

## **Tentative Syllabus – EEE 251**

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### **Part 1: Course Information**

#### **Instructor Information**

**Instructor:** Mohammad Vaziri Yazdi, Ph.D., P.E.

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#### **Course Description**

##### **Catalog Description:**

**EEE 251. Power System Economics and Dispatch.** Study of a number of engineering and economic matters involved in planning, operating, and controlling power generation and transmission systems in electric utilities. Effects of hydro and nuclear plants on system economics. Economic and environmental constraints. Theoretical developments and computer methods in determining economic operation of interconnected power systems with emphasis on digital computers. Prerequisite: EEE 141 or equivalent. **Graded:** Graded Student. **Units:** 3.0

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##### **Tentative areas of concentration (subject to change)**

*Tentative areas will include selected topics from the following list:*

- Area Generation Control
- Load – Frequency Control (LFC)
- Review of Constrained Optimization
- Economic Dispatch of Generation
- Generation Unit Commitment
- Hydro-Thermal Coordination
- Power System Stability
- Power System Security

##### **Prerequisite course (s);**

- [EEE 141 Graded.](#)

**Prerequisite by Subject(s);**

- Analysis of single phase and three phase AC circuits
- Basic Control system theory
- Transformer and Machine modeling and analyses
- Transmission line modeling and analyses
- Basic concepts of Linear Algebra and Vector analysis

**Textbook & Course Materials**

**Main Textbook:**

- Power Generation Operation and Control, Wood & Wollenberg, 2<sup>nd</sup> Ed. J. Wiley & Sons Other Recommended Texts & Reading Material
- Other readings may be made available in the course packet/Web site/SacCT environment

**Part 2: Course Requirements**

- *Attendance*
- *Assignments (may be collected for grading)*
- *Quizzes (unscheduled)*
- *Scheduled Written Exams (Test #1 and Test #2)*
- *Team Projects involving research, report, and presentation. (Topic of each project will be selected from a list provided by the instructor)*

***Project Requirements:***

**Group and member responsibilities:**

- Team members work effectively with one another, sharing the workload and Responsibilities,
- The project team is effectively managed by the team's elected (or assigned) project leader,
- The project team meets periodically to review progress, to update the

schedule and work plan. A log for member/tasks should be maintained to keep track of members assignments and progress

- The project team leader (or representative) meets by arrangements with the instructor, providing accurate status reports on work in progress and the team's schedule. Progress, new plans or changes are reviewed and discussed
- Tasks and assignments follow the team's management plan, including the work/task breakdown structure for team members and their schedules,
- The project team implements an effective quality assurance process. For Example; all work products are formally reviewed and approved by the group prior to submission,
- All team members demonstrate an understanding of the overall process, responsibilities of other members as well the engineering principles used and any simulations performed.

### **Structure and Format requirements of the report:**

#### **a) Structure:**

The main report should be 8-20 pages (for font size/type and other details refer to "Format" requirements below), in editable electronic format using MS Office software products, containing the following major sections;

- Title page, including names of authors, course name and number and date
- Abstract; one paragraph – 1 page (less than 200 words), containing a "high level" (very brief!) description of "what the project is about", "how it was done" (concepts used, analyses, simulations, etc.)', and "results and conclusions arrived at".
- Introduction; (2 - 4 pages), introducing the project, the backgrounds, objectives, theoretical concepts, and a brief description of the following sections of the report.
- Body of the report; (3 – 6 pages, includes several sub-sections), this is main part of the report containing sub-sections on; approach, theoretical analyses, computer simulations; discussion/explanations about expectations, difficulties, and tabulated results and conclusions.
- Conclusions and Summary; (1 – 4 pages), discussing the results and if they agreed with the theories/expectations, restating the main conclusions/results drawn from the project, recapping any problems/difficulties, and finally any recommendations/suggestions for future work/research.

- References; (2 – 5 pages) stating references to formulas, pictures, quotes, discussions, programs/software used, and other information obtained for the report.
- If needed, additional background information, theory, mathematical proofs, (up to several pages in addition to the 8-20 pages for the main report) may be added at the end of the report under section called “Appendices”.

**b) Format:**

The format requirements for the report are as follows;

- Font size should be 10 pitch,
- Font type should be “Times New Roman”,
- Justified to align text to both “left” and “right”,
- No scanned diagrams are allowed,
- All diagrams such as; single line, 3 line, schematics, circuit diagrams, flow charts, etc. MUST be original and make in MS Visio format. A directory of all Visio formatted files of the diagrams in the report must be submitted with the report.
- Number of pictures (originals or down loaded) in the report is limited to 3,
- For down loaded pictures, proper reference and the link to the picture must be provided.
- MS Word “Equation” feature must be used for all formulas and/or any mathematical relations.
- All derivations (or sources) for the formulas or relations must be provided.
- All formulas or mathematical equations must be numbered.

**Presentation requirements:**

- Presentations should be prepared in MS Power Point format,
- Each team will have 15-20 minutes for oral presentation (3-5 minutes for each member), with an additional 3-5 minutes to answer questions,
- Every member of the team must participate and have a part in the oral presentation,

Note: Original electronic files in Word, Power Point, Visio, Downloaded Pictures (including source links), etc. must be turned in (in a single directory designated by team number) by the due date.

## Course Structure

In class lectures, Take home assignments (team work is promoted), li9mitted computer programming (using Matlab), In class unscheduled Quizzes, In class and scheduled examinations, Team projects involving research, reports, and presentations.

## Major Objectives of the course:

- Review Power System Fundamentals
- Review of basic control systems
- Learn Fundamentals of Constrained Optimization
- Learn the basics of system Load – Frequency Controls (LFC)
- Learn about Economical Dispatch of Generation
- Learn about Economical Commitment of Generating Units
- Learn Transient Stability Analysis
- Learn about Power System Security

## Part 3: Tentative Topic Outline/Schedule

Week	Topic / Activity	Comments
1, 2	Introduction, Objectives, Syllabus and Basic Concepts	Various weekly assignments
3, 4	Basics of Control Systems, Load-Frequency Controls (LFC)	
5, 6, 7	Constrained Optimization, Economical Dispatch of Generation	
8, 9, 10	Basics in Hydro-Thermal Coordination, Generation Unit Commitment, Midterm exam	Midterm schedule will be discussed and determined in class
11, 12,13	Transient Stability Analyses, Power System Security	
14, 15	Selected other topics, Student presentation of projects	Schedule is adjusted as needed

Note: Actual schedule may deviate from the above table

## **Part 4: Grading and Specific Policies-EEE 251**

1 – Test1 (35%), Test 2 (35%) are in class Examinations. No make ups for missed exams unless the absence is caused by a valid, unavoidable reason. This may be subjected to a satisfactory proof of the "validity" and the "unavailability". Maximum attainable score for a makeup exam is 80% of its original value and the content may be different than the original exam.

2 – Project (15%) consisting of a "Proposal", "Research", and "Presentation" where team work is encouraged and promoted. Each of the team members will be graded for the areas of initiative, building agreement, persuasiveness, and communication skills. Each team can have 3 - 4 members. The projects involve acquisition and study of publications, computer programming, a 6-12 page prescribed technical report and a presentation of the results (refer to requirements section).

### **Your Reports are Grade is based on:**

- Proper Structure as specified in Part 2 above (Course Requirements)
- Proper Format as specified in Part 2 above (Course Requirements)
- Clarity of the contents,

### **Your Presentation Grade is based on:**

- Ease of comprehension of your presentation. Use top-down approach.
- Smooth transition from team members, i.e. good flow in presentation.
- Presentation materials: slides, easy-to-read block diagrams, functional hardware/software, and no hiccups.
- Professionalism.
- Ability to answer questions satisfactorily.
- Meeting your allotted time.
- Ability to attract the audience. Make it interesting.

Team must verbally practice the presentation at least 2 to 3 times or until the whole team is able to perform the presentation within the allotted time and achieve the criteria above. Questions will be held until end of presentation.

3 – Homework (5%, If collected) Homework is assigned with a due date but may or may not be collected for grading. Most of the assignments will require some computer programming. If the homework is not graded, the percentage points will be distributed amongst other elements at the instructor's discretion.

4 – Pop Quizzes (15% - Or 10% if Homework was collected), very similar to homework and class lectures. Quizzes will be unannounced to serve as an incentive for attendance and doing the homework.

5 – Every student's lowest score for Quizzes (or Homework if collected) will be dropped out before averaging. This provides an equal chance for every student to miss one of the collected home-works and be absent for one of the quizzes. So, students should use their best judgment on how to take advantage of this rule. No late assignments are accepted.

6 – Instructor's opinion on positive/negative behavioral patterns and professional ethics (such as timeliness/tardiness, etc.) can add/subtract up to 5 % to/from the students' overall grade.

7– No Lap Top usage, Web browsing, or text messaging is permitted during lectures, quizzes, or tests. Cell Phones must be on their silent modes. Violations will negatively impact student's final grade.

## Letter Grade Assignment

Letter grades are assigned based on an adjusted class distribution curve. The final grades can usually (but not necessarily!) be approximated by the following table. The actual final grade may be different based on various factors and/or unforeseen circumstances.

Adjusted Overall Performance in Percentile	Possible Final Grade
85% - 100%	A <sup>-</sup> , A
70% - 85%	B <sup>-</sup> , B, B <sup>+</sup>
55% - 70%	C <sup>-</sup> , C, C <sup>+</sup>
40% - 55%	D <sup>-</sup> , D, D <sup>+</sup>
Below 40%	F

**Important note:** For more information about grading at Sac State, visit the academic policies and grading section of the university catalog.

## Part 5: General University Policies

### Attend Class

Students are expected to attend all class sessions as listed on the course calendar.

### Build Rapport

If you find that you have any trouble keeping up with assignments or other aspects of the course, make sure you let your instructor know as early as possible. As you will find, building rapport and effective relationships are key to becoming an effective professional. Make sure that you are proactive in informing your instructor when difficulties arise during the semester so that they can help you find a solution.

### Complete Assignments

Assignments must be submitted by the given deadline or special permission must be requested from instructor *before the due date*. Extensions will not be given beyond the next assignment except under extreme circumstances.

All discussion assignments must be completed by the assignment due date and time. Late or missing discussion assignments will effect the student's grade.

### Understand When You May Drop This Course

It is the student's responsibility to understand when they need to consider dis-enrolling from a course. Refer to the Sac State Course Schedule for dates and deadlines for registration. After this period, a serious and compelling reason is required to drop from the course. Serious and compelling reasons includes: (1) documented and significant change in work hours, leaving student unable to attend class, or (2) documented and severe physical/mental illness/injury to the student or student's family.

#### Incomplete Policy

Under emergency/special circumstances, students may petition for an incomplete grade. An incomplete will only be assigned if **agreed by both the instructor and the department Chair**. All incomplete course assignments must be completed within **the terms of agreement**.

Inform Your Instructor of Any Accommodations Needed. If you have a documented disability and verification from the [Office of Services to](#)



[Students with Disabilities](#) (SSWD), and wish to discuss academic accommodations, please contact your instructor as soon as possible. It is the student's responsibility to provide documentation of disability to SSWD and meet with a SSWD counselor to request special accommodation *before* classes start.

SSWD is located in Lassen Hall 1008 and can be contacted by phone at (916) 278-6955 (Voice) (916) 278-7239 (TDD only) or via email at [sswd@csus.edu](mailto:sswd@csus.edu).

## Commit to Integrity

As a student in this course (and at this university) you are expected to maintain high degrees of professionalism, commitment to active learning and participation in this class and also integrity in your behavior in and out of the classroom.

### Sac State's Academic Honesty Policy & Procedures

"The principles of truth and honesty are recognized as fundamental to a community of scholars and teachers. California State University, Sacramento expects that both faculty and students will honor these principles, and in so doing, will protect the integrity of academic work and student grades."

Read more about Sac State's [Academic Honesty Policy & Procedures](#)

### Definitions

At Sac State, "**cheating** is the act of obtaining or attempting to obtain credit for academic work through the use of any dishonest, deceptive, or fraudulent means."

"**Plagiarism** is a form of cheating. At Sac State, "plagiarism is the use of distinctive ideas or works belonging to another person without providing adequate acknowledgement of that person's contribution."

**Source:** Sacramento State University Library

**Important Note:** Any form of academic dishonesty, including cheating and plagiarism, may be reported to the office of student affairs.

**Course policies are subject to change.** It is the student's responsibility to check SacCT for corrections or updates to the syllabus. Any changes will be posted in SacCT.