	NUMERIC	AL EL	ECTROMAGNETICS						
1	Course Title:	NUMERICAL ELECTROMAGNETICS							
2	Course Code:	EEM422	EEM4224						
3	Type of Course:	Optional							
4	Level of Course:	First Cycle							
5	Year of Study:	4							
6	Semester:	8							
7	ECTS Credits Allocated:	4.00							
8	Theoretical (hour/week):	3.00							
9	Practice (hour/week):	0.00							
10	Laboratory (hour/week):	0							
11	Prerequisites:	None							
12	Language:	Turkish							
13	Mode of Delivery:	Face to	face						
14	Course Coordinator:	Doç. Dr.	ESIN KARPAT						
15	Course Lecturers:								
16	Contact information of the Course Coordinator:	Dr. Öğr. Üye. Esin KARPAT Mühendislik Fakültesi Elektrik-Elektronik Mühendisliği Bölümü Ofis:320 0.224.294 20 20							
17	Website:								
18	Objective of the Course:	The students will learn to solve Electromagnetic Field problems with essential numerical techniques like FD,FDTD and etc							
19	Contribution of the Course to Professional Development:	Students gain the ability to solve complex electromagnetic problems that cannot be solved analytically, via numerical methods.							
20	Learning Outcomes:								
		1	The students will learn the key tools, techniques and principles of computational approaches at electromagnetic theory						
		2	The students will gain the ability to analyze and solve electromagnetic problems by homeworks and attendance to the lectures.						
		3	The students will learn the processes to construct original methods, to develop analytical cogitation and problem solving approximations and techniques. will understand the basis developing original and independent software processes related to computational electromagnetics.						
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21	Course Content:								
	Course Content:								

Week	Theoretical		Practice						
1	Introduction to contemporary problen electromagnetic wave engineering ar techniques in computational electrom	ns in nd nagnetics							
2	Review of the Fundamentals of Electromagnetic Theory								
3	Finite Difference Methods. Derivation difference from Taylor series and cut error.	of finite ting							
4	Forward, Backward and Center differ formulas for first and second order de	ence erivatives							
5	Solution of parabolic, hyperbolic and partial differential equations with finite difference	elliptic e							
6	Application of finite differences to 1-E equations.) wave							
7	Numerical dispersion of 1-D scalar w equation, numerical stability of 1-D sc wave equation, simple 1-D scalar wa source and absorber boundary condi	ave calar ve tions							
8	Maxwell equations, wave equations, Transverse Electric (TE) and Transve magnetic (TM) polarization	erse							
9	Introduction to Yee's definitions of ce difference in space and time in 1-D. Numerical dispersion of 1-D Yee algo numerical stability of 1-D Yee algorith	ntral prithm, nm							
Activit	es			Number	Duration (hour)	Total Work Load (hour)			
Theore	Hone the stability of 2-D Yee algorith	1111 m/		14	3.00	42.00			
Practica	als/Labs			0	0.00	0.00			
Self stu	applications of Liao absorber bounda	iry		3	6.00	18.00			
Homew	vorks	ender		2	12.00	24.00			
Pr å ≩ct	Finite difference application example	S		0	0.00	0.00			
Field S	tudies			0	0.00	0.00			
Mi tl4 ern	Fersitenstifference application example	s		1	16.00	16.00			
Others				0	0.00	0.00			
Final E	Malarials:		Ň	öntemler Birsen Yavın	46.00999	,10 <u>0</u> 16.00			
Total W	/ork Load					116.00			
Total w	ork load/ 30 hr		-	F B Hildebrand "Fini	e-Difference Equat	ຍິ⊎®7and			
ECTS	Credit of the Course					4.00			
			E E S - I th	Equations", Wiley-Eastern Limited, 1984. - Richard.C.BOOTON, "Computational Methodes for Electromagnetics and Microwaves", John Wiley and Sons, 1992. - Dennis M.SULLİVAN, "Electromagnetic Simulation Using the FDTD Method", 2nd Edition, Wiley-IEEE Press, 2013					
23	Assesment		_						
TERM L	EARNING ACTIVITIES	NUMBE R	WEIGHT						
Midtern	n Exam	1	20.00						
Quiz		0	0.00						
Home	work-project	2	20	0.00					
Final E	xam	1	60.00						

Total						4		100	100.00								
Contribution of Term (Year) Learning Activities to Success Grade							40.	40.00									
Contribution of Final Exam to Success Grade							60.	60.00									
Total								100	100.00								
Measurement and Evaluation Techniques Used in the Course						e Mic	Midterm Exam, Homewark and Final Exam										
24 EC	;TS/	WO	RK L	OAD	TAB	LE											
25 CONTRIBUTION OF LEA							ARN QUAI	RNING OUTCOMES TO PROGRAMME JALIFICATIONS									
	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ1 0	PQ11	PQ12	PQ1 3	PQ14	PQ15	PQ16	
** • • • •																	
OK1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
ÖK2	5 0	0 5	0 0	0 0	0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0	0	0	
ОК1 ÖK2 ÖK3	5 0 0	0 5 0	0 0 0	0 0 5	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	
ОК1 ÖK2 ÖK3	5 0 0	0 5 0	0 0 0 _ O: L	0 0 5 .earr	0 0 0 ning C	0 0 0 Dbjec	0 0 0 ctives	0 0 0 s P	0 0 0 Q: P	0 0 0 rogra	0 0 0 m Qu	0 0 alifica	0 0 0 tions	0	0 0 0	0 0 0	