FLORIDA ATLANTIC UNIVERSITY

NEW COURSE PROPOSAL
Graduate Programs

Department Comp. and Electrical Engineering and Comp. Science

College Engineering and Computer Science

*(To obtain a course number, contact **erudolph@fau.edu**)*

UGPC Approval _____
UFS Approval _____
SCNS Submittal _____
Confirmed _____
Banner _____
Catalog _____

Prefix EEL **Number** 6284	*(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)* **Lab Code**	**Type of Course** Lecture	**Course Title** Advanced Photovoltaic Power Systems

Credits *(Review Provost Memorandum)*
3

Effective Date *(TERM & YEAR)*
Spring 2021

Grading *(Select One Option)*
Regular X
Sat/UnSat

Course Description *(Syllabus must be attached; see Guidelines)*
This in an advanced course on solar electrical system analysis. Using basic electrical theories, an estimate on how much the energy deliver/recover from several solar systems. Projects will include designs of stand alone solar system and grid tied system.
Students cannot take both EEL 4281 and EEL 6284 for credit.

Prerequisites
EEE 3300 Electronics 1 or permission of the instructor

Prerequisites, Corequisites and Registration Controls are enforced for all sections of course.

Academic Service Learning (ASL) course
Academic Service Learning statement must be indicated in syllabus and approval attached to this form.

Corequisites
None

Registration Controls *(For example, Major, College, Level)*
Graduate and senior students

Minimum qualifications needed to teach course:
Member of the FAU graduate faculty and has a terminal degree in the subject area (or a closely related field.)

List textbook information in syllabus or here
None

Faculty Contact/Email/Phone
Dr. Yufei Tang/tangy@fau.edu/561-297-4981

List/Attach comments from departments affected by new course
NA

Approved by		***Date***
Department Chair	Hanqi Zhuang Digitally signed by Hanqi Zhuang DN: cn=Hanqi Zhuang, o=FAU, ou=CEECS, email=zhuang@fau.edu, c=US Date: 2020.05.11 09:37:08 -04'00'	5/11/2020
College Curriculum Chair	Ramesh Teegavarapu Digitally signed by Ramesh Teegavarapu DN: cn=Ramesh Teegavarapu, o=Florida Atlantic University, ou=Civil, Environmental and Geomatics Engineering, email=rteegava@fau.edu, c=US Date: 2020.05.14 08:58:22 -04'00'	5/14/2020
College Dean	Mihaela Cardei Digitally signed by Mihaela Cardei DN: cn=Mihaela Cardei, o=Florida Atlantic University, ou, email=mcardei@fau.edu, c=US Date: 2020.05.24 17:11:41 -04'00'	5/24/2020
UGPC Chair	Christopher Beetle 2020.08.21 09:31:14 -04'00'	
UGC Chair	Christopher Beetle 2020.08.26 14:53:59 -04'00'	
Graduate College Dean	member: CEA2EA9D-E3BA-4B8B-AB5E-7D1B6B864E2A CBA7DF15-75DF-484D-ADDC-87F16173373C 2020.08.26 15:09:55 -05'00'	
UFS President		
Provost		

Email this form and syllabus to UGPC@fau.edu 10 days before the UGPC meeting.

Department of Computer & Electrical Engineering and Computer Science
Florida Atlantic University
Course Syllabus

1. Course title/number, number of credit hours	
EEL 6284 Advanced Photovoltaic Power Systems	3 credit hours
2. Course prerequisites, corequisites, and where the course fits in the program of study	
Prerequisite: EEE 3300 (Electronics 1) or permission of the instructor	
3. Course logistics	
Term: Spring 2021 This is a classroom lecture course *Class time and location*: TBA	
4. Instructor contact information	
Instructor's name *Office address* *Office Hours* *Contact telephone number* *Email address*	Dr. Yufei Tang Engineering East (EE96), Room318 TBA 561-297-4981 tangy@fau.edu
5. TA contact information	
NA	
6. Course description	
This in an advanced course on solar electrical system analysis. Using basic electrical theories, an estimate on how much the energy deliver/recover from several solar systems. Students will design stand alone solar systems and grid tied systems. Students cannot take both EEL 4281 and EEL 6284 for credit.	
7. Course objectives/student learning outcomes/program outcomes	
Course objectives	This course will provide the student with both the theory and applications of the fundamental principles of Photovoltaic Systems. Students will gain experience from design project(s).
Student learning outcomes & relationship to ABET a-k objectives	NA
8. Course evaluation method	
4 Homeworks (each is worth 5%) 20 % 2 Projects (each is worth 30%) 60 % Research project presentation 20 %	Projects will include design, simulation, and reports of stand along solar systems and grid tied systems.
9. Course grading scale	
Grading Scale: A: 100%-96% ; A- 95%-90%; B+: 89%-86%; B: 85%-80%; B-: 79%-76%; C+: 75%-73%; C: 72%-68%; C-: 67%-62%; D+: 61%-58%; D: 57%-55%; D-: 54%-50%; F: below 50%	

10. Policy on makeup tests, late work, and incompletes

Makeup exams are given only if there is solid evidence of a medical or otherwise serious emergency that prevents the student of participating in the exam. Makeup exams will be administered and proctored by department personnel unless there are other pre-approved arrangements.

Incomplete grades are against the policy of the department. Unless there is solid evidence of medical or otherwise serious emergency situation incomplete grades will not be given.

Must turn in homework, reports and project(s) on time.
One point per day will be deducted from the late assignment.
Will not accept your work after 3 days OR after the solution has been provided.

11. Special course off site activity (Optional)

NA

12. Classroom etiquette policy

University policy requires that in order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular phones and laptops, are to be disabled in class sessions.

13. Attendance policy statement

Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance.
Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations or participation in University-approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student's responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student's final course grade as a direct result of such absence.

14. Disability policy statement

In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at www.fau.edu/sas/.

15. Counseling and Psychological Services (CAPS) Center

Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to http://www.fau.edu/counseling/.

16. Code of Academic Integrity policy statement

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001, www.fau.edu/regulations/chapter4/4.001_Code_of_Academic_Integrity.pdf

17. Required texts/reading

To reduce costs for our students, we strongly encourage you to explore the adoption of open educational resources (OER), textbooks and other materials that are freely accessible. We also encourage you to clearly state in the syllabus if course materials are available on reserve in the Library.

None

18. Supplementary/recommended readings

1. Renewable and Efficient Electric Power Systems, by Glibert M. Masters, John Wiley, 2013.
2. Photovoltaic Systems Engineering, by Roger Messenger and Jerry Ventre, Fourth Edition, CRC Press, 2017.

19. Course topical outline, including dates for exams/quizzes, papers, completion of reading

- Fundamentals of photovoltaic systems (**Weeks 1-4**)
  - ✓ Typical photovoltaic applications
  - ✓ Principles of electrical systems
  - ✓ PV definitions
  - ✓ PV system configurations
  - ✓ Basic components of a photovoltaic system
  - ✓ The solar resource
  - ✓ Site Surveys and Preplanning
  - ✓ Managing the Project
- Design of PV systems (**Weeks 5-6**)
  - ✓ System components
  - ✓ Design fundamentals
  - ✓ Decision matrix for system design
  - ✓ Principles of system sizing: methodologies and calculations
- Mechanical Integration (**Weeks 7 – 8**)
  - ✓ Mechanical Considerations
  - ✓ Array mounting systems
  - ✓ Mechanical integration
- Electrical Integration and NEC code compliance (**Weeks 9-11**)
  - ✓ PV Article 690
  - ✓ NEC and OSHA requirements for battery installation and safety
  - ✓ Overcurrent protection (OCPD) requirements
  - ✓ Grounding requirements
  - ✓ Labeling requirements
- PV Design Plans (**Weeks 12-13**)
  - ✓ Effective design plan creation and tying concepts together
  - ✓ Lessons from the field
  - ✓ Monitoring and O&M requirements
- Fundamentals of Battery Based Systems (**Week 13**)

- Economic Analysis (**Week 14**)
  - ✓ Payback, IRR, LCOE
- Microgrids (**Week 15**)
  - ✓ Design, modeling, and economic practicalities. HOMER and other tools will be used.

Homework1 due at the end of week 2
Homework2 due at the end of week 5
Homework3 due at the end of week 8
Project 1 due at the end of week 9
Homework4 due at the end of week 11
Project presentations during week 15
Project 2 due at the end of the course.