Course Specification	
Course Code: ECE 429	**Course Title:** Antennas and Waves Propagation
Prerequisites	ECE 323

(1) Basic information

Program Title	Electronics and communication engineering		
Department offering the program	Electrical Engineering Dept.		
Department offering the course	Electrical Engineering Dept.		
Course Code	ECE 429		
Year/level	second term- 2022/2023 / 5thlevel		
Specialization	Major		
Teaching Hours	Total	Practical / Tutorial	Lectures
	4	2	3
Date of approval of Bylaw	2008		

(2) Course Aims

No.	Aims
1.	The aims of this course are to provide the student, upon completing the Electronics and Communications Engineering Program, with the basic knowledge and skills of antennas and wave propagation. This course will also provide students with the ability to select the appropriate antenna for the required application. The skills necessary for analysis and design of many types of antennas are also provided. (Aim no.1 (PEO1) .)

(3). Learning Outcomes of Course (LOs)

B1.1	Select, model, and analyze specified antenna.
B2.1	Design antenna such as (wired – loop – helical – micro strip – antenna array)
B4.1	Estimate and measure the performance of antenna.
C1.1	Analysis and evaluate of the wireless Communication system based on antenna design.

(4). Course Contents				
Week No.	**Topics**	**Lecture**	**Tutorial / Practical**	**Total**
1	Introduction to antennas and propagation.	3	2	5
2	Antenna parameters	3	2	5
3	Antenna parameters	3	2	5
4	Auxiliary Potential Functions	3	2	5
5	Linear wire antennas.	3	2	5
6	Loop antennas.	3	2	5
7	**Midterm exam**			
8	Antenna Array	3	2	5
9	Broadband helical antenna	3	2	5
10	Aperture antennas and horn antenna	3	2	5
11	Microstrip antenna	3	2	5
12	Antenna simulation	3	2	5
13	surface wave propagation - ionospheric propagation. Propagation of microwave and millimeter waves.	3	2	5
14	Revision	3	2	5
15	**Practical exam (**Research and Project discussion**)**			
16	**Final exam**			
	Total	39	26	65

(5). Teaching and Learning methods	
No.	**Teaching Method**
1.	Interactive lectures (educational presentation)
2.	Active learning e.g. group discussion, brain storming, demonstration.
3.	Project based learning
4.	Case study
5.	Self-Learning

(6). Teaching and Learning methods of Disabled Students		
No.	**Teaching Method**	**Reason**
1.	Additional tutorial	
2.	Online lectures	

(7). Students Assessment

(7.1)Students Assessment Method

No.	Assessment Method	Los
1	Attendance	
2	Reports	B1.1, B2.1, B4.1, C1.1
3	Quiz 1 / Quiz 2	B1.1, B2.1, B4.1, C1.1
4	mini project	B1.1, B2.1, B4.1, C1.1
5	Mid-term Exam	B1.1, B2.1, B4.1, C1.1
6	Final Practical Exam	B1.1, B2.1, B4.1, C1.1
7	Final Exam	B1.1, B2.1, B4.1, C1.1

(7.2) Assessment Schedule

No.	Assessment Method	Weeks
1	Attendance	Weekly
2	Reports/ Sheets	Weekly
3	Quiz 1 / Quiz 2	4 and 12
4	Mini project	14
5	Mid-term Exam	7
6	Final Practical Exam	15
7	Final Exam	16

(7.3) Weighting of Assessments

No.	Assessment Method	Weights %	Weights	
1	Attendance and class discussion	5%	5	50
3	Quiz 1 / Quiz 2	5%	5	
4	Assignments	10%	10	
5	Mid-term Exam	20%	20	
6	Final Practical Exam	10 %	10	
7	Final Exam	50%	50	
Total		100%	100	

(8). List of References

[1]. A. Balanis, ”Antenna Theory – Analysis and Design,” John Wiley & Sons, 2005.

[2]. A. Abdelmonem,“Lecture notes of NCA”, 2010.

[3]. Liu, L; Cheung, SW; Yuk, TI,” Bandwidth improvements using ground slots for compact UWB microstrip-fed antennas,” The 30th Progress In Electromagnetics Research Symposium (PIERS), Suzhou, China, 12-16 September 2011. In Progress in Electromagnetics Research Symposium Proceedings, 2011, p. 1420-1423

[4].	B. Kumkhet, P. Rakluea, N. Wongsin, P. Sangmahamad, W. Thaiwirot and C. Mahatthanajatuphat, "Ultra Wideband Fabric MIMO Antenna for future 5G Applications," *2022 19th International Conference on Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI-CON)*, Prachuap Khiri Khan, Thailand, 2022, pp. 1-4, doi: 10.1109/ECTI-CON54298.2022.9795480.

(9). Facilities required for teaching and learning

1.	Lecture room equipped with e-learning tools (computer, internet, mike, headphones, etc.)
2.	Microsoft teams
3.	Data show
4.	Lab Facilities and simulation Software (Ansys HFSS or CST)

(10).Matrix of Aims and LOs of the Course

No.	Topics	Aims	Los
1	Introduction to antenna and wave propagation	1	B1.1, C1.1
2	Antenna parameters		B1.1, C1.1
3	Auxiliary Potential Functions		C1.1
4	Linear wire antennas.		B1.1, B2.1, B4.1, C1.1
5	Loop antennas.		
6	Antenna Array		
7	Broadband helical antenna		
8	Aperture antennas and horn antenna		
9	Microstrip antenna		
10	surface wave propagation - ionospheric propagation. Propagation of microwave and millimeter waves.		C1.1
11	New trend		B1.1, B2.1, B4.1, C1.1

(11). Matrix of Competencies/ Program LOs with Course Los

No.	Competences/ Program LOs	No.	Course Los
B1	Select, model and analyze electrical power systems applicable to the specific discipline by applying the concepts of generation, transmission and distribution of electrical power systems.	B1.1	Select, model and analyze specified antenna.
B2	Design, model and analyze an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.	B2.1	Design antenna such as (wired – loop – helical – micro strip – antenna array)
B4	Estimate and measure the performance of an electrical/electronic/digital system and circuit under specific input excitation and evaluate its suitability for a specific application.	B4.1	Estimate and measure the performance of antenna.

C1	Analysis and evaluate of the different Communication systems.	C1.1	Analysis and evaluate of the wireless Communication system based on antenna design and wave propagation.

Title	Name	Signature
Course Coordinator	Dr. Ahmed Magdy	
Head of Department	Assoc. Prof. Eyad Saeed	
Date of Approval	2022/ 2023	