# Course Change Proposal

**Form A**

<table>
<thead>
<tr>
<th>Academic Group (College):</th>
<th>Engineering and Computer Science</th>
<th>Academic Organization (Department):</th>
<th>Electrical &amp; Electronic Engineering</th>
<th>Date:</th>
<th>April 20, 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Course Proposal:</td>
<td>Change ________________________</td>
<td>Department Chair:</td>
<td>Suresh Vadhva</td>
<td>Submitted by:</td>
<td>Turan Gonen</td>
</tr>
<tr>
<td>New <em>x</em> Change ___ Deletion ___</td>
<td>For Catalog Copy:</td>
<td>Yes ___ No ___</td>
<td>CCE (Extension):</td>
<td>Yes ___ No ___</td>
<td>Semester Effective:</td>
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</table>

This course replaces experimental course Subject Area (prefix) and Catalog Nbr (course number):

If changing an existing course, should new version be considered a repeat of the original version? If so, the same Course ID will be maintained. If not, a new Course ID will be assigned. Note: In PeopleSoft terminology, the Course ID is the unique system identifier, not the Catalog Nbr.

<table>
<thead>
<tr>
<th>Change from:</th>
<th>Title:</th>
<th>Units:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Area (prefix) &amp; Catalog Nbr (course no.):</td>
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<td>Subject Area (prefix) &amp; Catalog Nbr (course no.):</td>
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<tr>
<td>EEE 136</td>
<td>Smart Electric Power Grid</td>
<td>3</td>
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**JUSTIFICATION:**

This course will prepare students for advanced applications in power engineering, specifically the future electrical power grid. New topics, concerning the future, will be introduced, such as storage methods, digital and informational upgrades, and advanced metering infrastructure.

**NEW COURSE DESCRIPTION:** (Not to exceed 80 words, and language should conform to catalog copy. See http://www.csus.edu/umanual/acad.htm - Guidelines for Catalog Course Description)


**Note:**

- Prerequisite:
  - Enforced at Registration: Yes ___ No ___
- Corequisite: EEE 142 or EEE 144
  - Enforced at Registration: Yes _x_ No ___
- Graded: Letter _x_ Credit/No Credit
- Instructor Approval Required? Yes ___ No _x_
- Course Classification (e.g., lecture, lab, seminar, discussion):
  - Title for CMS (not more than 30 characters)
  - Smart Electric Power Grid
- Lecture
- Cross Listed?
  - Yes ___ No _x_
  - If yes, do they meet together and fulfill the same requirement, and what is the other course.
- How Many Times Can This Course be Taken for Credit? 1

Can the course be taken for Credit more than once during the same term? Yes ___ No _x_
FOR NEW COURSE PROPOSALS OR SUBSTANTIVE CHANGES ONLY:

Description of the Expected Learning Outcomes: Describe outcomes using the following format: “Students will be able to: 1), 2), etc.” See the example at http://www.csus.edu/acaf/example.htm

Students will be able to:
1. Understand the operation of the power system grid
2. Understand the new technologies to upgrade the performance of the grid
3. Confidently design the grid of the future

**Attach a list of the required/recommended course readings and activities [Note: it is understood that these are updated and modified as needed by the instructor(s).] This attachment should be forwarded only to your Dean’s office, not Academic Affairs.

Assessment Strategies: A description of the assessment strategies (e.g., portfolios, examinations, performances, pre-and post-tests, conferences with students, student papers) which will be used by the instructor to determine the extent to which students have achieved the learning outcomes noted above:

Homework assignments
Midterms
Final exam
Project reports
Literature research

For whom is this course being developed?
Majors in the Dept __  Majors of other Depts ____  Minors in the Dept ____  General Education ____  Other ___
Is this course required in a degree program (major, minor, graduate degree, certificate)? Yes ___  No ___
If yes, identify program(s):

Does the proposed change or addition cause a significant increase in the use of College or University resources (lab room, computer facilities, faculty, etc.)? Yes ___  No ____
If yes, attach a description of resources needed and verify that resources are available.

Indicate which department or programs will be affected by the proposed course (if any).  __None___

The Department Chair’s signature below indicates that affected programs have been sent a copy of this proposal form.

Approvals: If proposed change, new course or deletion is approved, sign and date below. If not approved, forward without signing to the next reviewing authority, and attach an explanatory memorandum to the original copy.

Signatures:

Department Chair: __Signature__  Date  5/5/09
College Dean or Associate Dean: __Signature__  5/5/09
CPSP (for school personnel courses ONK): __Signature__  5/5/09
Associate Vice President
and Dean for Academic Programs

Distribution: Academic Affairs (original), Department Chair and College Dean. Dean’s Office to send original after approval to Academic Affairs, at mail zip 6016. An electronic copy must also be sent.

9/10/2008
EEE 136 Smart Electric Power Grid

EEE Elective


Topics
1. Principles and overview of the smart electrical power grid. (3 weeks)
2) Review of the main features of power system transmission and distribution and their role in meeting the demand in electrical energy. Power flow in the grid. (2 weeks)
3) Methods of digital and informational upgrades to increase the quality and security of the power system. (1 week)
4) The role of advanced meters infrastructure, demand response, and smart communication with the consumer load to shape the power system load. (1 week)
5) Home area networks, plug-in hybrid vehicles, distributed generators, micro-grids, and distributed generation and their integration and protection in the power system. (1 week)
6) Introduction to renewable resources (wind, hydro, solar, geothermal, biomass and fuels, tidal). Emphasis will be on wind and solar sources. Environmental aspects (CO₂ reduction) (2 weeks)
7) Integration of these resources in the power grid. Problems in this integration regarding proper extraction of electrical energy and transmission. (1 week)
8) Energy storage from these intermittent resources (batteries, flywheels, etc.) (1 week)
9) Methods of reliability, security, and stability of the power system. Main principles of voltage control (reactive power balance) and load-frequency control (real power balance). Current methods of protection of the grid. (2 weeks)
10) Economic analysis. (1 week)

Evaluation
Homework, midterms, final. Projects and research of literature.

Texts and References
1) Power Engineering in smart Electrical Energy Networks by Ryszard Strzleck
3) Future Generation Grids by Vladimir Getove and Alexander Reinfield. Springer Verlay 207
4) Papers: IEEE Journals