

ECE 6102: Wireless Networks

Course Description

Design principles and communication algorithms for wireless networks with a focus on MAC and routing protocols, scheduling algorithms, power control, and scaling properties.

Prior Course Number: 867 and 894.03

Transcript Abbreviation: Wireless Networks

Grading Plan: Letter Grade

Course Deliveries: Classroom

Course Levels: Graduate

Student Ranks: Masters, Doctoral

Course Offerings: Autumn

Flex Scheduled Course: Never

Course Frequency: Odd Years

Course Length: 14 Week

Credits: 3.0

Repeatable: No

Time Distribution: 3.0 hr Lec

Expected out-of-class hours per week: 6.0

Graded Component: Lecture

Credit by Examination: No

Admission Condition: No

Off Campus: Never

Campus Locations: Columbus

Prerequisites and Co-requisites:

Exclusions: Not open to students with credit for both 867 and 894.03.

Cross-Listings:

Course Rationale: Existing course.

The course is required for this unit's degrees, majors, and/or minors: No

The course is a GEC: No

The course is an elective (for this or other units) or is a service course for other units: Yes

Subject/CIP Code: 14.1001

Subsidy Level: Doctoral Course

Course Goals

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|--|
| Be fluent in fundamentals of scheduling, rate allocation, power control, and scaling laws in wireless networks |
| Learn MAC and routing protocols for single and multi-hop networks, and cross-layer design principles |
| Improve their communication skills through presenting the state-of-the-art papers in class and writing research-oriented term papers |
| Be trained in independent or team research to formulate and solve a real-life networking problem through their research-oriented term projects |

Course Topics

| Topic | Lec | Rec | Lab | Cli | IS | Sem | FE | Wor |
|--|------|-----|-----|-----|----|-----|----|-----|
| Wireless communication basics, propagation, and the wireless channel | 4.0 | | | | | | | |
| MAC layer design and scheduling | 10.0 | | | | | | | |

| Topic | Lec | Rec | Lab | Cli | IS | Sem | FE | Wor |
|--|-----|-----|-----|-----|----|-----|----|-----|
| Rate allocation and power control | 5.0 | | | | | | | |
| Cellular design and channel allocation | 6.0 | | | | | | | |
| Routing in multi-hop wireless networks | 6.0 | | | | | | | |
| Scaling Laws for multi-hop networks | 5.0 | | | | | | | |
| Cross layer design | 3.0 | | | | | | | |

Grades

| Aspect | Percent |
|-------------------------|---------|
| Term project | 30% |
| Term Paper Presentation | 5% |
| Midterm Exam | 30% |
| Final Exam | 35% |

ABET-EAC Criterion 3 Outcomes

| Course Contribution | | College Outcome |
|---------------------|---|---|
| *** | a | An ability to apply knowledge of mathematics, science, and engineering. |
| | b | An ability to design and conduct experiments, as well as to analyze and interpret data. |
| *** | c | An ability to design a system, component, or process to meet desired needs. |
| | d | An ability to function on multi-disciplinary teams. |
| *** | e | An ability to identify, formulate, and solve engineering problems. |
| | f | An understanding of professional and ethical responsibility. |
| ** | g | An ability to communicate effectively. |
| | h | The broad education necessary to understand the impact of engineering solutions in a global and societal context. |
| | i | A recognition of the need for, and an ability to engage in life-long learning. |
| | j | A knowledge of contemporary issues. |
| *** | k | An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. |

Additional Notes or Comments

updated course goals to be consistent with university format. Updated prereqs and exclusion to be consistent with university format.

Waiting for input an whether change of CIP code is OK. 2/28/12
CIP code can be 14.1001 3/29/30

Deleted 894G from prereq because hard to program and ran a long time ago (permanent number 891). 4/5/12

Added CSE861 to prereqs 11/7/13 BLA

Make consistent with university tool 2/21/14

Remove prerequisites and change term of offering to odd autumn. BLA 10/1818

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