

Course Syllabus

1	Course title	Advanced Wireless Networks
2	Course number	0907723
3	Credit hours (theory, practical)	3,0
	Contact hours (theory, practical)	3,0
4	Prerequisites/corequisites	Network systems design
5	Program title	Computer and Networks Engineering
6	Program code	0907
7	Awarding institution	The University of Jordan
8	School	Engineering
9	Department	Computer Engineering
10	Level of course	Semester 1 (Second level)
11	Year of study and semester (s)	Second Year, First Semester
12	Final Qualification	Passing the exams and the research project
13	Other department (s) involved in teaching the course	None
14	Language of Instruction	English
15	Date of production/revision	January 2020

16. Course Instructor/Coordinator:

Instructor: Prof. Khalid A. Darabkh
Office#: CPE 342,
Office hours: Daily 12-1 pm,
E-mail address: k.darabkeh@ju.edu.jo

17. Other instructors:

None

18. Course Description:

Introduction to wireless networks: physical layer, MAC and IEEE 802.11, HIPERLAN, Bluetooth, channel assignment and channel hopping, power control and rate control, multi-radio, network layer, mobile IP, and naming, routing in mobile networks, transport protocol in wireless networks; types of wireless networks: wireless mesh networks, sensor networks, cellular networks, delay tolerant networks, RFID and WiMax; wireless network management and security: localization, network

usage studies, network diagnosis, network security.

19. Course aims and outcomes:

A- Aims:
<ul style="list-style-type: none">• In-depth understanding of the unique aspects of mobile/wireless networks and how they impact network protocol designs.• In-depth understanding of the key mobile protocols such as mobile IP and routing.• In-depth understanding of the trade-offs in network protocol design.
B- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to
<ol style="list-style-type: none">I. Research current solutions for a problem in wireless networks and report and present the results of this research. [4, 5, 8]II. Learn to model radio signal propagation issues and analyze their impact on communication system performance. [1]III. Understand how the various signal processing and coding techniques combat channel uncertainties. [1, 3]IV. Understand the techniques of radio spectrum allocation in multi-user systems and their impact on networks capacity, [1, 2, 3]V. Introduce various wireless systems and standards. [2, 3]VI. Learn to simulate wireless networks and analyze the simulation results. [7]

20. Topic Outline and Schedule:

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
Overview of wireless communications and networking	1	Khalid A. Darabkh	II	Exams and Reports	[1]
Basic wireless communication technology, channel uncertainties and countermeasures	3	Khalid A. Darabkh	III	Exams and Reports	[1,3]
Overview of the wireless communication systems	5	Khalid A. Darabkh	IV	Exams and Reports	[1,2, 3]
Wireless LAN overview	7	Khalid A. Darabkh	V	Exams and Reports	[2, 3]
Wireless sensor	10	Khalid A.	V and VI	Exams and	[2, 3, 7]

networks		Darabkh		Reports	
Wireless ad hoc networks	13	Khalid A. Darabkh	V and VI	Exams and Reports	[2, 3, 7]

21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

- The student attends the class presentations and participates in the discussions.
- The student studies references and research papers.
- The student carries out a research project in wireless networks that surveys original and recent research papers where the student studies basic ideas, state-of-the-art solutions, and expected future directions.
- The student develops a professional report for the research report.
- The student presents the research project in class.

22. Evaluation Methods and Course Requirements:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

- Exams
- Report for the Research Project
- Presentation for the Research Project

23. Course Policies:

A. Attendance policies:

- Attendance is mandatory and highly encouraged. To that end, attendance will be taken every lecture. All exams (including the final exam) should be considered cumulative.

B- Absences from exams and handing in assignments on time:

- A makeup exam can be arranged for students with acceptable absence causes.
- The project report must be handed in in time.

C- Health and safety procedures:

- All health and safety procedure of the university and school should be followed.

D- Honesty policy regarding cheating, plagiarism, misbehavior:

- The research project and exams are expected to be individual work (have to be done by your own) and completed without any help of your classmates. Handing in work that was jointly prepared and/or copied will be considered plagiarism and will be handled according to the University regulations.

E- Grading policy:

- Research Project (25%)
- Mid-term Exam (35%)
- Final Exam (40%)

F- Available university services that support achievement in the course:

- Course Website: <http://eacademic.ju.edu.jo/k.darabkeh/Material>

24. Required equipment: (Facilities, Tools, Labs, Training....)

None

25. Events Schedule:

Event	Date
Spring 2020 Term Classes Begin	February 2, 2020 (Sunday)
Survey Paper Topic Due	March 16, 2020 (Monday)
Mid-term Exam	March 30, 2020 (Monday)
Survey Paper Submission Due and Start of Presentations	April 27, 2020 (Monday)
Spring 2017 Term Classes End	May 10, 2020 (Sunday)
Final Exam	May 13, 2020 (Wednesday) (Tentative)

25. References:

Required book (s), assigned reading and audio-visuals:

- William Stallings, *Wireless Communications and Networks*, Latest Edition, Prentice-Hall, Inc.

Recommended books, materials, and media:

- Jochen Schiller, *Mobile Communications*, Second Edition, Addison-Wesley, ISBN: 0-321-12381-6.
- Yi-Bing Lin and Imrich Chlamtac, *Wireless and Mobile Network Architecture*, Wiley.
- Charles E. Perkins, *Ad-hoc networking*, Addison-Wesley

26. Additional information:

Students are assumed to have sufficient knowledge pertaining to computer networks.

Name of Course Coordinator: **Prof. Khalid A. Darabkh** Signature: ----- Date: -----