

 <b>FLORIDA ATLANTIC UNIVERSITY</b>	<b>NEW COURSE PROPOSAL</b> <b>Undergraduate Programs</b>		UUPC Approval <u>10-11-21</u> UFS Approval _____ SCNS Submittal _____ Confirmed _____ Banner Posted _____ Catalog _____
	<b>Department</b> Electrical Engineering and Computer Science  <b>College</b> Engineering and Computer Science <i>(To obtain a course number, contact <a href="mailto:erudolph@fau.edu">erudolph@fau.edu</a>)</i>		
<b>Prefix</b> EEL  <b>Number</b> 4580	<i>(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)</i>  <b>Lab Code</b>	<b>Type of Course</b> <div style="border: 1px solid red; padding: 2px;">Lecture</div>	<b>Course Title</b> Intro to Wireless Communication Systems
<b>Credits</b> <i>(Review Provost Memorandum)</i>  3	<b>Grading</b> <i>(Select One Option)</i> <b>Regular</b> <input checked="" type="radio"/> <b>Pass/Fail</b> <input type="radio"/> <b>Sat/UnSat</b> <input type="radio"/>	<b>Course Description</b> <i>(Syllabus must be attached; Syllabus Checklist recommended; see Guidelines)</i> This course introduces students to fundamental principles of wireless system design, focusing on modern techniques used in wireless cellular systems (5G/6G and beyond) and WiFi, various levels of system design, from information compression, modulation/detection to traffic analysis. Labs and a project are given on how to design and build a wireless system, how to test your system on software radios.	
<b>Effective Date</b> <i>(TERM &amp; YEAR)</i>  Spring 2022	<b>Prerequisites, with minimum grade*</b> 4512C with "C" or better or consent from instructor		
		<b>Corequisites</b>	<b>Registration Controls</b> <i>(Major, College, Level)</i>
<b>*Default minimum passing grade is D-. Prereqs., Coreqs. &amp; Reg. Controls are enforced for all sections of course</b>			
<b>WAC/Gordon Rule Course</b> <input type="radio"/> Yes <input checked="" type="radio"/> No  <i>WAC/Gordon Rule criteria must be indicated in syllabus and approval attached to proposal. See <a href="#">WAC Guidelines</a>.</i>		<b>Intellectual Foundations Program (General Education) Requirement</b> <i>(Select One Option)</i>  None  <i>General Education criteria must be indicated in the syllabus and approval attached to the proposal. See <a href="#">GE Guidelines</a>.</i>	
<b>Minimum qualifications to teach course</b> PhD in CS, CE or EE			
<b>Faculty Contact/Email/Phone</b> Hanqi Zhuang, zhuang@fau.edu, 5612973413		<b>List/Attach comments from departments affected by new course</b>	
<b>Approved by</b> Department Chair _____ College Curriculum Chair <u>Dan Meeroff</u> College Dean <u>Fred Bloetacher</u> UUPC Chair <u>Dan Meeroff</u> Undergraduate Studies Dean <u>Edward Pratt</u> UFS President _____ Provost _____		<b>Date</b> 9/23/2021 <u>10-4-21</u> <u>10-4-21</u> <u>10-11-21</u> <u>10-11-21</u> _____ _____	

Email this form and syllabus to [mjenning@fau.edu](mailto:mjenning@fau.edu) seven business days before the UUPC meeting.

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<b>1. Course title/number, number of credit hours</b>	
Intro to Wireless Communication Systems – EEL 4580	3 credit hours
<b>2. Course prerequisites, corequisites, and where the course fits in the program of study</b>	
Prerequisite: 4512C with "C" or better or consent from instructor	
<b>3. Course logistics</b>	
Term: TBD Class location and time:	
<b>4. Instructor contact information</b>	
Instructor's name Office address Office Hours Contact telephone number Email address	TBD
<b>5. TA contact information</b>	
TA's name Office address Office Hours Contact telephone number Email address	TBD
<b>6. Course description</b>	
This course introduces students to fundamental principles of wireless system design, focusing on modern techniques used in wireless cellular systems (5G/6G and beyond) and WiFi, various levels of system design, from information compression, modulation/detection to traffic analysis. Labs and a project are given on how to design and build a wireless system, how to test your system on software radios.	
<b>7. Course objectives/student learning outcomes/program outcomes</b>	
Course objectives	This course introduces students to basic concepts and practical implementations of wireless communication systems. After taking this course, students shall be able to analyze, simulate, build and test wireless communication systems.
Student learning outcomes & relationship to ABET 1-7 outcomes	TBD
<b>8. Course evaluation method</b>	
Homework - 20% Quiz 1 - 20% Quiz 2 - 20% Quiz 3 - 20%	Note: The minimum grade required to pass the course is C.

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Quiz 4 - 20%	
<b>9. Course grading scale</b>	
<p>Grading Scale:            "A", 90-100: "A-", 85-89: "B+", 80-84: "B", 75-79: "B-", 70-74: "C+", 65-69: "C", 60-64: "C-", 55-59: "D+", 50-54: "D", 45-49: "D-", 40-44: 39 and below: "F."</p>	
<b>10. Policy on makeup tests, late work, and incompletes</b>	
<p><i>Makeup tests</i> are given only if there is solid evidence of a medical or otherwise serious emergency that prevented the student from participating in the exam.</p> <p><i>Late work</i> is not acceptable unless the instructor previously agreed.</p> <p><i>Incomplete grades</i> are against the policy of the department. Unless there is solid evidence of a medical or otherwise serious emergency situation incomplete grades will not be given.</p>	
<b>11. Special course requirements</b>	
TBD	
<b>12. Classroom etiquette policy</b>	
<p>Due to the casual communication common in the online environment, students are sometimes tempted to relax their grammar, spelling, and/or professionalism. Please remember that you are adult students and professionals—your communication should be appropriate.</p> <p>Disruptive behavior is defined in the FAU Student Code of Conduct as "... activities which interfere with the educational mission within the classroom." Students who disrupt the educational experiences of other students and/or the instructor's course objectives in a face-to-face or online course are subject to disciplinary action. Such behavior impedes students' ability to learn or an instructor's ability to teach. Disruptive behavior may include, but is not limited to non-approved use of electronic devices (including cellular telephones); cursing or shouting at others in such a way as to be disruptive; or, other violations of an instructor's expectations for classroom conduct.</p>	
<b>13. Attendance policy statement</b>	
<p>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.</p> <p>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.</p>	
<b>14. Disability policy statement</b>	

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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/](http://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](#). If your college has particular policies relating to cheating and plagiarism, state so here or provide a link to the full policy—but be sure the college policy does not conflict with the University Regulation.

**17. Required texts/reading**

TBD

**18. Supplementary/recommended readings**

N/A

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

Topics:

- Introduction to basics of radio propagation and its effect on communication signals
- Spatial frequency reuse
- Cellular system capacity
- Power control and hand-off strategies
- Channel access and sharing
- Orthogonal frequency division multiplexing (OFDM) and spread spectrum modulation (CDMA)
- Diversity techniques and multi-input multi-output (MIMO) signal processing

Advanced special topics include:

- MmWave communications
- Massive MIMO
- Cross-layer wireless
- Underwater wireless communications
- Low-power LoRa and backscatter networks

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- Wireless localization