

<p>Kingdom of Saudi Arabia Ministry of Higher Education Qassim University College of Engineering</p>		<p>المملكة العربية السعودية وزارة التعليم العالي جامعة القصيم كلية الهندسة</p>
---	--	--

Power Systems Planning and Reliability

College: Engineering

Department: Electrical

First: Course Definition

1- Course Code: EE 648

2- Units: 3 credit hrs

3- Level: 3rd

4- Prerequisite:

5- Co-requisite:

6- Location (if not on main Campus):

Second: Course Objectives

- Be acquainted with the main concept of short term and long term planning.
- Understand the load forecasting methodology.
- Be acquainted with the categories of electric energy consumers.
- Be able to evaluate power system generation, transmission, distribution reliability.
- Understand the assessment methods of power costs.
- Understand the methodology of reactive power planning.
- Be able to perform generation and transmission planning.

Third: Course Description

1- Topics to be covered		
Subject	No of Weeks	Units
1. Introduction to Power System Planning	1	3
2. Basic load forecast methodologies	1	3
3. Short term and long term planning	1	3
4. Electric energy consumer categories	1	3
5. Generation reliability evaluation	1	3

Kingdom of Saudi Arabia Ministry of Higher Education Qassim University College of Engineering		المملكة العربية السعودية وزارة التعليم العالي جامعة القصيم كلية الهندسة
--	--	--

6. Transmission sys. reliability evaluation	1	3
7. Distribution sys. reliability evaluation	1	3
8. Power system cost assessment	1	3
	1	3
9. Methods of economical evaluation	1	3
10. Power System Reinforcement	1	3
11. Reactive power planning methodology	1	3
12. Transmission system planning	2	6
13. Generation system planning	2	6

2- Course components (Total hrs in the Semester): 45

Lectures	Exercises	Other
45	---	----

3- Intended Learning Outcomes of the Course (ILO's)

a. Knowledge

i) Description of the knowledge to be acquired:

- Basic load types & characteristics and methods of forecasting.
- Main categories of energy consumers
- Main methods of generation, transmission & distribution reliability evaluation
- Power system cost assessment techniques
- The optimal techniques used for generation and transmission planning
- Methods used for the power system reinforcement

ii) Teaching strategies to be used to develop that knowledge

- Lectures.
- Group discussion in the Class
- Assignments at home
- Case study Report (internet search, and reporting)

iii) Methods of assessment of knowledge acquired

- Exams.
- Quizzes.
- Case study reports.
- Group Discussion

<p>Kingdom of Saudi Arabia Ministry of Higher Education Qassim University College of Engineering</p>		<p>المملكة العربية السعودية وزارة التعليم العالي جامعة القصيم كلية الهندسة</p>
--	--	--

b- Cognitive (Intellectual) Skills

i) Cognitive skills to be developed

- The Ability to solve planning problems of an existing power system.
- Ability to think creatively for planning any part of power system
- Ability to apply skills when planning for a given power system

ii) Teaching strategies to be used to develop these cognitive skills

- Lectures
- Discussions in the Class
- Case study Report (data collection, Internet search, and reporting)

iii) Methods of assessment of students' cognitive skills

- Seminars and presentations.
- Term projects.
- Written reports.

c. Interpersonal Skills and Responsibility

i) Description of the interpersonal skills and capacity to carry responsibility to be developed

- Having responsibility for own learning
- Ability of group participation, leadership (Team work)
- Ability to act responsibly-personal and professional

ii) Teaching strategies to be used to develop these skills

- Reports.
- Term team projects.
- Presentations and seminars

iii) Methods of assessment of students' interpersonal skills and capacity to carry responsibility

- Evaluation of the team projects.
- Written reports.
- Students' seminars and presentations.

d. Communication, Information Technology and Numerical Skills

i) Description of the skills to be developed in this domain

- Literature search.
- Problems numerical modeling.

<p>Kingdom of Saudi Arabia Ministry of Higher Education Qassim University College of Engineering</p>		<p>المملكة العربية السعودية وزارة التعليم العالي جامعة القصيم كلية الهندسة</p>
---	--	--

- Utilization of computer applications in analysis and design.

ii) Teaching strategies to be used to develop these skills

- Class lectures.
- Case studies analysis.
- Computer lab sessions.
- Term projects.

iii) Methods of assessment of students numerical and communication skills

- Term projects.
- Written reports.
- Students' seminars and presentations.

e. Psychomotor (if applicable) & Other Non-cognitive Skills

i) Description of the psychomotor or other skills to be developed and the level of performance required

- NA

ii) Teaching strategies to be used to develop these skills-

- NA

iii) Methods of assessment of student's psychomotor skills

- NA

4- Student Assessment Schedule

Serial	Assessment tool (test, group project, examination etc.)	Week due	Weight
1	Quizzes	5 th , 10 th	10 %
2	Mid Term Exam -1	7 th	15 %
3	Case study report	10 th	10 %
4	Term Project – 1	13 th	15 %
5	Final Exam	16 th	50 %

5- Student Support

- Providing electronic library for references and scientific periodicals.
- Providing the necessary computer applications for the course.
- Arrangements for availability of faculty for individual student consultations and academic advice.

<p>Kingdom of Saudi Arabia Ministry of Higher Education Qassim University College of Engineering</p>		<p>المملكة العربية السعودية وزارة التعليم العالي جامعة القصيم كلية الهندسة</p>
---	--	--

6- Learning Resources

i) Essential Books (References)

- X. Wang and J.R. McDonald, *Modern Power System Planning*, McGraw-Hill.
- Billinton, Allan, "Reliability Evaluation of Power Systems", Longman.

ii) Course Notes Course materials are uploaded on the College Web-Site (www.qec.edu.sa) to be available for the students.

iii) Recommended Books

- Sullivan, "power system planning", McGraw Hill,

iv) Electronic Books & Web Sites:

- Scientific journals and forums.

v) Periodicals

IEEE power engineering society concerned periodicals

7- Course Evaluation and Improvement Processes

i) Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- Students' Questionnaires,
- Observing the students opinions recorded in the college student site
- Appeal box
- Carrying out extensive questioners by a sample of the distinguished students just after the graduation from the college.-

ii) Other Strategies for Evaluation of Teaching by the Instructor or by the Department

- Instructor report
- Public faculty seminars.
- Periodical review of the teaching methods by both the department council and the education affairs vice dean.-

iii) Processes for Improvement of Teaching

- Evaluation of the course outlines by external staff member from outside the university.
- Periodical contact with the different engineering authorities and industries for evaluating and getting their feedback and suggestions concerning the course outlines.

<p>Kingdom of Saudi Arabia Ministry of Higher Education Qassim University College of Engineering</p>	 <p>The logo of Qassim University features a stylized blue and green geometric design above the text 'Qassim University' in a serif font. To the right, the university's name is written in Arabic calligraphy: 'جامعة القصيم'.</p>	<p>المملكة العربية السعودية وزارة التعليم العالي جامعة القصيم كلية الهندسة</p>
---	---	---

iv) Processes for verifying standards of student achievement

- Check marking by an independent faculty member of a sample of student work.
- Periodic exchange and remarking of a sample of assignments/exams with a external evaluator.

v) Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Assessment and evaluation of the level of achieving the course outcomes through a continuous improvement process (part of a quality assurance system established by the university),
- Consequently, actions are to be taken to improve the course delivery when necessary.
- Review of the course objectives, outcomes and curriculum every 2 years.