GCC501 Scientific Research Methods and Ethics			Graduate School of Applied Sciences				
Somoston			Cre	dit Structur	e		
Semester	Lecture	Practice	La	boratory	National Credits	ECTS	
Fall/Spring	3	-		-	3	10	
Level of Course	Second Cycle		Language		English		
Type of Course	Compulsory		Mode of I	Delivery	Face to Face		
Prerequisites	-						
Catalog Description	A brief introduction to characteristics, types and scheduling of research. Research planning and design. Methodologies of research design. Measurement, data analysis. Presenting the results of research.						
Course Objectives	 To teach the basic steps of scientific research methods. To help students improve their ability to make connections across ideas, read carefully, assess the quality of sources on which they or others rely. To develop communication skills that required to suggest and discuss scientific questions in the student field of study both written (informal memos and letters, formal project proposals, reports, thesis and journal papers) and oral (presentations, scientific discussions) communication. To reinforce students' sense of professionalism and ethical behavior. 						
Course Outcomes	 Define basic principles and steps of the scientific research. Understand scientific research ethics. Formulate a research plan. Evaluate literature, form a variety of sources, pertinent to the research objectives. Write a scientific research proposal, report and/or paper. Present their research work. 						
Course Category by Content	Mathematics and	Basic Science	es		1	0	
(%)	Engineering				3	80	
	Engineering Desi	gn			3	30	
	Canaral Education 20					80	
Textbook and /or References	 C.R. Kothari, G. Garg, Research Methodology: Methods and Techniques, New Age Int., 2019. Dipankar Deb, Rajeeb Dey, Valentina E. Balas, Engineering Research Methodology: A Practical Insight for Researchers, Springer, 2019. Several websites and several articles. 						
Assessment Criteria	5. Several websi		li articies		Orrentiter	Davaanta aa	
Assessment Criteria					Quantity	Percentage	
	Attendance						
	Quiz	ework		2	50		
	Project				1	50	
	Term Paper		1		50		
	Laboratory Work						
	Other Midterm Exams						
	Final Exam						
Student Workload	A	ctivities		Quantity	Duration (hour)	Total Workload	
	Course duration in	n class (includ	ing Exam	15	3	45	
	Labs and Tutorial	8					
	Homework			2	20	40	
	Project/Presentation	on/Report		1	50	50	
	E-learning activiti	es					
	Quizzes						
	Midterm Examina	tion Study					
	Final Examination	n Study			_		
	Self-Study			14	7	112	
	Total Workload (Workload (hours) 247				247	
	Total Workload /	25 (hours)				9.88	
	ECTS Credit of th	ne Course				10	

Course Plan					
Week	Topics				
1	Introduction Kothari Ch1 & Deb Ch1				
2	Defining the problem Kothari Ch2 & Deb Ch1				
3	Literature Review Deb Ch2 and 10 & WOS, Scopus				
4	Research planning and design Kothari Ch3 & Deb Ch8				
5	Writing project proposal Deb Ch2				
6	Collect data, Execution Kothari Ch6				
7	Analyze and Interpret Kothari Ch7				
8	Technical Writing Deb Ch2 and 6 & Kothari Ch14				
9	Attributions and Citations Deb Ch3				
10	Building Intellectual Property Rights Deb Ch4				
11	Ethics in Research Deb Ch5				
12	Contributions, Arguments, and Dealing with Criticisms Deb Ch7				
13	Publishing, Presentation Deb Ch6 and 10 & Deb Ch9				
14	Review of the semester				
15	Representations				

Relationship between the Course and Program Learning Outcomes							
Progr	ram Outcomes	С					
1	Attains knowledge through wide and in-depth investigations his/her field and surveys, evaluates, interprets, and applies the knowledge thus acquired.	5					
2	Has a critical and comprehensive knowledge of contemporary engineering techniques and methods of application.	3					
3	By using unfamiliar, ambiguous, or incompletely defined data, completes and utilizes the required knowledge by scientific methods; is able to fuse and make use of knowledge from different disciplines.	5					
4	Has the awareness of new and emerging technologies in his/her branch of engineering profession, studies and learns these when needed.	5					
5	Defines and formulates problems in his/her branch of engineering, develops methods of solution, and applies innovative methods of solution.	4					
6	Devises new and/or original ideas and methods; designs complex systems and processes and proposes innovative/alternative solutions for their design.	4					
7	Has the ability to design and conduct theoretical, experimental, and model-based investigations; is able to use judgment to solve complex problems that may be faced in this process.	4					
8	Functions effectively as a member or as a leader in teams that may be interdisciplinary, devises approaches of solving complex situations, can work independently and can assume responsibility.	4					
9	Have the oral and written communication skills in one foreign language at the B2 general level of European Language Portfolio.	5					
10	Can present the progress and the results of his/her investigations clearly and systematically in national or international contexts both orally and in writing.	5					
11	Knows social, environmental, health, safety, and legal dimensions of engineering applications as well as project management and business practices; and is aware of the limitations and the responsibilities these impose on engineering practices.	5					
12	Commits to social, scientific, and professional ethics during data acquisition, interpretation, and publication as well as in all professional activities	5					
C (Co	C (Contribution of the course): 1: None 2: Weak, 3: Medium, 4: Strong, 5: Very Strong						