<table>
<tr><td rowspan="3"></td><td colspan="5">Course name:
EE403
Digital Control Systems</td><td colspan="3">Department:
Electrical and Electronics Engineering</td><td>Semester</td></tr>
<tr><td colspan="8">Methods of Education</td><td>Credit (ECTS)</td></tr>
<tr><td>Lecture</td><td>Recitation /(Etud)</td><td>Lab</td><td>Project/ Field Study</td><td>Homework</td><td>Other</td><td>Total</td><td rowspan="2">5</td></tr>
<tr><td>42</td><td>28</td><td></td><td>40</td><td>30</td><td>10</td><td>150</td></tr>
<tr><td>Language</td><td colspan="9">English</td></tr>
<tr><td>Compulsory/Elective</td><td colspan="9">Elective</td></tr>
<tr><td>Prerequisites</td><td colspan="9">EE302 Control Systems</td></tr>
<tr><td>Course Contents</td><td colspan="9">Introduction, linear systems and sampling process. Difference equations. Modelling discrete time systems. Z-transform. Transfer functions. Stability. Discrete transform analysis. Digital control applications. Discrete state space models. Discrete optimal control.</td></tr>
<tr><td>Course Objectives</td><td colspan="9">Modern control techniques require high capacity computations, which can be performed by digital systems. In this case, the control methods should be modified. In that respect digital control systems should be treated by considering the use of discrete and continuous time signals together. The course aims to inform the student on these topics.</td></tr>
<tr><td>Learning Outcomes and Competences</td><td colspan="9">The student is expected to understand the fundamental concepts of digital control and apply them in appropriate situations.</td></tr>
<tr><td>Textbook and /or References</td><td colspan="9">Charles L. Philips, H. Troy Nagle, Digital Control System Analysis and Design (3rd Edition), Prentice-Hall 1994, ISBN-13: 978-0133098327 ISBN-10: 013309832X
Charles L. Philips, H. Troy Nagle, Aranya Chakrabortty, Digital Control System Analysis and Design (4th Edition), Prentice-Hall 2014, ISBN-13: 978-0132938310 ISBN-10: 0132938316
Benjamin C. Kuo, Digital Control Systems 2nd Edition, 1995, Oxford Univ. Press, 1995, ISBN-10: 0030128846 ISBN-13: 978-0030128844
Gene F. Franklin, J. David Powell, Michael L. Workman, Digital Control of Dynamic Systems (3rd Edition), Addison Welsey 1997, ISBN-10: 0201820544 ISBN-13: 978-0201820546
Karl J. Astrom, Bjorn Wittenmark,Computer-Controlled Systems: Theory and Design, Third Edition (Dover Books on Electrical Engineering) Third Edition, Dover Publications, 2011, ISBN-10: 0486486133 ISBN-13: 978-0486486130
Katsuhiko Ogata, Discrete-Time Control Systems (2nd Edition), Prentice Hall 1995, ISBN-10: 0133286428 ISBN-13: 978-0130342812</td></tr>
<tr><td rowspan="5">Assessment Criteria</td><td colspan="5"></td><td colspan="2">If any, mark as (X)</td><td>Percentage (%)</td></tr>
<tr><td colspan="5">Midterm Exams</td><td colspan="2">X</td><td>25</td></tr>
<tr><td colspan="5">Quizzes</td><td colspan="2"></td><td></td></tr>
<tr><td colspan="5">Homeworks</td><td colspan="2">X</td><td>20</td></tr>
<tr><td colspan="5">Projects</td><td colspan="2">X</td><td>20</td></tr>
</table>

	Term Paper		
	Laboratory work		
	Other		
	Final Exam	X	35
Instructors	Prof. Dr. Hüseyin Canbolat		
Week	**Subject**		
1	Introduction		
2	Discrete time signals and systems		
3	Linear systems and sampling		
4	Difference equations		
5	Z-transform		
6	Transfer Functionsı		
7	Laplace and z-transforms		
8	Stability of discrete time systems		
9	**Midterm Exam**		
10	Signal transformations		
11	Applications of digital control		
12	State equations		
13	Observability and controllability		
14	Discrete time optimal control		
15	Homework, Project		