<table>
<tr><td rowspan="3"></td><td colspan="2">Course name: MATH 313 Abstract Algebra I</td><td colspan="3">Department: Mathematics</td><td>Semester</td></tr>
<tr><td colspan="5">Methods of Education</td><td>Credit (ECTS)</td></tr>
<tr><td colspan="5"><table>
<tr><td>Lecture</td><td>Recitation/ (Etud)</td><td>Lab</td><td>Exams</td><td>Homework</td><td>Other</td><td>Total</td></tr>
<tr><td>56</td><td>0</td><td>0</td><td>36</td><td>32</td><td>56</td><td>180</td></tr>
</table></td><td>6</td></tr>
<tr><td>Language</td><td colspan="6">English</td></tr>
<tr><td>Compulsory/Elective</td><td colspan="6">Compulsory</td></tr>
<tr><td>Prerequisites</td><td colspan="6">MATH 217 Algebraic structures</td></tr>
<tr><td>Course Contents</td><td colspan="6"><table>
<tr><th>Weeks</th><th>Subjects</th></tr>
<tr><td>1</td><td>Binary operations, groups</td></tr>
<tr><td>2</td><td>Subgroups, cyclic groups</td></tr>
<tr><td>3</td><td>Groups of permutations</td></tr>
<tr><td>4</td><td>Orbits, cycles, alternating groups</td></tr>
<tr><td>5</td><td>Cosets and Lagrange’s Theorem.</td></tr>
<tr><td>6</td><td>Direct products and finitely generated Abelian groups</td></tr>
<tr><td>7</td><td>Homomorphisms, kernels, normal subgroups, factor groups</td></tr>
<tr><td>8</td><td>Rings, fields, integral domains</td></tr>
<tr><td>9</td><td>Fermat’s and Euler’s theorems, Encryption</td></tr>
<tr><td>10</td><td>The field of quotients of an integral domain, rings of polynomials,</td></tr>
<tr><td>11</td><td>Factorization of polynomials over a field, algebraic coding theory,</td></tr>
<tr><td>12</td><td>Homomorphisms and factor rings, prime and maximal ideals</td></tr>
<tr><td>13</td><td>Extension fields, algebraic extensions</td></tr>
<tr><td>14</td><td>Finite fields</td></tr>
</table></td></tr>
<tr><td>Course Objectives</td><td colspan="6">The purpose of this course is to
give the standard knowledge of groups, rings, and fields.
apply the technical tools to solve the problems related to abstract algebra.
introduce some usage of algebra to encrypt messages or to code data for transmission.</td></tr>
<tr><td>Learning Outcomes and Competences</td><td colspan="6">Upon completion of this course students will be able to
acquires mathematical thinking skills (problem solving, generating ways of thinking, forming correspondence, generalizing etc.) and can use them in related fields.
design mathematics related problems, devise solution methods and apply them when appropriate.
encrypt some messages and learn some efficient ways of coding data.</td></tr>
<tr><td>Textbook and /or References</td><td colspan="6">Textbook : A First Course in Abstract Algebra, J. B. Fraleigh, N. E. Brand, 8th Edition, Pearson (2021).</td></tr>
</table>

	References: 1. Gallian, Contemporary Abstract Algebra, 7th Edition 2010. 2. David S. Dummit, Richard M. Foote, Abstract Algebra, 3rd Edition, Wiley (2003).		
Assessment Criteria		If any, mark as (X)	Percentage (%)
	Midterm Exams	X	30
	Quizzes	X	10
	Homeworks		
	Projects		
	Laboratory work		
	Other		
	Final Exam	X	60