FUTURE UNIVERSITY IN EGYPT جامعة المستقبل

## Faculty of Engineering & Technology

### Planning of Electrical Networks

**Information :**

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|---|---|---|---|---|---|
| **Course Code :** | EPR 514 | **Level :** | Undergraduate | **Course Hours :** | 3.00- Hours |

**Department :** Specialization of Electrical Power Engineering

**Instructor Information :**

| Title | Name | Office hours |
|---|---|---|
| Professor | Hossam Eldin Abdallah Talaat | |
| Teaching Assistant | TOAA ABDELSALAM ELSAYED MOHAMED | 2 |

**Area Of Study :**

The Main Goals of this course are:
Develop the students' knowledge about power system planning, economy and reliability.
Prepare students to analyze and solve load forecasting and reliability problems.
Train students to conduct a generation planning project.

**Description :**

Load curves and load characteristics. Load forecasting: Linear and Quadratic Regression, Moving average and Exponential smoothing methods. Cost Analysis of Generation Systems and levelized cost of electrical energy. Distribution network reliability: Reliability Indices; SAIFI, CAIDI, SAIDI, ASAI. Reliability Analysis of Generation Systems: Capacity Outage Probability Table, Binomial Expansion, Recursive Algorithm, Loss of Load Expectation. Course Project.

**Course outcomes :**

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|---|---|
| **a.Knowledge and Understanding: :** | |
| 1 - | Define, using proper mathematical formulation, the key factors related to load characteristics. |
| 2 - | Describe the mathematical formulation of different load forecasting techniques. |
| 3 - | Demonstrate the cost components of generation system and the levelized cost of electrical energy. |
| 4 - | Define, using proper mathematical formulation, the distribution system reliability indices including: SAIDI, SAIFI, CAIDI and ASAI. |
| **b.Intellectual Skills: :** | |
| 1 - | Apply load forecasting techniques to predict maximum demand and energy consumption during upcoming time horizon. |
| 2 - | Analyze cost components of generation systems |
| 3 - | Evaluate distribution system reliability using SAIDI, SAIFI, CAIDI and ASAI. |
| 4 - | Determine the loss of load expectation trough constructing the capacity outage probability table for a generating system. |
| **c.Professional and Practical Skills: :** | |
| 1 - | Select suitable generating unitsônumber and size to achieve a specified level of generation reliability at minimum annual cost of generation. |

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|---|---|
| 2 - | Prepare technical reports. |
| **d.General and Transferable Skills: :** | |
| 1 - | Communicate effectively. |
| 2 - | Demonstrate efficient IT capabilities |

**Course Topic And Contents :**

| Topic | No. of hours | Lecture | Tutorial / Practical |
|---|---|---|---|
| Load forecasting: Linear and Quadratic Regression, Moving average and Exponential smoothing methods | 15 | 9 | 6 |
| Cost Analysis of Generation Systems and levelized cost of electrical energy | 15 | 9 | 6 |
| Distribution network reliability: Reliability Indices; SAIFI, CAIDI, SAIDI, ASAI | 15 | 9 | 6 |
| Reliability Analysis of Generation Systems: Capacity Outage Probability Table, Binomial Expansion, Recursive Algorithm, Loss of Load Expectation | 15 | 9 | 6 |
| Load curves and load characteristics | 10 | 6 | 4 |
| Course Project | 5 | 3 | 2 |

**Teaching And Learning Methodologies :**

Interactive Lecturing.

Problem Solving.

Discussion.

Self-Study.

**Course Assessment :**

| Methods of assessment | Relative weight % | Week No | Assess What |
|---|---|---|---|
| Course Project | 10.00 | | |
| Final exam | 40.00 | | |
| Mid-Term Exam I | 15.00 | | |
| Mid-Term Exam II | 15.00 | | |
| Participation | 10.00 | | |
| Quizzes | 10.00 | | |

**Course Notes :**

Available at http://shimymb.tripod.com

**Recommended books :**

1- Roy Billinton, ñReliability Evaluation of Engineering Systems: Concepts and Techniquesò, Springer, Second Edition, 1992.
2- T. Gonen ñElectric Power Distribution Engineeringò, Third Edition, CRC Press, 2014.

**Web Sites :**

http://shimymb.tripod.com
http://dsm.iea.org6.