

<i>Course Code</i>	GRAD 501	<i>Course Title</i>	Graduate Research Skills in Science and Engineering		
<i>Academic Year</i>	2019-20	<i>Academic Term</i>	SPRING	<i>Course Credit</i>	3
<b>Covid-19 Pandemic Version:</b> Attention: All information and rules provided in this syllabus is subject to change in accordance with the new decisions of academic boards of EMU in parallel to the developments in Covid-19 Pandemic.					
		<i>e-mail</i>	<i>Office</i>	<i>Tel.</i>	
<i>Instructor:</i>	Prof. Dr. Osman Yilmaz	osman.yilmaz@emu.edu.tr	AS227	2925	
<i>Course Web Page:</i> <a href="http://opencourses.emu.edu.tr">http://opencourses.emu.edu.tr</a>					
<p>In order to use this web page with full capacity you need to:</p> <ol style="list-style-type: none"> <li>1. Get an account for "opencourses" system of EMU by clicking "Login" then "Create new account" buttons in the opened pages. This account can be used for all courses listed in the opencourses system.</li> <li>2. Enroll as a student in Grad501. Open Grad501 page from the above-given link. Scroll the page to find "enroll" link. This step is necessary to receive news and announcements through your e-mail and to be able to upload your exam/assignment document(s)</li> </ol>					
<i>Course Overview</i>	<p>This course aims to provide a solid foundation in conducting quality research at graduate level (especially at Master level) in the fields of science and engineering. Scientific research methods and their implications at different stages of the research process will be studied. Emphasis will also be placed on how to locate and make the best use of relevant sources, the development of a positive attitude toward research, the appreciation of scientific values (integrity, ethics, originality and academic freedom), and developing skills in the use of appropriate academic genres (research proposals, different types of report, journal papers, thesis) employing an appropriate format, style and language. The use of information technologies at all stages of research (on-line literature search, data processing, written communication and presentations) and other contemporary methods will also be considered together with a range of practical applications.</p>				
<i>Course Objectives</i>	<p>As candidates of being true researchers or scientists, the she students will:</p> <ul style="list-style-type: none"> <li>• be acquainted with the main features of science and technology,</li> <li>• be aware of the fundamental characteristics of scientists</li> <li>• learn scientific methods of research</li> <li>• have sufficient background and practice in all types of literature search with specific emphasis on on-line methods</li> <li>• learn to develop a positive attitude towards research</li> <li>• be equipped with the basic elements of scientific and ethical values, such as integrity, originality, and academic freedom whilst also being aware of different types of research misconduct, and their likely consequences</li> <li>• develop communication skills in sharing scientific knowledge by emphasizing conventions in the format, style and language of both written (informal memos and letters, formal reports, thesis and journal papers) and oral (presentations, scientific discussions) communication</li> <li>• be equipped with the awareness that information technology tools are likely to dominate all phases of research in the foreseeable future;</li> <li>• be aware of the differences in between industrial and academic research methods</li> <li>• be aware of research funding and learn how to write a research proposals.</li> </ul> <p>Thus by successfully completing this course students will be able to:</p> <ul style="list-style-type: none"> <li>• generate research topics</li> <li>• develop good summaries of the current knowledge</li> <li>• design better research studies</li> <li>• conduct research more efficiently and effectively</li> <li>• interact more professionally with others involved in research</li> </ul>				

	<ul style="list-style-type: none"> <li>• present better oral and written research reports</li> <li>• be well acquainted with the use of information technologies</li> <li>• understand the basic elements of "being a responsible scientist/researcher"</li> </ul>																		
Weekly Schedule	<ul style="list-style-type: none"> <li>• <b><u>Ch-1: Fundamental characteristics of science, technology and scientists; Scientific thinking skills (1 week)</u></b></li> <li>• <b><u>Ch-2: An introduction to research and research environment (1 week)</u></b>: Definition of research; Characteristics of research; Types of research; Outcomes of research; Originality in research; Research environment and a brief introduction to academic carrier.</li> <li>• <b><u>Ch-3: Time management skills (1 week)</u></b></li> <li>• <b><u>Ch-4: Literature search and reviewing with an emphasis on on-line search methods (3 Weeks)</u></b> .Definition of literature; Objectives of a literature search (review); Types of Literature; Library vs. Internet; Initial search: Where to start from? How to do an efficient and effective literature search? Developing search and reading strategies; How to search for all the books published in a field? How to search for all research articles on a research topic? What are citation indices or databases? How to use ISI Web of Science? What is Cited References Search and how to do it? Using "EndNote" as a very handy tool for automated archiving, organizing, sharing, citing and formatting your reference collection. ISI Master Journal List (MJL) Search. Journal selection criteria for reading and for publication. How to use the Journal Citation Reports?</li> <li>• <b><u>Ch:5 Values (Ethics) in research (1 week)</u></b>: Introduction; An overview of the nature of science; Integrity in research; Ethical issues in research; Originality in research; Academic freedom</li> <li>• <b><u>Ch:6 The scientific method in research (3 weeks)</u></b>: <b>Observation</b>: Problem definition; Data collection; Record keeping; Validity of data; Variables; Other considerations in selecting a research problem; <b>Hypotheses</b>; <b>Experimentation</b>; <b>Induction</b>.</li> <li>• <b><u>Ch-7: Research article writing and publication skills -</u></b> Stages of publication; Components of a Paper; Guides on Equations and Formulas; Guides for tables and figures.</li> <li>• <b><u>Ch-8: Computer skills for thesis and research article writing</u></b>: A quick overview of computer aided tools like scientific graph drawing, table preparation, editing scientific equations and formulas (equation editor), automation technics in thesis or article manuscript preparation (inserting table of contents, index, hypertext, footnote and references etc...), language tools (scientific dictionaries, thesaurus, synonyms etc), databases</li> <li>• <b><u>Ch-9: Scientific communication - Information design! (1 week)</u></b>: The value of scientific communication; Writing guidelines; Correspondence: Memos; Letters; Electronic mail; Formal reports; Laboratory reports; Design reports; Progress reports; Instructions; Theses and dissertations; Scientific journal papers; Oral presentations; Scientific language; Scientific discussion manner (etiquette)</li> <li>• <b><u>Attitudes for success in research (1 week)</u></b>: Introduction; The research attitude; Motivation towards research; Performance related attitudes; Adapting your personality; Relationships with mentors (advisors)</li> </ul>																		
Textbook(s) / Required Reading	There is no compulsory textbook for this course.																		
Exams	<table> <tr> <td>Quiz-1</td> <td>15% (Chapters 1, 2 &amp; 3)</td> </tr> <tr> <td>Quiz-2</td> <td>15% (Chapters 4, 5 &amp; 6)</td> </tr> <tr> <td>Literature search practical exam</td> <td>20%</td> </tr> <tr> <td>Scientific writing skills report</td> <td>10%</td> </tr> <tr> <td>Midterm</td> <td>20%</td> </tr> <tr> <td>Final exam</td> <td>30%</td> </tr> </table>	Quiz-1	15% (Chapters 1, 2 & 3)	Quiz-2	15% (Chapters 4, 5 & 6)	Literature search practical exam	20%	Scientific writing skills report	10%	Midterm	20%	Final exam	30%						
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Grading Criteria	<p>Curve system will be used for grades A-F</p> <p>For NG Grade:</p> <p>Conditions that will lead to NG grade.</p> <ol style="list-style-type: none"> <li>1. Not attending any two exams (midterm and final), including make-up exams.</li> <li>2. Less than 50% attendance</li> </ol>																		
Academic Honesty	Individual accountability for all individual work, written or oral. Copying from others or providing answers or information, written or oral, to others is cheating. Providing proper acknowledgment of original author. Copying from another student's paper or from another text without written acknowledgement is plagiarism. According to University's bylaws <b>cheating and plagiarism</b> are serious offences resulting in a failure from exam or project and disciplinary action (which includes an official warning may appear in student's transcript or/and suspension from University for up to one semester).																		

<b>Additional Remarks</b>	<p><b>INSTRUCTION MEDIUM</b> All course related material including the syllabus, assignments, lecture notes are available on the GRAD 501 web page: <a href="http://opencourses.emu.edu.tr">http://opencourses.emu.edu.tr</a> (scroll all the way down to Grad501 link and click.)</p> <p>Computer projection method will be used during the lectures. Reading the relevant section prior to the lecture, and taking notes on the preprinted lecture notes during the lecture will help.</p> <p>No paper-printed material except the syllabus and exam papers will be supplied in this course. Similarly, no paper-printed homework will be accepted. All assignments and announcements will be published on the course web page. Students are expected to submit their homework electronically.</p> <p><b>ATTENDANCE POLICY</b> Students having less than 50% attendance get a letter grade of NG. Full attendance to the practical classes is expected. Attendance is an indication of responsibility, an inherent characteristic of being a "good scientist".</p> <p><b>COMPUTER BACKGROUND</b> Students are expected to be familiar with the basics of Windows, a WEB browser (Explorer or Netscape), Word and Excel. Those lacking this background are urged to make up for this as soon as possible.</p> <p><b>PRACTICAL EXAM</b> <b>Computer Assisted Literature search (20%):</b> Students are expected to do a literature search on Science Citation Index-Expanded (on-line: <a href="#">Web of SCIENCE</a>) on real research topics, researchers, places. By successfully completing this assignment they will improve their skills in: developing an effective search strategy; identifying search keywords to be used in <a href="#">General search</a> (terms from the article title, keywords, or abstract of articles), <a href="#">Author search</a> (one or more author names), <a href="#">Address search</a> (terms from an author's affiliation), <a href="#">Source (Journal) title search</a>, Mixed (set) search (Combination of above search methods), and <a href="#">Citation search</a>. The students may be asked to do a demonstration of their search criteria after submitting the report.</p> <p><b>SCIENTIFIC WRITING SKILLS (10%)</b> Each student is expected to write very small technical report on either her/his ongoing research, or literature findings on a hot topic in his/her field or the reproduction of an article including publication ready graphs/tables/diagrams/reference lists from his/her field. The student may be asked to sit in a 10 min oral exam on the preparation of the report.</p>
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