation and related problems
 | 2, 3,4 |
| **Week 8** | * Hydro power stations: plant auxiliaries, plant operation
* Related Mathematical problems
 | 1,3 |
| **Week 9** | * Nuclear power stations: Definition
* Chain reactions, Nuclear Fission and Fusion
* Energy Conversion
* Radioactive decay
* Binding Energy, Reactor types
* Layout of nuclear power plant
 | 1,3 |
| **Week 10** | * Nuclear power plant Equipment
* Nuclear reactor and its types
* Moderator and moderating ratio, Reflector, Biological shielding
* Classification of coolant cycles
* Methods of waste disposal
* Review of lectures delivered so far and discussion with the students
 | 1,3 |
| **Week 11** | * Importance of renewable energy based power plant
* Basic working principle of solar cell
* PV module design
* Grid-connected PV system design
* Battery Sizing
 | 4 |
| **Week 12** | * Wind Power Plant
* Biomass Power Plant
* Review of lectures delivered so far and discussion with the students
 | 4 |

**IX. Evaluation Policy:**

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| **Marks Distribution:**  |

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| --- | --- |
| AttendanceQuizAssignmentPresentationFinal Exam | 10%20%10%10%50% |
| **Total** | **100%** |

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| **Grading System:** | As per DIU rule |

**X. Resources:**

Textbook(s):

[1] Principles of Power System, V.K .Mehta

[2] Power Plant Engineering, G. R. Nagpal

Reference(s):

[1] Power Station Engineering and Economy, B.G.A. Skrotzki, W.A. Vopat

[2] Electrical Power Station Design, Deshpande

**XI. Course Link in Moodle/Google Class Room:**

https://elearn.daffodil.university/course/view.php?id=2017

**XII. Course Instructor(s):**

* Name: Nusrat Chowdhury

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* Name: Kanij Ahmad

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* Name: Israt Jahan

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 Dr. Alam Mondal (DAM)

 AND

MMB

**XIII. Approval of the teacher along with sign:**

I/We agree that you may excerpt some of my work to share with other teaching assistants and faculty. The purpose is to assess student learning and to improve teaching. I recognize that every effort will be made to keep this information confidential and that my name will not be associated with my comments.

Signature of the Instructors