CURRICULUM OF
FACULTY OF ENGINEERING

ASSIUT UNIVERSITY
Year 2004
## Contents

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</table>
CHAPTER I

Scientific Departments

Article (1):
Mission of the Faculty
The mission lies in graduating engineers, who are fully aware with the basic engineering theories and related technologies. This makes the graduates able to exert leadership in the different engineering projects. The mission extends also to update the engineering knowledge of these graduates through specialized short courses and enrolment in the programs of higher studies (diploma, M. Sc. and Ph. D.).

Article (2):
Transitional Umpires:
With reference to the preceding bylaws, the umpires of this bylaw are to be applied gradually for the preparatory-year students enrolled in the successive years starting on the date of approval of this bylaw.

Article (3):
The Faculty consists of the following departments:
1- Civil Engineering Department.
2- Mechanical Engineering Department.
3- Electrical Engineering Department.
4- Mining and Metallurgical Engineering Department.
5- Architectural Engineering Department

Article (4):
1- The mechanical engineering department includes the following specialization fields:
   a- Mechanical Power.
   b- Applications of Mechanical Engineering in Agriculture.
   c- Mechanical Design and Production.
   d- Mechatronics

2- The electrical engineering department includes the following specialization fields:
   a- Electronics and Communications.
   b- Computers and Systems.
   c- Electrical Power and Machines.

Article (5):
Assiut University awards at the request of the Faculty of Engineering the Bachelor Degree in one of the specializations listed in Article (11).

Article (6):
Each department of the Faculty departments is concerned with teaching the following courses and performing researches related to these courses.
\- Civil Engineering Department:
It is Concerned with the following courses and related researches:

\- Mechanical Engineering Department:
It is Concerned with the following courses and related researches:
The programme provides courses and researches in following areas:
Electrical Engineering Department:
It is concerned with the following courses and related researches:

Mining and Metallurgical Engineering Department:
It is concerned with the following courses and related researches:
- **Architectural engineering Department:**
  It is Concerned with the following courses and related researches:

**Article (7):**
The study begins with a preparatory year for all students and the specialization starts with the first year. The students are distributed among the different departments according to rules set by the faculty council.

**Article (8):**
The study follows the semester system with two semesters per year. The time for the Bachelor degree is four years preceded by a preparatory year. Each semester extends about 15 weeks.

**Article (9):**
The student must attend more than 57% of the lectures, tutorials and laboratory exercises for each course, as a condition for taking the final examination in the attended courses. Based on the request of the council of the concerned department and the approval of the faculty council, the student who does not meet the 57% attendance will be deprived from taking the final examination. In this case, the student is considered to fail the courses he deprived from taking their final examination.

**Article (10):**
The student of Architectural Department who is transferred to the next year with failed courses of Architectural Design and Working Drawings must attend the semester work as a principle condition for taking the final examination in these courses.
CHAPTER II

The Bachelor Degree

Article (11):
Assiut University at the request of the Faculty of Engineering Council awards (confers) the Bachelor degree in one of the following disciplines:

1. Civil Engineering.
2. Mechanical Engineering in one of the following specializations:
   a. Mechanical Engineering.
   b. Design and Production.
   c. Mechanical Applications in Agriculture.
   d. Mechatronics.
3. Electrical Engineering in one of the following specializations:
   a. Electronics and Communication.
   b. Control and Computers.
   c. Electrical Power and Machines.
4. Mining and Metallurgical Engineering
5. Architectural Engineering.

The bachelor degree is granted annually in June and November for the students who pass successfully the exams of the courses listed in the tables reported in Article (11).

Article (12):
The fourth (final) year students prepare a graduation project during the study year. The department councils determine its subjects. A four-week additional period after the final exams of the second semester is assigned to the graduation project.

Article (13):
The council of each department may set a program for experimental training of the first, second and third year students during the summer vacation. The training period extends for three weeks inside or outside the faculty laboratories and workshops under the supervision of the teaching staff.

Article (14):
The department councils arrange scientific tours for the third and fourth year students. The tours are aimed at visiting industrial firms, engineering, cultural and service establishments to have the students aware with the available technological systems. The tour is performed under the supervision of teaching staff from the concerned scientific departments. The arrangement of scientific tours for visiting industrial or engineering establishments extends to all students of the scientific departments.

Article (15):
1. The student is enrolled for the bachelor degree in engineering in one of the scientific disciplines (specializations) according to acceptance rules set by the coordination office in conformity with the decisions of the Universities Supreme Council.
2. The student is promoted to the next university year if he succeeds all courses of his university year or he fails in not more two courses in his year or previous years as well as any number of humanity or cultural courses.

3. The student is entitled to be examined in courses he failed with the students currently studying these courses. In case the student score is \( \geq 70\% \) and above from the course maximum mark, his mark is reduced to that of the upper limit of "PASS" grade.

4. The mark and grade remain the same without change for the student who failed to appear for an examination due to an acceptable excuse.

5. In November, an examination is held for the final-year students who fail not more than two courses and any number of humanity cultural courses. If they fail again, they are entitled to be examined in the failed courses with the semester students studying these courses.

6. The student may be exempted from attending courses except those of the final-year if he confirmed his successful completion of these courses at a university college or a scientific institute confessed by Assiut university. The dispensation is made by a decision from the university president after the approval of the education and student affairs council pending the agreement of the faculty and department councils. This is made without desecration of Article (\( \text{\textsuperscript{36}} \)) of University Regulation law.

Article (\( \text{\textsuperscript{16}} \)):

Without desecration of Articles \( \text{\textsuperscript{33}}, \text{\textsuperscript{34}}, \text{\textsuperscript{35}} \) of the executive bylaw of the University Regulation Law, the successful completion of a course is evaluated according to grade points as follows:

- **Excellent:** more than \( \text{\textsuperscript{80}}\% \)
- **Very Good:** from \( \text{\textsuperscript{70}}\% \) to less than \( \text{\textsuperscript{80}}\% \)
- **Good:** from \( \text{\textsuperscript{60}}\% \) to less than \( \text{\textsuperscript{70}}\% \)
- **Pass:** from \( \text{\textsuperscript{50}}\% \) to less than \( \text{\textsuperscript{60}}\% \)

The course in which the student fails its examination is evaluated by one of the following grades:

- **Poor:** from \( \text{\textsuperscript{30}}\% \) to less than \( \text{\textsuperscript{50}}\% \)
- **Very Poor:** less than \( \text{\textsuperscript{30}}\% \)

Article (\( \text{\textsuperscript{17}} \)):

1. The course which is taught in one semester and has one examination mark and more than examination answer sheets, is treated as one-course as regards the course evaluation.

2. The partitioned course (spitted into two parts, one in the first semester and the other in the second semester) is considered one course. The student succeeds if the total mark of the two parts exceeds the succeeding limit. If the student fails the course, he is entitled to be examined in the two parts of the course.

3. The humanity and cultural courses are not counted as non-passing (failing) courses. The student has to pass these courses before awarding the bachelor degree.

4. If a course includes written and oral/lab tests, the course evaluation is made according to the total mark of all tests in addition to the academic standing (yearly work) throughout the year. No mark is recorded for the student who fails to appear in the written examination.
**Article (18): Course Code and Number System**

### a) Course Code System

<table>
<thead>
<tr>
<th>Department</th>
<th>Department code</th>
<th>Year</th>
<th>Year code</th>
<th>Option</th>
<th>Option code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil</td>
<td>C</td>
<td>First</td>
<td>C¹</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
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<td>Second</td>
<td>C²</td>
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<td></td>
<td></td>
<td>Third</td>
<td>C³</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fourth</td>
<td>C⁴</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mechanical</td>
<td>M</td>
<td>First</td>
<td>M¹</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Second</td>
<td>M²</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Third</td>
<td>M³</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fourth</td>
<td>M⁴</td>
<td></td>
<td>Mechanical Power MP¹</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Design &amp; Production MD² / MR²</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mechanical Applications in Agriculture MA¹</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mechatronics MT¹</td>
</tr>
<tr>
<td>Electrical</td>
<td>E</td>
<td>First</td>
<td>E¹</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Second</td>
<td>E²</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Third</td>
<td>E³</td>
<td></td>
<td>Electronic &amp; Communication EE³</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Control &amp; Computers EC³</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Power &amp; Machinery EP³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fourth</td>
<td>E⁴</td>
<td></td>
<td>Electronic &amp; Communication EE⁴</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td>Control &amp; Computers EC⁴</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Power &amp; Machinery EP⁴</td>
</tr>
<tr>
<td>Mining &amp; Metallurgical</td>
<td>I</td>
<td>First</td>
<td>I¹</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Second</td>
<td>I²</td>
<td>-</td>
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</tr>
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<td></td>
<td></td>
<td>Fourth</td>
<td>I⁴</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Architectural</td>
<td>A</td>
<td>First</td>
<td>A¹</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Second</td>
<td>A²</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Fourth</td>
<td>A⁴</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

The Code of humanity and cultural courses for all scientific departments is (O) and

- O¹ for first year
- O² for second year
- O³ for third year
- O⁴ for fourth year

For other courses, the code of the course is the name of the department (after being abbreviated) offering the course following by a digit to express the year code, e.g.

- MATH⁰ for courses offered by mathematics department for preparatory year.
- PHY⁰ for courses offered by physics department for preparatory year.
- CHEM⁰ for courses offered by chemistry department for preparatory year.
- MC⁰ for courses offered jointly by mechanical and civil engineering departments for preparatory year.
- ENG⁰ for courses offered jointly by different engineering departments.
- ART⁰ for courses offered by English department for preparatory year.
MATH\1 (for courses offered by mathematics department for first year).
GE\1 (for courses offered by geology department for first year).

b) Course Number System
Following the code, the course number is added which consists of two digits:
The first digit is for the course relationship to the specialization and option:
0 for mandatory courses offered from outside the scientific department.
1 for the optional courses offered from outside the scientific department.
2 for mandatory courses offered by the scientific department.
3 for optional courses offered by the scientific department.

The second digit is for the course number (within its group 1, 2, ..., )
CHAPTER III

Study Courses, Distribution, Teaching Hours and Maximum Examination Marks

Article (14):

The following tables report the study courses distributed over the study years and the teaching hours assigned weekly for lectures, exercises, and laboratories. This is in addition to the duration of written examinations and the maximum mark for each course being distributed among semester work, oral / laboratory examinations and final examination.
### 1. Preparatory Year (For all Students)

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Course Title</th>
<th>Hours / Week</th>
<th>Duration of Written Exam.</th>
<th>Marks Upper Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lecture</td>
<td>Ex. &amp; Lab.</td>
<td>Total</td>
</tr>
<tr>
<td>MATH 001</td>
<td>Mathematics (A)</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>PHY 001</td>
<td>Physics (A)</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>MATH 002</td>
<td>Mechanics (A)**</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>MC 001</td>
<td>Engineering Drawing (A) and Descriptive Projection(A)**</td>
<td>1</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>M 001</td>
<td>Production Technology (A)**</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>EC 001</td>
<td>Computers and Programming</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>ART 001</td>
<td>Technical English Language ***</td>
<td>-</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Total Hours</td>
<td>14</td>
<td>16</td>
<td>30</td>
</tr>
<tr>
<td>MATH 001</td>
<td>Mathematics (B)*</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>PHY 001</td>
<td>Physics (B)*</td>
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<td>2</td>
<td>6</td>
</tr>
<tr>
<td>MATH 002</td>
<td>Mechanics (B)**</td>
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<td>2</td>
<td>4</td>
</tr>
<tr>
<td>MC 001</td>
<td>Engineering Drawing (B) and Descriptive Projection (B)**</td>
<td>1</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>M 001</td>
<td>Production Technology (B)**</td>
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<td>2</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 001</td>
<td>Chemistry</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>ENG 001</td>
<td>History of Engineering Sciences &amp; Technology ***</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Total Hours</td>
<td>16</td>
<td>14</td>
<td>30</td>
</tr>
</tbody>
</table>

* A & B are one course with intra-semester work and final exam in each semester. All marks are added by the end of the second semester.

** A & B are one Course with intra-semester work in each semester. All marks are added by the end of the second semester.

*** Not counted, in case of failing , for the student to be transferred to the next year.
### Civil Engineering
#### First Year

#### Table No. 1

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Course Title</th>
<th>Hours/Week</th>
<th>Duration of Written Exam.</th>
<th>Marks Upper Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lecture</td>
<td>Ex. &amp; Lab.</td>
<td>Total</td>
</tr>
<tr>
<td>C121</td>
<td>Theory of Structures (1-A)</td>
<td>2</td>
<td>2</td>
<td>4</td>
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<tr>
<td>C122</td>
<td>Civil Eng. Drawing (A)</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>C123</td>
<td>Properties and strength of materials (1-A)</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>C124</td>
<td>Surveying (1-A)</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>C125</td>
<td>Engineering Geology</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>ME111</td>
<td>Principles of mechanical and electrical engineering</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>O111</td>
<td>Humanity and cultural course (1-A)</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>17</td>
<td>13</td>
<td>30</td>
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<table>
<thead>
<tr>
<th>Code No.</th>
<th>Course Title</th>
<th>Hours/Week</th>
<th>Duration of Written Exam.</th>
<th>Marks Upper Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lecture</td>
<td>Ex. &amp; Lab.</td>
<td>Total</td>
</tr>
<tr>
<td>C121</td>
<td>Theory of Structures (1-B)</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>C122</td>
<td>Civil Eng. Drawing (B)</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>C123</td>
<td>Properties and strength of materials (1-B)</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>C124</td>
<td>Surveying (1-B)</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>MATH121</td>
<td>Mathematics (1)</td>
<td>4</td>
<td>2</td>
<td>6</td>
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<tr>
<td>A101</td>
<td>Building Construction</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>O112</td>
<td>Humanity and cultural course (1-B)</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Doesn't add-up to the maximum allowed failure courses

**Humanity and Culture Course (O111): The Student Chooses One out of the Following Languages Group:**

- O111a - English Language
- O111b - French Language
- O111c - Arabic Language
- O111d - German Language

**Humanity and Culture Course (O112): The Student Chooses One out of the Following Histories Group:**

- O112a - Pharaonic History
- O112b - Islamic History
- O112c - Egypt’s Economic History

A & B are one course with intra-semester work and final exam in each semester. All marks are added by the end of the second semester except humanities and cultural courses.
# Civil Engineering
## Second Year

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Course Title</th>
<th>Hours/Week</th>
<th>Duration of Written Exam.</th>
<th>Marks Upper Limit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lecture</td>
<td>Ex. &amp; Lab.</td>
<td>Total</td>
<td>Intra-Semester Work</td>
</tr>
<tr>
<td>C221</td>
<td>Theory of Structures (1-A)</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>30</td>
</tr>
<tr>
<td>C222</td>
<td>Design of concrete structures (1-A)</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>30</td>
</tr>
<tr>
<td>C223</td>
<td>Irrigation &amp; drainage engineering (A)</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>30</td>
</tr>
<tr>
<td>C224</td>
<td>Surveying (Topography) (1-A)</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>25</td>
</tr>
<tr>
<td>C225</td>
<td>Strength &amp; properties of materials (1)</td>
<td>3</td>
<td>3</td>
<td>6</td>
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* Doesn't add-up to the maximum allowed failure courses

**Humanity and Culture Course (O211): The Student Chooses One out of the Following Courses:**
- O211a - Philosophy and Rational
- O211b - Geography of the Arab World
- O211c - Natural Resources

**Humanity and Culture Course (O212): The Student Chooses One out of the Following Courses:**
- O212a - Music
- O212b - painting & Sculpturing
- O212c - Athletic Education

A & B are one course with intra-semester work and final exam in each semester. All marks are added by the end of the second semester except humanities and cultural courses.
## Civil Engineering
### Third Year

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</table>

* Doesn't add-up to the maximum allowed failure courses

A & B are one course with intra-semester work and final exam in each semester. All marks are added by the end of the second semester except humanities and cultural courses.

**Humanity and Cultural Course (O311):** The Student Chooses One out of the Following Courses:
- O311a - Introduction of Political Science
- O311b - Laborers Laws and Rules
- O311c - Profession and Society

**Humanity and Cultural Course (O312):** The Student Chooses One out of the Following Courses:
- O312a - Accounting
- O312b - Business Administration
- O312c - Feasibility Study and Costs
C-310  Elective Course (1)

The student selects one from the following courses:
C 331 - 2 - Repair, Maintenance and strengthening of concrete structures.
C 331 - 3 - Dynamics of Structures and Earthquake Engineering.
C 331 - 4 - Foundations on soil with problems.
C 331 - 5 - Design of Advanced Irrigation systems.
C 331 - 6 - Applied Hydraulics.
C 331 - 7 - Water control engineering and its Management.
C 331 - 8 - Applications of photogrammetry and Remote Sensing in Map production
    A- Photogrammetry               B- Remote Sensing
C 331 - 9 - Planning and Design of Transportation infrastructure.
C 331 - 10 - Sanitary and environmental engineering
# Civil Engineering
## Fourth Year

### Table No. 5

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A & B are one course with intra-semester work and final exam in each semester. All marks are added by the end of the second semester except humanities and cultural courses.

### Elective Courses (**) 

- C431.1 Advanced Concrete Structures
- C431.2 Advanced Steel Constructions
- C431.3 Concrete Bridges
- C431.4 Advanced Strength of Materials
- C431.5 Theory and Advanced Structural Analysis
- C431.6 Pre-stressed or Pre-Fabricated Structures
- C431.7 Advanced Foundations
- C431.8 Special and deep foundations
- C431.9 Design of Special and Big Irrigation Structures
- C431.10 Methods and systems of constructing big irrigation projects
- C431.11 Hydrology
- C431.12 Hydrology of Underground Water
- C431.13 Hydrology of Rivers and open Channels
- C431.14 Irrigation Records Measurements and balancing works
- C431.15 Control Engineering of Environmental Pollution
- C431.16 Maintenance of Transportation Nets
- C431.17 GIS applications for modernizing digital maps
- C431.18 GPS applications in Geodesy
- C431.19 Solid Wastes
- C431.20 Airports Engineering
## Mechanical Engineering
### First Year

<table>
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<th>Code No</th>
<th>Course Title</th>
<th>Hours per Week</th>
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|         | Ordinary Differential Equations  
b- Analytic Geometry and Algebra (1) |      |        |       |           |              |       |       |
| MR 111 | Production Engineering (1)                        | 2    | 2      | 4     | 40        |              | 5     | 100   |
| MD 111 | Machine Construction (A)                          | 1    | 2      | 3     | 30        |              | 3     | 50    |
| MP 111 | Basics of Computer Science                        | 1    | 2      | 3     | 30        |              | 3     | 50    |
| C 101  | Testing and Properties of Materials               | 4    | 4      | 8     | 40        |              | 10    | 50    |
| MD 112 | Stress Analysis (A)                               | 2    | 1      | 3     | 30        |              | 2     | 50    |
| O 111  | Humanity and Cultural Course (A)*                 | 2    | 2      | 4     | 10        |              | 4     | 50    |
| **Total** |                                              | 17   | 13     | 30    | 120       |              |       | 200   |

| **C 102** | **Second Semester:**                             |      |        |       |           |              |       |       |
|           | Fundamentals of Civil Engineering                | 4    | 4      | 8     | 40        |              | 10    | 50    |
|           | a-Surveying                                      |      |        |       |           |              |       |       |
|           | b-Concrete Structures                             |      |        |       |           |              |       |       |
| MD 113  | Mechanics of Machines (1)                         | 4    | 2      | 6     | 50        |              | 3     | 100   |
| MD 111  | Machine Construction (B)                          | 1    | 2      | 3     | 30        |              | 4     | 50    |
| MD 112  | Stress Analysis (B)                               | 4    | 2      | 6     | 50        |              | 10    | 50    |
| MP 111  | Engineering Analysis (1)                          | 4    | 2      | 6     | 50        |              | 10    | 50    |
| MP 112  | Scientific Reports Writing                        | 1    | 1      | 2     | 10        |              | 10    | 50    |
| O 111  | Humanity and Cultural Course (B)*                 | 2    | 2      | 4     | 10        |              | 4     | 50    |
| **Total** |                                              | 18   | 12     | 30    | 120       |              |       | 200   |

* Not counted in case of failing

### Humanity and Cultural Course (O 111) to be Chosen From Languages Group:
- O 111 a – English Language
- O 111 b – French Language
- O 111 c – Arabic Language
- O 111 d – German Language

### Humanity and Cultural Course (O 112) to be Chosen From Histories Group:
- O 112 a – Pharaonic History
- O 112 b – Islamic History
- O 112 c – Egypt’s Economic History

A & B are one course with intra-semester work and final exam in each semester. All marks are added by the end of the second semester except humanities and cultural courses.
# Mechanical Engineering
## Second Year

### Table No. 7

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<td>Engineering Materials and Applications</td>
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*Not counted in case of failing*

### Humanity and Cultural Course (O211) to be Chosen From:
- O211 – a- Philosophy and Rational
- O211 – b- Arab World Geography
- O211 – c- Natural Resources

### Humanity and Cultural Course (O212) to be Chosen From:
- O212 – a- Pharaonic History.
- O212 – b- Islamic History
- O212 – c- Egypt’s Economic History

A & B are one course with intra-semester work and final exam in each semester. All marks are added by the end of the second semester except humanities and cultural courses.
# Mechanical Engineering
## Third Year
### Mechanical Power

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* Not counted in case of failing

**Elective Course (1)**

- MR 331 Operations Research
- MT 331 Modeling and Simulation in Mechanical Systems

**Humanity and Cultural Course (O*11) to be Chosen From:**

- O*11 a – Introduction to Political Sciences
- O*11 b – Laborers Laws and Rules
- O*11 c – Occupation and Society

**Humanity and Cultural Course (O*12) to be Chosen From:**

- O*12 a – Accounting
- O*12 b – Management
- O*12 c – Feasibility Study and Costs
# Mechanical Engineering
## Third Year
### Mechanical Design And Production

#### Table No. 1

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<td>Design of Industrial Furnaces</td>
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<td>MP 323</td>
<td>Measuring Instruments</td>
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<td>E 321</td>
<td>Electric Power Engineering and Machines</td>
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<tr>
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<td>Metal Forming</td>
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<tr>
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<td>Mechanical Design and Production Laboratories</td>
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<td>MR 323</td>
<td>Metrology</td>
<td>4</td>
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<td>MT 332</td>
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<tr>
<td>MP 331</td>
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<td>MP 332</td>
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* Not counted in case of failing

**Elective Course (1)**
- MT 321 Hydraulic Systems
- MP 321 Environmental Engineering
- MP 331 Internal Combustion Engines

**Humanity and Cultural Course (O 311) to be Chosen From:**
- O 311 a – Introduction to Political Sciences
- O 311 b – Laborers Laws and Rules
- O 311 c – Occupation and Society

**Humanity and Cultural Course (O 312) to be Chosen From:**
- O 312 a – Accounting
- O 312 b – Management
- O 312 c – Feasibility Study and Costs
# Mechanical Engineering

## Third Year

### Applications of Mechanical Engineering In Agriculture

**Table No. 10**

<table>
<thead>
<tr>
<th>Code No</th>
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<th>Hours per Week</th>
<th>Maximum Marks</th>
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<td>Mechanical Vibrations</td>
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<td>E 331</td>
<td>Electrical Power Engineering and Machines</td>
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<td>2</td>
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<tr>
<td>MP 323</td>
<td>Environmental Engineering</td>
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**Year Work**: 30

**Total**: 150

### First Semester:

**Second Semester:**

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<td>MP 326</td>
<td>Measuring Instruments and Mechanical Power</td>
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<td>MA 321</td>
<td>Basics of Agricultural Sciences</td>
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**Year Work**: 30

**Total**: 150

### Elective Course (1)

- MR 331 Operations research
- MT 331 Modeling and simulation in Mechanical Systems

**Humanity and Cultural Course (O 311) to be Chosen From:**

- O 311 a – Introduction to Political Sciences
- O 311 b – Laborers Laws and Rules
- O 311 c – Occupation and Society

**Humanity and Cultural Course (O 312) to be Chosen From:**

- O 312 a – Accounting
- O 312 b – Management
- O 312 c – Feasibility Study and Costs

* Not counted in case of failing
## Mechanical Engineering
### Third Year
#### Mechatronics

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<td>Measurements and Transducers</td>
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**Total** 13 12 30 %50

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<td>Mechatronics Laboratory (1) – B</td>
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<td>MT 322</td>
<td>Modeling and Computer Simulation of Dynamic Systems</td>
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<td>MP 333</td>
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<td>O 311</td>
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</table>

**Total** 18 12 30 75 |

* Not counted in case of failing

**Elective Course (1)**
- MP 333: Hydraulic Machines and Stations
- MP 334: Pumps, Valves and Pipe Networks

**Humanity and Cultural Course (O 311)** to be Chosen From:
- O 311 a – Introduction to Political Sciences
- O 311 b – Laborers Laws and Rules
- O 311 c – Occupation and Society

**Humanity and Cultural Course (O 312)** to be Chosen From:
- O 312 a – Accounting
- O 312 b – Management
- O 312 c – Feasibility Study and Costs

A and B are one course with intra-semester work and final exam in each semester. All marks are added at the end of the second semester.
# Mechanical Engineering
## Fourth Year
### Mechanical Power

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<td>Prac. or Oral</td>
<td>Final</td>
<td>Total</td>
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<td>Prac. or Oral</td>
<td>Final</td>
<td>Total</td>
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<td></td>
<td>Year Work</td>
<td>Prac. or Oral</td>
<td>Final</td>
<td>Total</td>
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<tr>
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<td>Heat Exchangers</td>
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<td>1</td>
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<td>50</td>
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<td>100</td>
<td>150</td>
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<tr>
<td>MP 422</td>
<td>Turbines and Compressors</td>
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<td>1</td>
<td>5</td>
<td>50</td>
<td>-</td>
<td>100</td>
<td>150</td>
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<td>MT 411</td>
<td>Automatic Control in Mechanical Systems</td>
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<td>1</td>
<td>5</td>
<td>-</td>
<td>-</td>
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<td>150</td>
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<td>20</td>
<td>40</td>
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<td>5</td>
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<td>100</td>
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<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>O 411</td>
<td>Humanity and Cultural Course*</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>10</td>
<td>-</td>
<td>40</td>
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<td>11</td>
<td>29</td>
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</table>

| **Second Semester:** |                                       |      |        |       | Year Work | Prac. or Oral | Final | Total |
|----------------------|---------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| MP 425              | Energy Systems; Power Plants and Economics | 4    | 1      | 5     | 50       | -               | 100   | 150   |
| MP 426              | Refrigeration and Air Conditioning     | 4    | 1      | 5     | 30       | 20              | 100   | 150   |
| MP 427              | Internal Combustion Engines            | 4    | 1      | 5     | -        | -               | 100   | 150   |
| MP 428              | Mechanical Power Laboratories (B)      |      |        |       | 20       | 40              | 60    | 120   |
| MP 429              | Elective Course (2)                    | 3    | 2      | 5     | 30       | 20              | 100   | 150   |
| MP 430              | Project                               | 2    | -      | 2     | -        | -               | 40    | 50    |
| **Total**            |                                       | 14   | 11     | 28    | 100      | 150             | 500   | 300   |

* Not counted in case of failing

**Elective Course (1)**
- MP 431 - Renewable Energy
- MP 432 - Industrial ventilation

**Elective Course (2)**
- MP 433 - Waste Energy Recovery
- MP 434 - Gas Dynamics
- MP 435 - Fault Diagnoses in Mechanical Power Systems

**Humanity and Cultural Course (O 411)** to be chosen from:
- O 411 a – Industrial Psychology
- O 411 b – Occupational Health
- O 411 c – Occupational Safety

A and B are one course with intra-semester work and final exam in each semester. All marks are added at the end of the second semester.
# Mechanical Engineering
## Fourth Year
### Mechanical Design And Production

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<th>Maximum Marks</th>
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<td>Tribology</td>
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<tr>
<td>MR 421</td>
<td>Machine Tool and Cutting Tool Design</td>
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<td>MT 421</td>
<td>Automatic control in Mechanical Systems</td>
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<td>2</td>
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<tr>
<td>MD 422</td>
<td>Design and Production Laboratories (A)</td>
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</tr>
<tr>
<td>MR 422</td>
<td>Project</td>
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<tr>
<td>MR 431</td>
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<td>2</td>
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<td>MR 432</td>
<td>Project</td>
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<td>Fault Diagnosis and Failure Analysis in Mechanical Systems</td>
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<td>MR 423</td>
<td>Project Management and Factory Planning</td>
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<td>MR 424</td>
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<td></td>
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</table>

* Not counted in case of failing

**Elective Course (1)**
- MR 431 - Unconventional Metal Cutting and Forming
- MR 432 - Motion and time study
- MR 433 - Die Design

**Elective Course (*)**
- MT 431 - Modeling and Simulation in Mechanical Systems
- MD 431 - Industrial Robots
- MD 432 - CNC Machines

**Humanity and Cultural Course (O 411) to be Chosen From:**
- O 411 a – Industrial Psychology Science
- O 411 b – Occupational Health
- O 411 c – Occupational Safety

A and B are one course with intra-semester work and final exam in each semester. All marks are added at the end of the second semester.
# Mechanical Engineering

## Fourth Year

### Applications of Mechanical Engineering In Agriculture

#### Table No. 14

| Code No | Course Title | Hours per Week | Maximum Marks | | | |
| --- | --- | --- | --- | --- | --- |
| | | Lec. | Excer. | Total | Year Work | Prac. or Oral | Final | Total |
| **First Semester:** | | | | | | | | |
| MP 437 | Internal Combustion Engines | 4 | 2 | 6 | 3 | 20 | 100 | 150 |
| MA 438 | Pumps and Compressors | 4 | 2 | 6 | 3 | -- | -- | 100 |
| MT 439 | Automatic control in Mechanical Systems | 4 | 2 | 6 | 3 | -- | -- | 100 |
| MA 440 | Agricultural Engineering Laboratories (A) | -- | 3 | 3 | 2 | 10 | 40 | 70 |
| MP 441 | Elective Course (1) | 3 | 2 | 5 | 3 | -- | 70 | 125 |
| MA 442 | Project | 2 | -- | 2 | -- | -- | -- | -- |
| O 441 | Humanity and Cultural Course * | 2 | -- | 2 | -- | 10 | -- | 40 | 55 |
| Total | 19 | 11 | 30 | | | | |
| **Second Semester:** | | | | | | | | |
| MA 443 | Tractors and farm Machinery | 4 | 2 | 6 | 3 | 20 | 100 | 150 |
| MA 444 | Engineering Processing of Agricultural Crops | 4 | 2 | 6 | 3 | 20 | -- | 100 |
| MP 445 | Refrigeration and Environment Control | 4 | 2 | 6 | 3 | -- | -- | 100 |
| MA 446 | Agricultural Engineering Laboratories (B) | -- | 3 | 3 | 2 | 10 | 40 | 70 |
| MA 447 | Elective Course (2) | 3 | 2 | 5 | 3 | -- | 70 | 125 |
| MA 448 | Project | 2 | -- | 2 | -- | -- | -- | -- |
| Total | 15 | 12 | 27 | | | | |

* Not counted in case of failing

**Elective Course (1)**
- MP 431 - Renewable Energy
- MP 432 - Heat Exchangers

**Elective Course (2)**
- MA 431 - Statistical Analysis
- MD 432 - Industrial Ventilation

**Humanity and Cultural Course (O 441)** to be Chosen From:
- O 441 a – Industrial Psychology Science
- O 441 b – Occupational Health
- O 441 c – Occupational Safety

A and B are one course with intra-semester work and final exam in each semester. All marks are added at the end of the second semester.
# Mechanical Engineering
## Fourth Year
### Mechatronics

<table>
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<th>Code No</th>
<th>Course Title</th>
<th>Hours per Week</th>
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<td>MT 425</td>
<td>Robotics</td>
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<td>MT 427</td>
<td>Electromechanical servo systems</td>
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* Not counted in case of failing

**Elective Course (1)**
- MT 421 - Digital Control
- MT 422 - Industrial Process Control

**Humanity and Cultural Course** (O 411) to be Chosen From:
- O 411 a – Industrial Psychology Science
- O 411 b – Occupational Health
- O 411 c – Occupational Safety

A and B are one course with intra-semester work and final exam in each semester. All marks are added at the end of the second semester.
### Electrical Engineering
#### First Year

**Table No. 11**

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<td>E124</td>
<td>Electrical Properties of Materials</td>
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* Out of the flunk courses

**Elective courses from other departments are selected from the following:**
- C111 – Theory of Structure and Machines Foundation
- C112 – Surveying Engineering
- C113 – Construction Engineering

**Humanity and Cultural Course (O 111) to be Chosen From Languages Group:**
- O111 a – English Language
- O111 b – French Language
- O111 c – Arabic Language
- O111 d – German Language

**Humanity and Culture Course (O 112) to be Chosen From Histories Group:**
- O112 a – Pharaonic History
- O112 b – Islamic History
- O112 c – Egypt’s Economic History

A & B are one course with intra-semester work and final exam in each semester. All marks are added by the end of the second semester except humanities and cultural courses.
Electric Engineering
Second Year

Table No. 1

<table>
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- E221 & E222 & E223 & E225 & E226 & O211: A & B are one course with intra-semester work and final exam in each semester. All marks are added by the end of the second semester except humanities and cultural courses.

* Out of the flunk courses

**Humanity and Cultural Course (O 211)** Selected From the Following:
- O211 a – Philosophy and Rational
- O211 b – Arabic World Geography
- O211 c – Natural resources

**Humanity and Cultural Course (O 212)** Selected From the Following:
- O212 a – Music
- O212 b – Drawing and Carving
- O212 c – Athletic Education
### Electric Engineering Department

#### Third Year

##### Electronics and Communication Section

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Course Title</th>
<th>Hours/Week</th>
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<td>EE 326</td>
<td>Electronic Circuits (1)</td>
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* Out of the flunk courses

The Elective Courses are selected from the following:

### (from other sections)
- EC 333 - Operating Systems
- EC 334 - Advanced Language for Computer Programming (C-Lang)
- EP 335 - Industrial Electronics

### (from same section)
- EE 331 - Very Large Scale Integrated (VLSI) Circuits,
- EE 332 - Circuits Computer Aided Design
- EE 333 - Electronic Devices
- EE 334 - Introduction to Biomedical Equipment Technology
- EE 335 - Fundamentals of Television Engineering

The department council can add and create optional courses after credence and submission the course contents

**Humanity and Cultural Course (O 311) Selected From the Following:**
- O 311 a - Introduction to Political Science
O311 b - Rules and states working class
E311 c - Occupation and Society
O312 d - Accountancy
O312 e - Business Administration
O312 f - Feasibility study and Costs

A & B are one course with intra-semester work and final exam in each semester. All marks are added by the end of the second semester.
## Electrical Engineering
### Third Year
#### Computers and Systems Section

**Table No. 19**

<table>
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<td>Signals and Systems Analysis</td>
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<td>Electronic Circuits</td>
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* Out of the flunk courses

The Elective Courses are selected from the following:

**From other section**

- EP 337 - Power Systems
- EE 337 - Design of Integrated Circuits

**From the same section**

- EC 331 - Advanced Computer Languages
- EC 332 - Software Packages

The department council can add and create optional courses after credence and submission the course contents.

**Human and Cultural Course (O 311) Selected From the Following:**

- O 311 a - Introduction to Political Science
- O 311 b - Rules and states working class
- O 311 c - Occupation and Society

**Human and Cultural Course (O 312) Selected From the Following:**

- O 312 a - Accountancy
- O 312 b - Business administration
- O 312 c - Feasibility Study and Costs

A & B are one course with intra-semester work and final exam in each semester. All marks are added by the end of the second semester except humanities and cultural courses.
# Electrical Engineering
## Third Year
### Power and Machines Section

**Table No. 20**

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* Out of the flunk courses

**The Elective Courses are selected from the following:**
EP 331 - Protection Against Electricity Hazards
EP 332 - Electric Power Distribution Systems
EP 333 - Power System Reliability
EP 334 - Power Quality
EE 338 - Microprocessor Principles
EC 330 - Programmable Logic Controller (PLC)

The department council can add and create optional courses after credence and submission the course contents.

**Human and Cultural Course (O 311) Selected From the Following:**
O 311 a - Introduction to Political Science
O 311 b - Rules and states working class
O 311 c - Occupation and Society

**Human and Cultural Course (O 312) Selected From the Following:**
O 312 a - Accountancy
O 312 b - Business Administration
O 312 c - Feasibility Study and Costs

A & B are one course with intra-semester work and final exam in each semester. All marks are added by the end of the second semester except humanities and cultural courses.
### Electrical Engineering
#### Fourth Year
##### Electronics and Communication Section

**Table No. 21**

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<td>Electronic Circuits (1)</td>
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<td>Microcomputers</td>
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<td>Project</td>
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<td>Electrical Testing (A)</td>
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**Second Semester:**

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<td>Lecture &amp;</td>
<td>Intra-Semester</td>
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<td>EE 427</td>
<td>Interfacing</td>
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<td>EE 428</td>
<td>Microwave Circuits and Optical Fibers</td>
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<td>EE 429</td>
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*Out of the flunk courses*

**The Elective Courses are selected from the following:**

- EE 431 - Digital Telephony
- EE 432 - Adaptive filters and Digital signal processing applications
- EE 433 - Optoelectronic devices
- EE 434 - Wave propagation and Fiber optics
- EE 435 - Laser and its applications
- EE 436 - Sound signal processing
- EE 437 - Information theory
- EE 438 - TV engineering
- EE 439 - Satellite communication systems

The department council can add and create optional courses after credence and submission the course contents

**Human and Cultural Course * is Selected From the Following:**

- O 411 a - Industrial Psychology
- O 411 b – Occupational Health
- O 411 c – Occupational Safety
O 412 a - Environment Pollutant
O 412 b - Engineering Economics

A & B are one course with intra-semester work and final exam in each semester. All marks are added by the end of the second semester.
# Electrical Engineering

## Fourth Year

### Computers and Systems Section

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Course Title</th>
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<td>Operating Systems</td>
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<td>Project</td>
<td>4 2 6</td>
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<tr>
<td>EC 430</td>
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<td>3</td>
<td>50</td>
</tr>
<tr>
<td>EC 431</td>
<td>Elective Courses</td>
<td>4 2 6</td>
<td>3</td>
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</tr>
<tr>
<td>O 412</td>
<td>Human and Cultural Course (B)*</td>
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<td>Total</td>
<td>18 12 30</td>
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</table>

* Out of the flunk courses

The Elective Courses are selected from the following:

- EC 431 - Introduction to Using Computer in Control
- EC 432 - Neural Networks
- EC 433 - Artificial Intelligence
- EC 434 - Robots
- EC 435 - Computer Graphics
- EC 436 - UNIX Operating System
- EC 437 - Parallel Processing
- EC 438 - Programmable Logic Circuits

The department council can add and create optional courses after credence and submission the course contents.

**Human and Culture Course (A) Selected From the Following:**

- O 411 a – Industrial Psychology
- O 411 b – Occupational Health
- O 411 c – Occupational Safety
Human and Culture Course (B) Selected From the Following:
O ١١١ a - Environment Pollutant
O ١١١ b - Engineering Economics

A & B are one course with intra-semester work and final exam in each semester. All marks are added by the end of the second semester except humanities and cultural courses.
# Electrical Engineering
## Fourth Year
### Power and Machines Section

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Course Title</th>
<th>Hours/Week</th>
<th>Duration of Written Exam.</th>
<th>Marks Upper Limit</th>
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</tr>
<tr>
<td>EP 421</td>
<td>First Semester: Electrical Machines (*)</td>
<td>4</td>
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<td>EP 422</td>
<td>Power System Analysis</td>
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<td>EP 423</td>
<td>Energy Conversion and Utilization</td>
<td>3</td>
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<td>EP 424</td>
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<td>EP 425</td>
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| EP 426   | Second Semester: Power Systems Protection       | 4          | 2          | 6     | 3     | 0          | -              | 100   | 100   |
| EP 427   | Power Systems Control                           | 4          | 2          | 6     | 3     | 0          | -              | 100   | 100   |
| EP 428   | Project                                         | 2          | 1          | 3     | -     | 30         | -              | 100   | 100   |
| EP 429   | Electrical Testing (B)                          | 1          | 4          | 5     | 3     | 6          | 25             | 50    | 150   |
|          | Elective Courses (4)                            | 3          | 1          | 4     | 3     | 0          | -              | 70    | 100   |
|          | Elective Courses (5)                            | 3          | 1          | 4     | 3     | 0          | -              | 70    | 100   |
| O 412    | Human and Cultural Course (B)*                  | 2          | -          | 2     | 10    | -          | 40             | 50    | 50    |
|          | Total                                            | 19         | 11         | 30    | 10    | 30         | 25             | 170   | 340   |

The Elective Courses are selected from the following:

EP 431 - Variable Speed Drives
EP 432 - Theory of Electric Machines (*)
EP 433 - Linear Electric Machines
EP 434 - Dynamics of Electric Machines
EP 435 - Electrical Machines Design
EP 436 - Power System Voltage Stability
EP 437 - Introduction to Synchronous Stability
EP 438 - Introduction to FACTS
EP 439 - Static VAR Compensator and HVDC System.

The department council can add and create optional courses after credence and submission the course contents

* Out of the flunk courses

**Human and Culture Course (A) Selected From the Following:**

O 411 a - Industrial Psychology
O 411 b – Occupational Health
O 411 c – Occupational Safety

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Curriculum of Faculty of Engineering - Assiut University
Human and Culture Course (B) Selected Form the Following
O ०२२ a - Environment Pollutant
O ०२२ b - Engineering Economic

A & B are one course with intra-semester work and final exam in each semester. All marks are added by the end of the second semester except humanities and cultural courses.
## Mining and Metallurgical Engineering Department
### First Year

<table>
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<th>Course Title</th>
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<th>Marks Upper Limit</th>
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<td>Thermodynamics</td>
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<td>M1102</td>
<td>Machine Drawing and Design</td>
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<td>3</td>
<td>5</td>
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<td>I121</td>
<td>Engineering Geology</td>
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<td>C101</td>
<td>Theory of Structures</td>
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<td>Mineralogy and Petrology</td>
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<td>Introduction to Mining Engineering</td>
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* Not counted in case of failing

**Humanity and Culture Course (O111):** The Student Chooses One out of the Following Languages Group:
- O111 a - English Language
- O111 b - French Language
- O111 c - Arabic Language
- O111 d - German Language

**Humanity and Culture Course (O112):** The Student Chooses One out of the Following Histories Group:
- O112 a - Pharaonic History
- O112 b - Islamic History
- O112 c - Egypt's Economic History
### Mining And Metallurgical Engineering Department

#### Second Year

**Table No. 25**

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Course Title</th>
<th>Hours / Week</th>
<th>Duration of Written Exam.</th>
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<td>C 201</td>
<td>Topographic Surveying and Photogrammetry.</td>
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<tr>
<td>I 221</td>
<td>Rock Mechanics</td>
<td>4</td>
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<td>8</td>
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<td>I 222</td>
<td>Principles of Metallurgical Engineering</td>
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<td>6</td>
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<td>M 201</td>
<td>Fluid Mechanics and its Applications</td>
<td>4</td>
<td>4</td>
<td>8</td>
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<td>I 223</td>
<td>Applications of Computer in Mining</td>
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</table>

**Total Hours**

|           | 17 | 13 | 30 |        |

| **Second Semester** | Mathematics and Statistics | 2 | 2 | 4 | 6 | 1.5 | 0.5 | 40 | 50 |
| I 224    | Mining Geology (1)           | 4 | 4 | 6 | 3 | 1.5 | 0.5 | 43 | 100|
| I 225    | Drilling and Blasting Engineering | 4 | 4 | 6 | 6 | 1.5 | 0.5 | 73 | 150|
| I 226    | Mine Development             | 3 | 2 | 5 | 3 | 1.5 | 0.5 | 40 | 50 |
| I 227    | Physical Metallurgy          | 4 | 4 | 6 | 3 | 1.5 | 0.5 | 43 | 100|
| O 212    | Humanity and Cultural Course (B)* | 3 | 2 | 5 | 1 | 0.5 | 0.5 | 43 | 100|

**Total Hours**

|           | 19 | 11 | 30 |        |

* Not counted in case of failing

**Humanity and Culture Course (O 211)**: The Student Chooses One out of the Following Courses:

- O 211 a - Philosophy and Rational
- O 211 b - Geography of the Arab World
- O 211 c - Natural Resources

**Humanity and Culture Course (O 212)**: The Student Chooses One out of the Following Courses:

- O 212 a - Music
- O 212 b - painting & Sculpturing
- O 212 c - Athletic Education
## Table No. 31

### Mining and Metallurgical Engineering Department Third Year

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Course Title</th>
<th>Hours / Week</th>
<th>Duration of Written Exam.</th>
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<td>I 322</td>
<td>Mining Geology (†)</td>
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<td>I 323</td>
<td>Rock Mechanics and Supporting</td>
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<td>2</td>
<td>6</td>
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<td>I 324</td>
<td>Extraction and Production of Metals</td>
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<td>I 325</td>
<td>Elective Course (†) Mining Engineering</td>
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**Total Hours** 21 9 30 50 150 70

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<th>Duration of Written Exam.</th>
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<td>Geodesy and Mine Surveying</td>
<td>4</td>
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<td>I 328</td>
<td>Ore Dressing (†)</td>
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<td>I 329</td>
<td>Mine Surveying Project</td>
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<td>Elective Course (†) Ore Dressing</td>
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**Total Hours** 18 12 30 50 150 70

* Not counted in case of failing

### Humanity and Cultural Course (O³11): The Student Chooses One out of the Following Courses:

- O³11 a - Introduction of Political Science
- O³11 b - Laborers Laws and Rules
- O³11 c - Occupation and Society

### Humanity and Cultural Course (O³12): The Student Chooses One out of the Following Courses:

- O³12 a - Accounting
- O³12 b - Business Administration
- O³12 c - Feasibility Study and Costs
Elective Course (1): Mining Engineering
1. a - Mineral Resources Exploration
1. b - Geology of Underground Water
1. c - Block Theory
1. d - Method of Finite Element
1. e - Geodynamics History of Earth Structures
1. f - Surface Subsidence in Mining Areas
1. g - Mining Drainage
1. h - Rock Fragmentation
1. i - Drilling Methods and Their Applications
1. j - Physical and Mechanical Properties of Rooks

Elective Course (2): Ore Dressing:
1. a - Gravity Separation
1. b - Crushing and Grinding Operations
1. c - Coal Preparation and Concentration
1. d - Automation of Ore Processing Plants
1. e - Material Handling in Ore Dressing Plants

Elective Course (3): Engineering Metallurgy:
1. a - Powder Metallurgy
1. b - Fuels Refractors and Furnaces
1. c - Mathematical Models and Computer Applications in Metallurgy
1. d - Corrosion and Protection of Materials
1. e - Defects and Failure in Metals and Alloys
1. f - Ferroalloys
1. g - Transport Phenomena
1. h - Heat Treatment of Alloys
## Mining and Metallurgical Engineering Department
### Fourth Year

Table No. 77

<table>
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<th>Course Title</th>
<th>Hours / Week</th>
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<td>Mining Geophysics</td>
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<td>2</td>
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<td>I 431</td>
<td>Optional Course (2) Ore Dressing</td>
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<td>I 430</td>
<td>Project</td>
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**Second Semester:**

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<td>Mine Machinery</td>
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<td>I 430</td>
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</tbody>
</table>

* Not counted in case of failing

**Human and Cultural Course (O 411)** is Selected From the Following:
- O 411 a - Industrial Psychology
- O 411 b - Occupational Health
- O 411 c - Occupational Safety

**Elective Course (4):**

(a) Ore Dressing:
- I 431 a - Modeling and Simulation of Mineral Processing Operations
- I 431 b - Concentration of Egyptian Ores
- I 431 c - Froth Floatation of Ores and Its Applications
- I 431 d - Dewatering and Waste Disposal of Mineral Processing Plants Reject
- I 431 e - Evaluation of Mineral Processing Operations
- I 431 f - Electrical and Magnetic Separations
- I 431 g - Physical and Chemical Properties of Froth Floatation
Elective Course (\*)

(b) Mining Engineering:
1. a - Tunnel Engineering
2. b - Engineering Models
3. c - Mining Technology
4. d - Geometry of Ore Deposits
5. e - Photoelasticity and its Applications in Mining
6. f - Engineering Geophysics
7. g - Petroleum Geophysics
8. h - Design of Stratified mines
9. i - Study and Management of Mining Projects
10. j - Stability and Design of Rook Slopes
11. k - Effect of Mining Operation on Earth’s Crust
12. l - Ventilation Design
13. m - Technology of Surface Mining and Quarries
14. n - Special Methods of Ore Extraction

Elective Course (\*):

(c) Engineering Metallurgy:
1. a - Engineering Materials
2. b - Solidification and Casting of Metals & Alloys
3. c - Metallurgical Equipment Plant Design
4. d - Phase Equilibrium
5. e - New Materials
6. f - Electro metallurgy
7. g - Materials Testing and Processes
8. h - Manufacturing Processes
9. i - Recovery & Recycling of Energy and Materials
Architectural Engineering Department  
First Year

<table>
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<th>Course Title</th>
<th>Hours / Week</th>
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<td>A 123</td>
<td>Visual Drawing &amp; Colors</td>
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<td>Theories of Architecture (1)</td>
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<td>C 101</td>
<td>Surveying</td>
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<td>A 126</td>
<td>Shade, Shadow &amp; Perspective Drawing</td>
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<td>C 102</td>
<td>Theory of Structures</td>
<td>4</td>
<td>2</td>
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</tr>
<tr>
<td>A 128</td>
<td>Introduction to Computing</td>
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<td>3</td>
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<tr>
<td>O 112</td>
<td>Humanities and Cultural Course (B)*</td>
<td>2</td>
<td>-</td>
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<td>17</td>
<td>30</td>
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</tr>
</tbody>
</table>

* Doesn't Add-up to the Maximum Allowed Failing Courses

Humanity and Culture Course (O 111): The Student Chooses One out of the Following Languages Group:
- O 111 a - English Language
- O 111 b - French Language
- O 111 c - Arabic Language
- O 111 d - German Language

Humanity and Culture Course (O 112): The Student Chooses One out of the Following Histories Group:
- O 112 a - Pharaonic History
- O 112 b - Islamic History
- O 112 c - Egypt’s Economic History
## Architectural Engineering Department
### Second Year

### Table No. 29

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Course Title</th>
<th>Hours / Week</th>
<th>Duration of Written Exam.</th>
<th>Maximum Marks</th>
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<td>A 441</td>
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<td>Applications of Computer</td>
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<td>History of Architecture (1)</td>
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<th>Code No.</th>
<th>Course Title</th>
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<th>Duration of Written Exam.</th>
<th>Maximum Marks</th>
<th>Total</th>
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<td>Acoustics</td>
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<td>Lighting</td>
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<td>Air-Conditioning</td>
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</tbody>
</table>

* Doesn’t Add-up to the Maximum Allowed Failing Courses

**Humanity and Culture Course (O 441)**: The Student Chooses One out of the Following Courses:
- O 441 a - Philosophy and Rational
- O 441 b - Geography of the Arab World
- O 441 c - Natural Resources

**Humanity and Culture Course (O 442)**: The Student Chooses One out of the Following Courses:
- O 442 a - Music
- O 442 b - painting & Sculpturing
- O 442 c - Athletic Education
# Architectural Engineering Department

## Third Year

### Table No. 30

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Course Title</th>
<th>Hours / Week</th>
<th>Duration of Written Exam</th>
<th>Marks Upper Limit</th>
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<td>Final Written Exam.</td>
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<td>Working Drawings (1)</td>
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<td>A 323</td>
<td>Environmental &amp; Climatologic Studies</td>
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<td>Building Laws &amp; Regulation</td>
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<td>C 301</td>
<td>Structural Eng. Concrete Construction</td>
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<td>Steel Construction Foundations</td>
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<td>O 311</td>
<td>Humanity and Cultural Course (A)*</td>
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<td>A 325</td>
<td>Second Semester: Architectural Design (5)</td>
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<td>10 20</td>
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<td>Urban Planning (3)</td>
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<td>75 0</td>
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</table>

* Doesn’t Add-up to the Maximum Allowed Failing Courses

**Humanity and Cultural Course (O 311):** The Student Chooses One out of the Following Courses:

- O 311 a - Introduction of Political Science
- O 311 b - Laborers Laws and Rules
- O 311 c - Occupation and Society

**Humanity and Cultural Course (O 312):** The Student Chooses One out of the Following Courses:

- O 312 a - Accounting
- O 312 b - Business Administration
- O 312 c - Feasibility Study and Costs
### Fourth Year

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Course Title</th>
<th>Hours / Week</th>
<th>Duration of Written Exam</th>
<th>Marks Upper Limit</th>
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<tr>
<td></td>
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<td>A 421</td>
<td>First Term</td>
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<td>Architectural Design (1)</td>
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<td>Urban Design</td>
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<td>A 423</td>
<td>Management of Building Operations</td>
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<td>A 424</td>
<td>Quantities &amp; Specifications</td>
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<td>O 411</td>
<td>Humanity and Cultural Course *</td>
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<td>Second Term</td>
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<td>Working Drawing (2)</td>
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<td>A 427</td>
<td>Urban &amp; Regional Planning</td>
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<td>Project</td>
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<td>A 429 to A 430</td>
<td>Elective Course</td>
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<td>26</td>
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</tbody>
</table>

* Doesn’t Add-up-to the Maximum Allowed failure Courses

**Human and Culture Course (O 411)** Selected From the Following:
- O 411a - Industrial Psychology
- O 411b – Occupational Health
- O 411c - Occupational Safety

**Elective Course:**

**The Student Selects One out of the Following Courses:**
- A 431 - Methods of Scientific Research in Architecture & Urbanization
- A 432 - Environmental Pollution
- A 433 - Geography of Cities
- A 434 - Building Economics
- A 435 - Acoustic Design of Building
Preparatory Year (For all Students)

MATH 001- Mathematics

A- Differential Calculus and Algebra:
Functions (concepts, classification, composition, inverse) – Elementary functions (trigonometric and inverse trigonometric, logarithmic and exponential, hyperbolic and inverse hyperbolic) – Limits (limit of a sequence, limit of a function, one sided limit, limit of infinity, theorems of limits) – Continuity definition, theorems, continuity of composite and inverse functions – Derivatives (rules of differentiation, derivatives of inverse functions, implicit and parametric differentiation, higher order derivatives) – Applications (mean value theorem, Taylor and Mclaurin expansions, drawing functions and approximations).

Binomial theorem (with arbitrary exponent) and applications in approximations, general term and sum of series – General theory of equations and some approximate solutions (bisection, fixed point, Newton – false location and intersection methods) – Matrices and systems of linear equations (solution of systems, rank and elementary operations, Gauss elimination method, Gauss – Jordan method, iteration method).

B- Integral Calculus and Analytic Geometry:
Integration as antiderivative – Methods of integration (integration by parts, substitution, partial functions, power of trigonometric and hyperbolic functions, reduction formulas) – Definite integrals (properties, Reimann lower and upper sums – fundamental theorem of integral calculus, improper integrals) – Applications (areas, volume of revolution, surface area) – Approximations (trapezoidal and Simpson) Introduction to simple first order differential equations.

MATH 002- Mechanics

A- Statics

B- Dynamics
Kinematics of a particle – Kinetics of a particle – Conservation laws (conservation of energy, liners momentum and angular momentum) - Principle of work and Kinetic energy- Applications.

PHY 001- Physics

A- Properties of Matter

**Heat and Thermodynamics**

**B- Electricity and Magnetism**

**MC ･･･- Engineering Drawing and Descriptive Projection**

**Engineering Drawing(A)**
1 - Types of lines and using of drawing instruments Writing letters.
2 - Geometry of technical drawing.
3 - Multi-view Projection (orthographic Projection).
4 - Missing View and isometric drawing dimensioning.

**Descriptive Projection (A)**
1 - Representation of the basic elements (Point, Line and Plane) in Monge and Axonometric Projections.
2 - Intersections and development of solids with edge plane.
3 - Auxiliary projection and its application.
4 - Index projection and its application
5 - Representation of solids and their intersections by CAD³D.

**Engineering Drawing (B)**
1 - Sectional views.
2 - Intersections of Engineering Solids.
3 - Steel Construction drawing.

**Descriptive Projection (B)**
1 - Principal of computer drawing representation using V-BASIC.
2 - Positions and metric problems
3 - Polyhedra
4 - Revolution Surfaces
5 - Plane intersection of surfaces and their developments
6 - Intersections of surface of revolutions.

**M･･･- Production Technology**

**Production Technology (A)**
- Engineering Materials:
  ( Ferrous metals, Non-ferrous metals, Non-metallic materials, Heat treatment of metals, Mechanical properties of metals, Alloys).
- Casting Processes :
  ( Sand casting, plate molding, sweep molding, Die casting centrifugal casting).
- Metal Forming Process
(Forging process, Rolling process, Wire drawing process, Deep drawing process, Spinning of sheet metals)
- Joining of Metals:
  (Riveting, Welding, Adhesive bonding).

**Production Technology (B)**
- Metal Cutting Processes:
  - Machining Processes:
    - Cutting lathe, shapers and planer, Drilling, Milling, Broaching, Grinding).
  - Measuring Processes:
    - Vernier calipers, Micrometers, Dial gauges of dial indicators, Angular measurements, plug and ring limit gauges).
- Workshop Layout:

**EC 414- Introduction to Computers**
Programming Introduction: System Programs, Application Programs, Problem analysis, algorithms, problem solution technique,
Software Packages:

**ART 214- Technical English Language**
Characteristics of technical English Language – Revision of grammar, rules of style and features of the sentence- Showing common mistakes in writing the technical English sentence – Building-up paragraphs – Kinds of paragraphs – Explaining the main idea in a text – Developing skills of communication through reading and analyzing extracts of technical writing in the various branches of engineering.

**CHEM 414- Chemistry**

**ENG 414- History of Engineering & Technology**
Definition of Arts, Sciences and Engineering technology- Cultures development and its relation with natural and human Sciences and Society – History of technology and engineering – Historical interrelation between science and technology – relations between the Engineering and environmental development socially, economically and civilization- examples of evolution of the Engineering activities.
Civil Engineering Department
First Year

C121 - Theory of Structures

Theory of Structures (A)
Principles of plane statics – Loads and reactions – Internal straining actions in statically determinate beams and frames.

Theory of Structures (B)
Analysis of statically determinate trusses – Influence lines for statically determinate structures (Beams, Frames, Arches, Trusses) - Properties of plane areas.

C122 - Civil Engineering Drawing

Civil Engineering Drawing (A)

Civil Engineering Drawing (B)
Artificial construction in the intersection of water channels- Artificial construction for retaining walls in water channels- Projection of water structures way intersections and their artificial construction- Technical specifications and projections of reinforced concrete building – Technical specification of sanitary engineering structures- Netscape constructions for water way (channels and drains) – locks and weirs constructions

C123 - Properties and Strength of Materials

Properties and Strength of Materials (A)

Properties and strength of materials (B)
Properties, strength and testing of non-metallic materials (Timber, Brick , Tiles, Plastic tubes PVC and Stone) – Physical, chemical and mechanical properties for non-metallic materials (cement, Gypsum and lime)- Applications of Egyptian Code in the flied of non-metallic materials.

C124 - Surveying

Surveying (A)

**Surveying (B)**
Leveling (theory, measurements, equipments)- Longitudinal and transverse sections- Network leveling- Contouring maps by using computer – Earthwork quantities – Theodalit and its applications.

**C112 - Engineering Geology**

**ME 111 - Principles of Mechanical and Electrical Engineering**
First – Mechanical engineering
The definition of machines and their elements- energy conversion –prime moves (Gasoline and Diesel engines) – Simple steam plants- Refrigerators – Truck cranes – Winches- Road machinery the pedal power- Friction – Transmission pf power- Lubrication of machines.
Second- Electrical engineering

**MATH 111 - Mathematics**

**I-ALGEBRA**
Theory of complex numbers and its applications - The equations roots at third and fourth degree - Theory of matrices and its applications in linear equations system- Conical sections

**II-CALCULUS**

**III-APPLIED MATHEMATICS**
Fundamentals of elastic bodies mechanics (displacement, energy and stability)- Thermal stresses – Distribution of stresses and Hook’s law- Theory of bending and Clabiron equation for equilibrium.
Hydrostatic: Equilibrium of floating bodies- Bernoulli’s equation- forces paths and equal domain surfaces.

**A111 Building Construction**

Civil Engineering Department
Second Year

C ٢٢١ - Theory of Structures

Theory of Structures ( A )
Normal Stresses – Shear Stresses – Combined and Principal Stresses .

Theory of Structures ( B )
Deformations in Statically determinate Structures- Solution of Statically indeterminate Structures by using three moments equation – Moving loads – Buckling of columns.

C ٢٢٢ - Design of Concrete Structures

Design of Concrete Structures ( A )
Reinforced Concrete materials Properties – Concrete members Subjected to bending moment – Design methods of reinforced concrete – Elastic design of Sections subjected to bending moment.

Design of Concrete Structures ( B )

C ٢٢٣ - Irrigation & Drainage Engineering

Irrigation & Drainage Engineering ( A )

Irrigation & Drainage Engineering ( B )
Introduction about drainage : its importance and Problems _ Open drainage _ covered drainage _ Vertical drainage _ Drainage Stations _ Treatment of drainage water _ underground water.

C ٢٢٤ - Surveying (Topography)

Surveying (A): (Topography)

Surveying (B) (Photogrammetry and Remote Sensing )

**C ٢٢٥ - Strength and Properties of Materials (†)**

**C ٢٢٦ - Hydraulics (†)**

**C ٢٢٧- Soil Mechanics and Foundation (†)**

**MATH ٢٠١- Mathematics (†)**
Civil Engineering Department
Third Year

C 321 - Theory of Structures (*)

C 322 - Design of Steel Constructions

Design of Steel Constructions (A)
Loads and stresses- design of steel members subject to tension and compression-
Frame roofs – Design of Connections

Design of Steel Constructions (B)
Design of columns and supports – Design of different beam types – Design and analysis of multistory structures – design of composite structures of steel and concrete.

C 323 – Design of Concrete Structures

Design of Concrete Structures (A)
Special roofs – Design of reinforced concrete sections subject to axial forces and bending moments – design of reinforced concert frames

Design of Concrete Structures (B)
Design of different systems of roofs- structural details - special problems

C 324 - Water Supply Engineering
Introduction -studies of water consumption (prediction of population quantities of water consumption and sources of water supply) - Ground water and rain water - works of water supply (collection works, purification works, mixing, coagulation and flocculation, sedimentation filtration and disinfection)- distribution works (pipe networks , water storage tanks and pumping stations)- quality and specifications of drinking water.

C 325 - Geodesy
C ٣٣٦ - Soil Mechanics and Foundations (*)

C ٣٣٧- Design of Irrigation Structures
Siphons : concrete siphons - steel siphons - stone siphons - weir siphons - design of different types of siphons.
Culverts:stone culverts- steel culverts- reinforced concrete culverts - design of culverts.
Aqueducts : metallic aqueducts - stone aqueducts- concrete aqueducts.
Weirs : end weirs - side weirs – design of weirs.

C٣٤٨- Hydraulics (*)
Water flow in open channels - equations used for design of channel sections - specific energy, critical depth- hydrostatic and hydrodynamic forces due to water flow in open channels, and applications -Gradually varied flow - water surface profile and its methods of calculation - introduction on boundary layer - drag and lift on submerged objects- river hydraulics and bed load - hydraulic hammer tanks – turbines & pumps - hydraulic machines - flow systems in open channels and river - critical shear stress.

C٣٤٩- Transportation and Traffic Engineering

-Transportation

-Traffic
Characteristics of trucks- driver and road - traffic features studies- relationships between traffic variables- traffic capacity and service level – means of traffic organizing and control.

A - Elective Courses of Structural Engineering

C ٣٤١- Construction Technology and Engineering Materials
connections - different systems of concrete constructions and steps of implementation.

**C 331-1 - Repair, Maintenance and Strengthening of Concrete Structures**

**C 331-2 - Dynamics of Structures and Earthquake Engineering**
SDOF undamped free vibration mode - SDOF damped mode - SDOF under harmonic loading - dynamic behavior due to general loading- multidegree of freedom systems- damped motion of shear buildings - behavior of structures during earthquake motions - precautions against earthquake in the codes of practice.

**C 331-3 - Foundations on Soils with Problems**
Characteristic behavior of swelling soil - characteristic behavior of loose soil - characteristic behavior of collapsed and soft soil.

**B– Elective Courses of Irrigation and Hydraulics**

**C 331-4 - Design of advanced irrigation systems**
Introduction - advanced irrigation systems- irrigation methods - surface irrigation - undersurface irrigation - drip irrigation - sprinkler irrigation.

**C 331-5 - Applied Hydraulics**

**C 331-6 - Engineering of Water Control and its Management**
Available surface water - design of flow - control structures.

**C– Elective Courses of Public Works**

**C 331-7 - Photogrammetry and Remote Sensing**
General condition of photogrammetry- photogrammtic triangulation condition - vertical phonograms production- digital photogrammetry- panorama photogrammetry- engineering application - remote sensing- principles of remote sensing and developments- the role of weather condition - different techniques of photography in remote sensing- preparation of information- digital production of images- rectification of images- GIS and remote sensing- engineering applications- remote sensing in urban planning and agriculture.

**C 331-8 Planning and Design of Transportation Infrastructure**
Introduction - transportation problems - transportation demand - serviceability and engineering characteristics - different transportation means - how to choose the most suitable transportation means - traffic organization - planning of public transportation.
C 331 - Sanitary & Environmental Engineering
Introduction - field sanitary and environmental engineering - environmental pollution - water feeding - sanitary works - pipes - drainage liquid wastes in isolated regions - protection laws for water areas.

Civil Engineering Department
Fourth Year

C 421 – Design of R. C. Structures (*)
Water Structures – Pre-stressed Concrete structures – Shell structures (domes, cones, ..... etc.) – Selected problems.

C 422 – Design of Irrigation Structures

Design of Irrigation Structures (A)
Weirs – Regulators - Methods of energy dissipation behind water structures.

Design of Irrigation Structures (B)
Locks – Dams - Tunnels.

C 423 - Roads and Airports Engineering
Introduction to planning of roads and airports – road network skeleton – longitudinal and transverse section in roads – planning of surface and lower intersections - Road pavement materials – Design of elastic and rigid pavement for roads & airports – Construct instrumentation.

C 424 - Sanitary Engineering
Water distribution system – Wastewater treatment system – Wastewater Collection system – Self – Purification of water streams – Solid wastes collection and disposal system.

C 425 - Computer Application in Civil Engineering

C 426 - Profession Risk Protection

C 427 - Design of Steel Bridges

C 428 - Constructions Management
Planning and scheduling, Construction economics, contract construction, construction safety and health – Relation between cost and time.

C 429 - Railway Engineering

C 429+1- Harbor Engineering and Internal Navigation

C 431 - Elective Course (†)

C 431-1 - Advanced Concrete Structures
Limit state design – Multi-Story buildings – Shells and folded plates structures – R. C. silos.

C 431-2 - Advanced Steel Constructions
Curved beams – design of composite bridges – suspended bridges – box curved bridges.

C 431-3 - Reinforced Concrete Bridges

C 431-4 - Advanced Strength of Materials

C 431-5 - Advanced Structural Analysis
Beams an elastic media – axial force effects – Analysis of rectangular and circular thin plates – Numerical analysis by finite differ & finite elements methods.

C 431-6 - Theory of Pre-stressed or Prefabricated Structures

C 431-7 - Advanced Foundations
The general principles of foundation design – Spread foundation – Buoyancy rafts and basements (Box Foundation) – Foundation construction – Cofferdams – Shoring and underpinning – Protection of foundation structures.

C 431-8 - Special and Deep Foundations
Introduction – Types and usages of piles- Static and dynamic analysis of pile – Determine of pile load caring capacity of pile in site and lab – Types of casinos - Determine of load caring capacity of casinos and its settlement on soil – Behavior of casinos under horizontal loads.

**C 431-1 - Design of Special and Big Irrigation Structures**
Types, choice of locations and design of Dams and storage Tanks - Theories of storage – Refinement of rivers – Lining of canals.

**C 431-1 - Methods and Systems of Constructing Big Irrigation Projects**
Definition of small and big irrigation projects – Refinement of canals and rivers – Dams execution for de-watering – determination of artificial works axes – Control of underground water in situ – Timber and steel form-work for curtains – Specifications and precautions concerning the execution of pre-cast piles – Construction of big barrages on rivers – construction of siphons by floating and diving.

**C 431-11 - Hydrology**
Occurrence of ground water – Ground water movement – Ground water and well hydraulics – water wells – Ground water levels and fluctuations – Quality of ground water – Ground water development - Surface and subsurface investigations of ground water – sea water intrusion.

**C 431-12 - Hydrology of Underground Water**

**C 431-13 - Hydrology of Rivers and Open Channels**

**C 431-14 - Irrigation Records Measurements and Balancing Works**
Different methods of water levels measurement – Methods of measuring water velocity and discharge – Difference between head and cross regulators – Balancing on weirs and water falls – Methods of scour protection downstream balancing works – Balancing works on dams – Records measurement of underground water.

**C 431-15 - Control Engineering of Environmental Pollution**

**C 431-16 - Maintenance of Transportation Nets**
Studies of different transports – Means for Urban & inter-city transportation – Methods of determining the transportation intensities – Traffic engineering for urban & inter-city transportation – Economic studies of different transport means.

**C 431-17 - GIS Applications for Modernizing Digital Maps**
Elements of geography information system – Advantages of using computer in maps production – Data resources – Different methods of representing data of GIS Linear representation of data – Data bases – Different methods of maps modernization.

**C 431-18 - GPS Applications in Geodesy**
Determination of coordinates from space – Systems development in last years (From Dupler system to GPS system ) – Principal elements of GPS system ) – Principal elements of GPS – Satellites – Application of GPS in geodesy.

**C 431-19 - Solid Wastes**
Sources and classification of solid wastes – Solid wastes characteristics – gathering methods – Transportation methods – Treatment methods and final disposal – Reuse of solid wastes.

**C 431-20 - Airports Engineering**
Mechanical Engineering Department
First Year

M 101 - Mathematics:

- **Differentiation and Integration:** Ordinary Differential Equations: Multiple Integrals and applications – First degree ordinary differential equations – linear DE of higher orders – Laplace transform and applications – Fourier Series and application.- Partial DE.

- **Analytic Geometry and Algebra:** Conical sections – Three dimensional geometry and applications – Divergence and convergence tests – Complex number algebra – complex variables – Demorete theory – solutions of non- Linear algebraic equations and sets.

MR 121 - Production Engineering (1):

MD 121 - Machine Construction:

Machine Construction (A)

Machine Construction (B)

MP 121 - Basics of Computer Science:
C 101- Testing and Properties of Materials:

MD 122 - Stress Analysis:
Stress Analysis (A):
Loads and reactions -Types of loads, Types of supports. Classification of beams – Axial Loads Stress-Strain relationship, Poisson’s ratio, Shear stress and Factor of safety, stresses caused by temperature – Torsion Torque diagram, the torsion formula, Angle of twist of circular members – Shearing force and bending moment diagram Method of sections, Sign convention for shearing force and bending moment, Relation between shear force and bending moment, bending of compound beams – Shear stresses in beams the shear stress formula for Shear flow.

Stress Analysis(B):
Complex stresses and strains-- Stresses on an inclined plane, Principal stresses, Maximum shear stress, Mohr’s circle of stress, Design of shaft, Stress and strain relationships, Relation between the elastic constants, Strains in an inclined plane, Mohr’s circle of strain gauges – Deflection of beams Relations between shear force, bending moment, slope and deflection, Direct integration method, Mycology’s method for concentrated loads. Moment area method The theorem of Castilian, the three--moments equation-- continuous beams.

C 102 - Fundamentals of Civil Engineering.
(a) Surveying:
Basic Principals-Distance measurements-Compass Surveying- Area -measurements-Leveling and its applications in mechanical works.

(b) Concrete Structures:

MD 122 - Mechanics of Machines (1):

MP 122 - Engineering Analysis (1):
Heat transfer from a body to the surrounding media – Velocity of Escape of a body projected vertically outwards from the earth’s surface – changes of water level in a tank supplied with water and equipped wit the drains - absorption of light when passing through a transparent layer of water – loss of humidity from a porous body
to the ambient air – Electric current in an R-C or L-C circuit – Motion of a particle attached to a spring and dashpot in each of the four possible cases – Equilibrium curve of a heavy chain or cable hanging from its two ends – Motion of a particle attached to a spring and dashpot under the action of an external constant or variable periodic force in each of all possible cases – Electric current in an electric circuit consisting of a power source - a resistor - an inductance and a condenser in series in each of all possible cases.

**MP 123 - Scientific Reports Writing:**
Stages of preparation of scientific reports (define the object-information gathering-studies preparation-runny experiments-writing drift of report). studying of styles of writing reports. Use of word processing, spread electronic sheets, electronic mail, data presentation in tables, figures and, charts, (case studies, technical letters, design reports, final reports). Conducting laboratory experiments and writing their reports. Use of email to write short reports and technical letters- Conducting field studies and preparing Posters – working in groups of students.
Mechanical Engineering Department
Second Year

MP 221 - Engineering Analysis (1):
Engineering analysis for different applications - Equation governing small transverse vibrations of an elastic string (one dimensional wave equation) - Longitudinal vibrations of an elastic horizontal bar or rod vibrations of a rectangular membrane-- Temperature distribution in a long thin bar of constant cross section and perfectly insulated laterally - Steady heat temperature distribution in a rectangular plate (two dimensional heat flow).

MP 222 - Thermodynamics (1):
Thermodynamics (1-A):

Thermodynamics (1-B):

E 201 - Electric & Electronic Circuits

MR 221 - Engineering Materials and Applications:
Engineering materials and their structure - effect of stresses temperatures on the atomic structure of metals - controlling the microstructure and the mechanical properties of material - strain hardening and annealing - relationship between properties and the phase diagram-- ferrous alloys-- steel and its alloys-- special steels-- stainless steel-- non ferrous alloys-- Aluminum alloys – magnesium alloys – copper alloys – nickel and cobalt. – Ceramic materials-- ceramic glasses (atomic

**MR 222 - Engineering Economy**

**MD 221- Machine Design (1):**

**Machine Design (1-A)**
Introduction and Definitions of machine elements-- principles of machine elements -- strength calculations-- Engineering materials used in machine elements.

**Machine Design (1-B)**
Riveted Joints welded Joints --spindles and axles - key joints-- couplings and clutches - Applications, - problems.

**MP 223 - Fluid Mechanics (1):**
Classification of fluids. Definition of viscosity - relationships of pressure - Density and head in stationary fluid- manometers and barometers - pressures- effect of stationery fluid on subjected flat and bended plates - points of effect - Archimedes law - floating bodies - stream lines- velocity and acceleration in two dimensional flow - angular velocity, - continuity equation - Bernoulli’s equation and its application for ideal fluid - Newton’s law for fluids and its application in simple cases - laminar and turbulent flow in pipes - Ronald’s experiments - similarity flow fields and their relations - dimensional analysis- steady flow in pipes, pressure losses in joints and exit connections.

**MR 223 - Theory of Metal Cutting and Applications:**

**MD 222 - Mechanics of Machines (1):**
**MP 224 - Computers and Programming**

**MECHANICAL ENGINEERING**
**THIRD YEAR**
**MECHANICAL POWER SECTION**

**MP 321 - Thermodynamics (†)**
Power and refrigeration cycles – Mixtures of ideal gases – Availability and irreversibility – chemical reaction and combustion – Application of first and second Laws of thermodynamics on chemical reactions – Thermodynamic relations and generalized charts – Introduction to chemical equilibrium.

**MP 322 - Fluid Mechanics (†)**

**MP 323 - Environmental Engineering:**

**MD 321 - Mechanical Vibrations:**

**E 301 - Electric Power and Machines:**
MP 324 - Heat Transfer:

MP 325 - Hydraulic Machines and Hydraulic Stations:

MP 326 - Measurements and Mechanical Power Laboratories:


b- Mechanical Engineering Laboratories:

MD 322 Machine Design (†):

Machine Design (†-A)
Springs – clutches and Brakes – belt drives – Rolling contact bearings - sliding bearings.

Machine Design (†-B)
Spur gears – Helical gears – Conical gears – Worm and worm gearing.

Elective Course (†)

MR 331- Operations Research:

MT 331- Modeling and Simulation in Mechanical Systems:
Modeling and Simulation – Modeling of Complex systems – Modeling software – random number generators – Analysis of Results case studies.
MECHANICAL ENGINEERING
THIRD YEAR
MECHANICAL DESIGN AND PRODUCTION SECTION

MD 321 - Mechanical Vibrations:

MR 321 - Operations Research:

MP 327 - Design of Industrial Furnaces:

MP 328 - Mechanical Measurements:

E 301 - Electric Power and Machines:
voltage lines – Short, medium and long lines – Calculation of efficiency and Regulation of High Voltage lines. Mechanical design of High Voltage lines.

**MR 322 - Metal Forming:**

**MD 323 - Mechanical Design and Production Laboratories:**

**MR 323 - Metrology:**

**Elective Course(‘**

**MT 332 - Hydraulic Systems:**

**MP 331 - Environmental Engineering:**

**MP 332 - Internal Combustion Engines:**
MECHANICAL ENGINEERING
Third Year
APPLICATION OF MECHANICAL ENGINEERING IN AGRICULTURE

MA 321 - Basics of Agricultural sciences:
This course covers the basic agricultural sciences that are connected and related to engineering activities it is divided into 4 parts
A) Soil and land: Introduction about earth formation and composition - physical and chemical properties of soils - plant feeding and soil fertility - land reclamation
D) Food processing: Methods of food preservation (cooling - freezing - drying - smoking - thermal treatment) - Methods of food processing (meat - fish - oil - fats - grains - sugar - milk - vegetables - fruits).
Mechanical Engineering  
Third Year  
Mechatronics Section

**MP 329 - Cooling of Electronic Equipment**  

**E 302 - Electronic Circuits (1)**  

**MT 321 - Mechatronics Laboratory (1-A)**  

**MT 322 - Measurements and Transducers**  

**MT 323 - Automatic Control (1)**  
criterion – Gain margin and phase margin – Applications using MATLAB software package.

**E 303 - Electrical Motors**

**MT 321 Mechatronics Laboratory (1-B)**
- Transient response of a pneumatic position servosystem.
- Transient response of a level control system with different controllers P-PI- PID.
- Transient response of flow control process.
- Transient response of temperature control process.
- Speed control of conveyors.
- A/D and D/A converters.
- Computer Simulation of industrial process control systems.

**MT 324 - Modeling and Computer Simulation of Dynamic Systems:**

**MP 333 - Hydraulic Machines and Hydraulic Power Station**

**MP 334 - Pumps, Valves, and Pipe Networks**
MECHANICAL ENGINEERING
Fourth YEAR
MECHANICAL POWER SECTION

**MP 421 - Heat Exchangers:**

**MP 422 - Turbines and Compressors:**

**A- Compressors**

**B- Turbines**

**MT 421- Automatic Control in Mechanical Systems:**

**MP 423 - Laboratories of Mechanical Power Engineering (A):**
Applications and experiment in the field of mechanical power which include power cycles, refrigeration and air conditioning, hydraulic machines and heat exchanges.
Optional Course(*)

**MP 43** - Renewable Energy:
Solar energy (Solar radiation flux, solar angles estimation energy and measurements of solar radiation fluxes, solar energy systems) – Nuclear energy (Nuclear fuel, radiation activity and depletion, nuclear reaction, nuclear reactors) – Biomass energy Conversion of biomass, energy generation from agricultural wastes and organic materials, biogas, systems of biogas generation) – Wind energy (available power, power factor, Principles of wind energy generation, curves of power and speed, site conditions, forces of lift and friction, wind energy systems) – Ocean energy – Geothermal energy.

**MP 432** - Industrial Ventilation:

**MP 424** - Project:
Students are required to prepare a project to solve a realistic and practical case related to mechanical power engineering. They should present a report containing the engineering applicable solutions to the case study in a clearly explained way.

**MP 425** - Energy Systems and Power Plants and Economics:

**Sun and solar Radiations:** Sun and solar radiation- sun physical structure- solar radiation in space- Extraterrestrial solar radiation - Types of radiation reaching The earth - Factors affecting the path of solar radiation- solar noon and azimuth angle-optimum collector tilt angle solar geometry - Azimuth and altitude angles- Declination and hour angle – Estimation and measurement of solar radiation.

**Solar Thermal Energy Systems:** solar energy systems, past, present and Future-solar Energy collection- Flat plate collectors- Focusing collectors- solar water heating systems- solar Thermal power plants.

**Biomass Energy Conversion systems:** Energy from cultivated plants- Energy from Organic waste- anaerobic conversion process- physical and chemical properties of biogas- Biogas production systems.

**Nuclear Energy systems:** Alternatives to fossil Fuels- Principle of Nuclear Energy- The conventional type Thermal Nuclear reactors-Fast breeder reactors- Fusion reaction - Radiation intercity and half life- Nuclear reaction and critical mass- Future development of Nuclear reactors.

**Wind Energy systems:** operating principle of windmills- Electricity generation from wind energy - Design of electricity generation system from wind energy.

**Heat Recovery systems:** Properties of exhaust gases- Gas to air heat recovery- Gas to liquid heat recovery - Gas- to- organic fluid heat recovery- waste heat steam generators.
**MP 426 - Refrigeration and Air Conditioning**

**A- Refrigeration**
Introduction to refrigeration systems – Air refrigeration systems – Vapor compression refrigeration systems – Multi – pressure systems – Refrigerants properties – Components of vapor compression system – Absorption refrigeration.

**B- Air Conditioning**

**MP 427 - Internal Combustion Engines**:

**MP 423 - Laboratories of Mechanical Power Engineering (B):**
Applications and experiment in the field of mechanical power which include power cycles, refrigeration and air conditioning, hydraulic machines and heat exchangers.

**Elective Course(†)**

**MP 433 Waste Energy Recovery:**

**MP 434 - Gas Dynamics:**

**MP 435 - Fault Diagnosis in Mechanical Power Systems:**
MECHANICAL ENGINEERING
Fourth YEAR
MECHANICAL DESIGN AND PRODUCTION SECTION

MD 421 - Tribology

MR 421 - Machine Tool and Cutting Tool Design:

MT 421 - Automatic control in Mechanical Systems:

MD 422 - Mechanical Design and Production Laboratories (A):

MR 431 - Project:
Students are required to prepare a project to solve a realistic and practical case related to Mechanical Design and Production engineering. They should present a report containing the engineering applicable solutions to the case study in a clearly explained way.

Elective Course (*)

MR 431 - Unconventional Metal Cutting and Forming:
Friction Machining (Welding), Electro-Chemical Machining (ECM), Electrical Discharge Machining (EDM), Electrical Arc and Induction Machining, Laser Seam
Machining Plasma Arc Machining (PAM), Die Injection process, Plastic Forming, thermoplastic forming, Types of thermo plastic Dies, Applications.

**MR 432 - Motion and time study:**

**MR 433 - Die Design:**
Over view of CAD / CAM systems - Geometric modeling- two and three-dimensional graphic concepts - General design applications- precision bulk forming – computer aided perform design – precision die manufacturing.

**MD 423 - Fault Diagnosis and Failure Analysis in Mechanical Systems:**

**MR 434 - Project Management and Factory Planning:**

**MR 435 - Quality Control Systems:**

**MD 424 - Mechanical Design and Production Laboratories (B):**

**Elective Course (*):**

**MT 431- Modeling and Simulation in Mechanical Systems:**

**MD 431 - Industrial Robots:**
Actuators (Electric actuators, hydraulic actuators, pneumatic actuators) – Grippers (hydraulic electric, pneumatic) on off ripper servo gripper – Sensors position displacement speed fore – optical sensors – dynamics Robot manipulators-- robotic programming Robotic manufacturing cells – Robot applications in flexible
manufacturing systems – Reliability maintenance and safety of robots – Robot Applications in hazardous environment (chemical, etc.)

**MD 432 - CNC Machines:**

**MECHANICAL ENGINEERING**
**Fourth Year**
**APPLICATION OF MECHANICAL ENGINEERING IN AGRICULTURE**

**MP 427 - Internal Combustion Engines:**

**MA 421 - Pumps and Compressors:**
A) **Pumps:** Characteristics, design and performance study of centrifugal pumps - portable irrigation pumps - submerged pumps – design of pumps components – operation systems – pump maintenance.


**MT 421 - Automatic in Mechanical Systems:**

**MA 422 - Agricultural Engineering Laboratories (A):**
Revision of measurement methods and instrumentation and their calibrations in field of energy, heat, motion power, forces and moments - lab experiments in ICE, farm machinery, soil properties, water movement in soil, soil box, tillage tools - lab experiments in farm structures ventilation cooling, refrigeration, air conditioning and solar energy, green houses - lab experiments in food processing, mechanical and thermal properties of food non-Newtonian flow, cooling and freezing.

**Elective Course(†):**

**MP †- Renewable Energy:**
Solar energy (Solar radiation flux, solar angles estimation energy and measurements of solar radiation fluxes, solar energy systems) – Nuclear energy (Nuclear fuel, radiative activity and depletion, nuclear reaction, nuclear reactors) – Biomass energy – Energy conservation of biomass, energy generation from agricultural wastes and organic materials, biogas, systems of biogas generation) – Wind energy (available power, power factor, Principles of wind energy generation, curves of power and speed, site conditions, forces of lift and friction, wind energy systems) – Ocean energy – Geothermal energy.

**MP †- Heat Exchangers:**

**MA †- Project:**
Students are required to prepare a project to solve a realistic and practical case related to mechanical Agricultural Engineering. They should present a report containing the engineering applicable solutions to the case study in a clearly explained way.

**MA †- Tractors and Farm Machinery:**
Classification of tractors according to their use and methods of tractions - theory of traction - mechanics of traction and motion on unprepared soils - design of tractor chassis and means of motion transfer - performance of tractors - factors that are considered in tractor design - tractor maintenance - characteristics of farm machinery - types of farm machinery and farm capacity - machinery for land preparations for cultivation - machinery for land preparation for plant seeds - planting machinery - servicing machinery - pesticide and insecticide - Harvesting machinery.

**MA †- Engineering Processing of Agricultural Crops:**
Characteristics of industrial processing of agricultural crops-- volume reduction - cleaning and sorting - materials handling - design of heat exchangers - drying of agricultural crops - analysis of industrial processing of agricultural crops-- design of processing factories - cost analysis of processing - waste processing and management.
MP 428 - Refrigeration and Environment Control:
Environmental factors – psychometric chart and moist air processes – refrigeration cycles and systems food preservation – design of food preservation compartments – distribution of cold and frozen foods—heating and cooling load calculations – air and chilled water distribution systems – natural ventilation – environmental control for animals and botany.

MA 422 - Agricultural Engineering Laboratories (B):
Revision of measurement- methods and instrumentation and their calibrations in field of energy, heat, motion power, forces and moments - lab experiments in ICE, farm machinery, soil properties, water movement in soil, soil box, tillage tools - lab experiments in farm structures ventilation cooling, refrigeration, air conditioning and solar energy, green houses - lab experiments in food processing, mechanical and thermal properties of food non-Newtonian flow, cooling and freezing.

Elective Course (*)

MA 431 - Statistical Analysis:

MD 432 - Industrial Ventilation:
MECHANICAL ENGINEERING
Fourth Year
Mechatronics Section

**MT 421 - Automatic Control (**)**

**E 401 - Electronic Circuits (**)**
Microprocessor architecture, Microprocessor families, 386/387 microprocessors, Hardware and instruction set, programming Languages, Assembly Language, Microprocessor interfacing. Interfacing microprocessors with dc and stepper motors. Microprocessors.

**MT 422 - Mechatronics Laboratory (**)**
- Interfacing a microprocessor to a dc/ stepper motor.
- PWM- driven dc motor velocity control using a microprocessor
- PWM- driven dc motor position control with shaft-encoder feedback.
- Digital measurement of temperature using a PC.
- Digital measurement of pressure using a PC.
- Digital measurement of displacement using a PC.
- Control of Variable- Flow process using a microcontroller.
- Position- control of a γ-axis manipulator using a microcontroller

**MT 423 - Mechatronics (A)**

I- Overview of Mechatronics
1- What is mechatronics
2- Evolution of mechatronics
3- Importance of mechatronics for different applications
4- Examples of mechatronics products
5- The role of mechatronics engineering

II- Modeling and Simulation of Mechatronics System using
1- Object oriented simulation
2- Examples of different mechatronics simulation software packages such as DYNAST.

III- Mechatronics Components
1- Sensor in mechatronics system
2- Actuator in mechatronics system
3- Interfacing mechatronics system with microprocessor
4- The role of control in mechatronics system
IV- Case Studies

- Hard disk drive
- Two – axis manipulator
- Mobile robot

**MT 424 - Robotics**

Basics of robotics, Analysis and design of robotic systems including arms and vehicles, Kinematics, Inverse Kinematics and Dynamics of robots (stationary and mobile robots), Algorithms for describing, planning and commanding, robotic control systems, Position, speed and force control of robot Grippers, Examples on various practical applications of robots.

**MT 425 - Project**

A significant Mechatronic Project is considered an essential part of mechatronic education. The purpose of the project is to give the student experience in designing systems that need to integrate various technologies they have learned about in the program. These projects should be based on real physical systems that come from industry, and could be conducted as a team effort. This is intended to improve students skills in designing Mechatronics systems for solving practical problems or designing new smart components. Project planning, implementation presentation and reporting should be an integral part of these projects.

**MT 423 - Mechatronics (B)**

Mechatronics Design: Mechatronics Design Versus Conceptual Design, The role of modeling in mechatronics Design
Simulation of mechatronics using mechatronics simulation software – Intelligent Mechatronics Systems.
Applications: CNC machines – Robot – Micro electro mechatronics system MEMS (intelligent sensor, micro pumps ……..) – Medical Application (wheel chair, surgical tools,…….) – Other mechatronics products (home appliances,……).

**E 402 – Programmable Logic Controller (PLC)**

Overview of PLCs, Central Processing Unit, I/O system, Programming, Terminal and peripherals, Relay Logic, Ladder Logic, Timers, Counters, Sequencers, Data Transfer, Mathematical Functions, Numerical Systems and codes, Digital Logic.

**MT 422 - Mechatronics Laboratory (B)**

- PLC control of 2-axis manipulator
- PLC control of a flow process
- Digital control of a tilting platform
- Transient response of an electrohydraulic position servo
- Frequency response of an electrohydraulic position servo
- Computer simulation of an electrohydraulic position servo
- applying Automation Studio Software package.
- Digital control of two– tank – level / flow process
MT 426 - Electrohydraulic Servo Systems:
Hydraulic Basics, positive displacements pumps, control valves, solenoid valves, accumulator and filters, Actuators, hydraulic motors, hydrostatic transmissions, circuit design – Two –Stage electro hydraulic servovalves: Static and dynamic characteristics- Design of electrohydraulic systems applying state space method – Closed loop response of electrohydraulic servo systems – troubleshooting in fluid control systems- Computer aided design of fluid power systems applying AUTOMATION STUDIO Software.

Elective Course (*)

MT 432 – Digital Control:

MT 433- Industrial Process Control:
Electrical Engineering Department
First Year

E121- Electric Circuit Theory
Current, Voltage, Power and energy, Constant and controlled current/voltage sources, series and parallel circuit, Analysis & DC circuits (Loop/mesh and Nodal methods), Circuit Theorems, Capacitance and inductance, Alternating current, Analysis of AC circuits using vectors, Computation of power, Resonance Circuits, Magnetic circuits.

E122- Theory of Electric Fields(1)

Theory of Electric Fields(1-A)

Theory of Electric Fields(1-B)
Conductors, Dielectrics and Semiconductors properties and current density and Continuity of current, boundary conditions, The method of images, Capacitance, Capacitance of two-wire line, Experimental Mapping, Poisson’s and Laplace’s Equations, Example of the solution of Poisson's equation.

E123- Computer Languages
Introduction to computer languages & development of algorithms, Fortran and C/C++, Developing programs in IDE environments, Program compilation, linking debugging and execution (Source), Program programming, Variables, Constants, Operators, Assignment Statements, I/O statements, Control Statements, Repetitions, Matrices and Matrix operations I/O Format Statements, Subprograms, Functions, and Subroutines, Complex variables, Introduction to structured/object-oriented, files.

E124- Electrical Properties of Materials

MATH101- Mathematics (1)
First order ordinary differential equations (ODE’s) and their applications, Higher order linear ODE’s, Systems of simultaneous linear ODE’s, solution using serieses, Orthogonal functions, Bessel, Lagendre, Hermite suctions, Partial Differential Equations (PDE), Linear and non-linear PDE’s, Applied Vector analysis.

E125- Electronics (1)
Related Physics Background-Motion of charged particles in electric and magnetic fields, Cathode Ray Oscilloscope, Relativistic concepts, Crystal properties, Quantum mechanics, Atomic structure and energy bands in solid, Drift and diffusions of carriers in semiconductors, P-N Junctions and their properties, Diode functions: rectifier, Voltage regulator, Varactor, Varistors, Photodiode, Light emitting diode (LED), Solar cell, Tunnel diode, Schottky diode.
**MATH 102 - Mathematics (3)**
Analytic functions of complex variables, Infinite series in the complex domain, Residue theorem, Fourier series, Laplace transformation, Z transform, Applications of Laplace and Z transforms to electric circuits and digital/Analog systems

**E126 - Electric Testing (1)**
Measurement of unknown resistance (Ohm’s law and bridge methods), Ideal Voltage Generator, Theorems of direct and alternating current circuits, RC, RL and RLC Circuits, Resonance Circuits, Cathode Ray Oscilloscopes (CRO), Diode characteristics and applications, Zener Diode, Opto-electronics (Photo diode and solar cell), Simulation of electronic Circuits using PSPICE.

**Elective Courses:**

**C111 - Theory of Structure and Machines Foundation**
Plane statics – Supports, loads and reactions – Internal actions in statically determinate beams - Internal actions in statically determinate frames - Internal forces in statically determinate trusses – Normal stresses – Shear stresses – Combined stresses – Different kinds of foundations.

**C112 - Surveying Engineering**
Introduction – Distance measurements and maps production – Compass in simple surveying works – Leveling – Use of theodolite for angle measurements – Distance measurements by Tachometric equipment – Applications of photogrammetry and remote sensing in electrical field.

**C113 - Construction Engineering**
Electric Engineering Department  
Second Year  

**E321- Electromagnetic Field Theory**

**Electromagnetic Field Theory (E-A)**
The steady magnetic field; Biot Savart and Ampere circitual laws, Magnetic forces, torque, materials and calculation of self and mutual Inductance, Time varying field and Maxwell's equations, The uniform plane wave; the transverse Electromagnetic (TEM) Wave, Poynting theorem, normal and oblique incidence, normal and oblique,

**Electromagnetic Field Theory (E-B)**
Transmission and reflection of TEM wave through non-homogenous media, Transmission Lines; primary and secondary constants of Transmission Lines (TL), TL Equivalent circuits, Transmission and Reflection along Mismatched TLs. Power TL primary constants, Characteristics of Radio Frequency (RF) TLs. Matching techniques of RF TLs, Applications of Smith Chart.

**E322- Circuit Theory(*)**

**Circuit Theory(*)-A**
Network structures - The Operational Amplifier, Response of First Order Circuits, Response of Second Order Circuits, Three-phase Circuits, Mutual Inductance – Laploue and Fourier transfers analysis of electric circuits – Transfer function – Two port Networks.

**Circuit Theory(*)-B**
The Laploue Transform in Circuit Analysis, Introduction to Frequency Selective Circuits, Fourier Series, Two-Port Circuits, Circuit Analysis using PSPICE Software – Transfer function – Two port Networks

**E323- Electronics (*)**
Bipolar Junction Transistors BJTs, BJT applications at low frequencies, Junction Field Effect Transistors JFETs, Metal- Oxide-Semiconductor Field Effect Transistors, Basic FET circuit Applications, Switching Devices: Four-layer PNPN devices, (SCR, Bilateral devices, Unjunction (UJT), Programmable (PUT) Transistors, Power Circuits and systems; Classification of output stages, audio power amplifiers, IC power amplifiers, power supplies, Operational amplifiers Regulated power supplies, Monolithic regulators, Introduction to semiconductor device technology.

**E324- Electrical Testing**

**Electrical Testing (A)**
- Transistor characteristics  
- Applications of Transistors in logic circuits  
- Common-base, -emitter, -collector transistors  
- Transistor simulation using Pspice  
- FET characteristics  
- Difference and operational amplifier with applications  
- Ampere turn calculations for D.C. machines  
- Open circuit and external characteristics for isolated and parallel operated transformers  
- External and load characteristics for D.C. transformers
**Electrical Testing (B)**
- Logic gates and De-Morgan theorem
- Half and full adder
- Multiplexers and decoders
- Flip-flops
- Counters and shift registers
- Random access memories
- Open circuit and short circuit tests for transformers
- Three phase transformers characteristics
- No load short circuit and load tests for τ-phase induction motors

**E226- Electric Machines (A)**

**Electric Machines (A-A)**
Direct current machines, Armature winding and Armature reaction and commutation, Method of excitation, Characteristic of dc generators, Load characteristic of dc motors, Speed control of DC motors. Alternating current machines, Construction of signal phase transformers, Determination of its parameters,

**Electric Machines (A-B)**

**E227- Numerical Analysis (A)**

**E228- Electric and Electronic Measurements**

**E229- Digital Circuit Design**
Boolean Algebra and Logic Gates, Simplification of Boolean Function, Combinational Circuits, Adders, Comparators, Decoders and Encoders, Multiplexes and demultiplexers, PAL & PLA, Sequential Circuits, Flip-Flop circuits, Register, Shift registers; Counters; Memory Units.

**M201- Hydraulics and Heat Engines**
Electrical Engineering Department  
Third Year  
Electronics and Communication Section

EE321 - Signals and Systems Analysis  

EE322 - Electronics (3)  

EE323 - Electrical Testing (A)  
RC coupled voltage amplifier - Power amplifiers - Operational amplifier applications – Comparator – Operational amplifier as Integrator and Differentiator - Pseudo-Random Bit sequences and noise generators - PLL (phase locked loop) circuits - Transmitter and receiver.

EE323 - Electrical Testing (B)  
Phase shift oscillator – Application of bus systems in liquid-level detector – The Arithmetic logic unit – The slotted coaxial line as a measuring device – Frequency, Wavelength and standing wave ratio measurements – Horn, Parabolic, Slot and helix antennas and Antenna systems demonstrator – ADC/DAC.

EE324 - Guided Waves and Antennas  
Guided Waves and Antennas (A)  

Guided Waves and Antennas (B)  
Radiation and propagation of waves - Fundamentals of radar systems - Microwave tubes and circuits - Semiconductor microwave devices and circuits.
**EC 301- Automatic Control**

**EE 325- Communication Systems and Random Processes**

**EE 326- Electronic Circuits (1)**

**Optional Courses (from other sections)**

**EC 333- Operating Systems**

**EC 334- Advanced Language for Computer Programming (C or C++)**
Introduction to C/C++ – Class function and conversions - Input/Output file streams and data files- Arranges – strings – Addresses - Pointers and arrays - Records as data structures – Object – Oriented stacks and queues.

**EP 335- Industrial Electronics**
Introduction to electronic devices and circuits used in control systems – Diodes - Control-free rectification circuits - Thyristor - Control rectification circuits - Voltage regulators - Static switches - Methods for turning off Thyristors working in DC circuits - Choppers and DC generators - Power transistors – Inverters - Un-Interruptible power supply (UPS).
Optional Courses (from same section)

EE 331 - Very Large Scale Integrated (VLSI) Circuits
Very large scale integrated circuits (VLSIs) - Types - Fabrication steps - their physical and chemical properties - Assessment of VLSIs - Measurement of electrical characteristics (Current-Potential-Capacitance-Resistance) - Measurement of optical properties - Advanced VLSIs.

EE 332 - Circuits Computer-Aided Design

EE 333 - Electronic Devices
Classification of electronic devices - Application of pn-junction (rectifier - Ziner diode - Varactor - Optical diode - Solar sell - light emitting diode - Tunnel diode) - The transistor (bipolar - field effect - uni-junction - power transistor - Charge coupling devices) - Switching power devices (Schockely – Diac - Silicon controlled rectifier - Triac) - Microwave devices - Laser - Optical coupling circuits - Optical fibers.

EE 334 - Introduction to Biomedical Equipment Technology
Electrodes and Transducers - Bioelectric amplifiers - The heart and circulatory system – Electrocardiography - Cardiac stimulation and life supporting equipment - Medical Laboratory Instrumentations - Medical Ultrasound - Hemodialysis Machines Radiology and Nuclear Medicine.

EE 335 - Fundamentals of TV Engineering
Transmitting and receiving stations - Basics of sound transmitter and receiver circuits - Video/image transmitting and receiving circuits. Horizontal and vertical synchronization of color and B/W TV – Printed circuits implementation of same training TV circuits.
Electrical Engineering Department  
Third Year  
Computer and Systems Section

**EC 321 - Computer Organization**
Basic hardware structure, Addressing modes and assembly language, main memory operation, machine instruction, Center processing units design, hardware implementation, Micro programming, ALU, Main memory design, RAM, Cash memory, Virtual memory, Flash memory.

**EC 322 - Signals and Systems Analysis**

**EC 323 - Electronic Circuits**

**EC 324 – Electrical Testing (A)**
Experiments using the microprocessors ^30^x^36^ and ^30^ - Computer serial and parallel ports - Control of a dc motor - Time response of first order systems - Time response of second order systems - Frequency response of first order systems - Frequency response of second order systems - Data acquisition and data distribution boards.

**EC 324 – Electrical Testing (B)**
Writing of programs using various data structures and classes - Control systems components - Fundamentals of position control servo system - Fundamentals of proportional and Integral speed control systems, ADC/ DAC.

**EC 325 - Microprocessors**
Microprocessor families, The architecture of the ^30^x^36^ microprocessor, ^30^x^36^ instruction set, ^30^x^36^ memory addressing modes, ^30^x^36^ Assembly language, Interfacing ^30^x^36^, Introduction to the ^63^x^0^ microprocessor, RISC architectures

**EC 326 - Automatic Control (1)**
Introduction, Open loop and closed loop control systems, Steady state characteristics of closed loop systems and advantages of closed loop systems, Transfer functions of control system components, Time response of first order and second order systems, Steady state error and error constants, Feedback Control Systems Characteristics Second order servo system, Design specifications of second order systems, Error rate damping and tacho generator feedback used in servo systems, The concept of

**EC 327 - Data Structures**
Introduction to data structures and data abstraction, algorithms, arrays and vectors, linked lists, doubly-linked lists, pointers, stacks and queues, trees, binary trees, files, search and sorting techniques.

**Elective Courses (from other sections)**

**EP 336 – Power Systems**
Components of power systems - Transmission lines - Control Theory in power systems - Interference between communication circuits and power lines.

**EP 337 - Electrical Machine II**
Phase Induction Machines: Performance Circle Diagram and Starting, Speed Control and Testing, High Starting Torque Cage Motors, Braking and Induction Generator, Unbalanced Operation and Effect of Space Harmonics.

**EE 336 – Design of Integrated Circuits**
Introduction to advances in integrated circuits - Manufacture of ICS, stages, operations, material. Simulation, Applications - Design and testing of ICS.

**EE 337 – Analog and Digital Communication**

**Optional courses (from same section)**

**EC 331 - Advanced Computer Languages**

**EC 332 – Software Packages**
Oracle, power builder, and Open GL
Electrical Engineering Department
Third Year
Power and Machines Section

EP 321 - Electrical Power

EP 322 - Automatic Control

EP 323 - Electrical Machine (1)

EP 324- Electric Testing (A)
Three phase transformer - Induction relay - Potential distribution along high voltage insulators - Test of high voltage insulating materials - Performance of synchronous machine - Measurement of earth resistance- Circle diagram of three phase induction motor - Reactive power effects.

EP 324- Electric Testing (B)

EP 325 - Power Electronics
**EP 326 - High Voltage Engineering**


**EE 327 - Digital Signal Processing**


**Elective Courses:**

**EP 331 - Protection Against Electricity Hazards**

Electrical shocks - Dangers of electrical shocks - Step voltage and touch voltage - Burns caused by electricity - Electrical safety modeling by recognizing, evaluating and controlling hazards - Grounding of power systems (Aims - Means - Benefits) - Electromagnetic field and human health (Biological effects of electrostatic and electromagnetic fields) - Interference of power lines fields with communication networks - Environmental effects of electric field - Microwave dangers - Surges dangers - Leakage current dangers - Cars electric circuit dangers - Today dangers of mobile telephones.

**EP 332 - Electric Power Distribution Systems**


**EP 333 - Power System Reliability**

Introduction - Definition of reliability - Basic probability theory - Probability distributions - Basic reliability concepts - Combination analysis - Failures - Limitations of distribution systems - Limitations of transmission systems - Markov processes - Reliability measurement - Reliability aids - Recent developments - Applications.
**EP 334 - Power Quality**

**EC 335- Programmable Logic Controllers (PLC)**
Introduction to programmable logic controllers, Input/output devices, Input/output processing, Programming, internal relays, Timers, Counters, Shift registers, Data handling, Designing programs, Testing and debugging, Practical applications.

**EE 338- Microprocessor Principles**
Microcomputers and their classifications - Microprocessor families - 3036/3033 Microprocessors (Internal structure - Instruction set- Assembly language) - Microcomputer systems (Main units - Supporting chips- Controllers - Interfacing) - Microprocessor applications in power systems - PLC.
Electrical Engineering Department  
Fourth Year  
Electronics and Communication Section

EE 421 - Digital Signal Processing  

EE 422 - Electronic Circuits (II)  

EE 423 - Microcomputers  
Introduction: Main frames Mini Computers and Microcomputers – Microprocessors: Microprocessors building blocks - ALU Registers and Buses - Microprocessors-microcomputers and Microcontrollers – Assembly language versus High Level Languages – Advanced Microprocessors Structures – The \( \times \times \) family: \( \times \times \) Architectures \( \times \times \) Registers – The \( \times \times \) Instruction Set Data memory addressing modes \( \times \times \) Instruction Groups - Data Movement instructions - Control Transfer Instructions – Arithmetic Instructions– Logic Instructions – Stack Instructions – String Primitive (basic) Instructions – Miscellaneous Instructions – Assembler Directives – Microcomputer DOS Functions- INT \( \times \) Function Calls - standard input / output – File Handle Disk Access – INT \( \times \) Function calls - display functions – Interfacing: Analog Interfacing - A/D- D/A – Digital Interfacing: Transistor drivers – optocouplers – Handshaking – Interfacing Examples.

EE 424 - Project

EE 425 - Electrical Testing (A)  

EE 425 - Electrical Testing (B)  
EE 426 - Digital Communication Theory

EE 427 - Interfacing
Revision to microprocessors - Multiplexed pins - Memory interfacing - The programmable peripheral interface - The programmable interval timer - The programmable communication interface - The key - board interface - The display interface - The DMA - The interrupt controller - The RS232 interface - Micro controllers - Floating point numeric coprocessor.

EE 428 - Microwave Circuits and Optical Fibers

Elective Courses:

EE 431 - Digital Telephony
Principles of Telephone system - Basics of telephone communications - Switching in electronic exchanges - Time and space switches - Digital exchange and its elements - calling process - Control system in Digital exchange - Signaling in electronic exchange - Subscriber interfacing.

EE 432 - Adaptive Filters: Theory and Application

EE 433 - Optoelectronic Devices
**EE 434 - Wave Propagation and Optical Fibers**

**EE 435 - Laser and its Applications**

**EE 436 - Sound Signal Processing**
Introduction - Digitization of Speech Signals- Coding of Speech Signals and Speech Compression - Speech Characteristics and Speech production - Time domain methods of Speech processing - Linear Prediction Coding of Speech - Cepstrum Analysis of Speech- Speech Synthesis - Speech Recognition - Speaker Recognition

**EE 437 - Information Theory**

**EE 438 - Television Engineering**

**EE 439 - Satellite Communication Systems**
EC 421 - Computer Architecture
Input and Output systems, Computer peripherals, Parallel processing, Pipelining and vector processing, SIMD processors, Array processors, Multiprocessor architecture and programming.

EC 422 - Automatic Control II
Design of cascaded compensators in the root locus domain, Analytical approach to design of a series compensators, Control ratio modeling, Guillemin-Truxal design procedure taking into consideration dynamic and accuracy specifications, Error criteria performance indices, Parseval’s Integral, State variable analysis and design of control systems, Controllability and observability – Gilbert and Kalman tests, Pole placement by state feedback, Design of state Observers, Introduction to optimal control and quadratic performance indices.

EC 423 - Control of Industrial Process

EC 424 - Project

EC 425 - Electrical Testing (A)
Programming a Microcomputer - Introduction to Unix/Linux - Computer networks - Analog-to-digital conversion - Servomotor system modeling - Programmable Logic Controllers (PLCs) applications.

EC 426 - Electrical Testing (B)
Design of Arithmetic and logic unit (ALU) - Batch/Script Files - Input/output operations using microprocessor - data transfer between computer nodes - Control of dc motors - Control of ac motors - Servomotor systems with different compensators.

EC 427 - Digital Control
**EC 427 - Operating Systems**

**EC 428 - Computer Interfacing**
Multiplexed pins, Microprocessors and bus system, its relation with data movement instructions, RAM-ROM interfacing, DRAM interfacing, Programmable peripheral interface, Programmable communication interface, Programmable display interface, Keyboard interface, Interfacing Analog/Digital converter and Digital/Analog converter, Programmable interval timer.

**Elective Courses:**

**EC 431 – Introduction to using computers in control**
Introduction to MATLAB. Programming using MATLAB. Time and frequency analysis of continuous and discrete systems using MATLAB tools. Introduction to SIMULINK.

**EC 432 – Neural Networks**

**EC 433 – Artificial Intelligence**

**EC 434 – Robots**

**EC 435 – Computer Graphics**
Introduction to computer graphics, applications of computer graphics, drawing of basic figures, points, lines and ellipses, viewing pyramids, three-dimensional drawings, hidden surfaces removal, Beizer curves.

**EC 436 – Parallel Processing**
**EC 437 – UNIX Operating System**
Introduction. Services offered by the UNIX operating system. Components of UNIX. UNIX commands, memory organization. UNIX File Systems.

**EC 438 – Programmable Logic Circuits**
Introduction to PLCs. Components of PLCs. Programming. Applications.

**EC 439 – Computer Networks**
Introduction to computer networks and data communication, network layers, network protocols, network security, distributed systems.
Electrical Engineering Department  
Fourth Year  
Power and Machines Section  

EP 421 - Electrical Machines (*)  

EP 422 - Power System Analysis  

EP 423 - Energy Conversion and Utilization  

EP 424 - Project  
Projects are to be performed in all machines and power system subjects. Each student is allowed to select a project subject from the available presented projects by department staff members.  

EP 425 - Electrical Testing (A)  
**EP 425 - Electrical Testing (B)**


**EP 426 - Power Systems Protection**


**EP 427 - Power Systems Control**

Controlled power system configuration, Controlled power plants, Generators transfer functions, Exciters transfer functions, Automatic Voltage regulator (AVR), Power system stabilizer (PSS), Controllers circuits, Speed governor, Automatic generation control (AGC), Load/frequency control (LFC), Tie-line control, Economic generation control (EGC), Multilevel generation control (MLGC), Power electronic devices and HVDC system control, Static voltage control, SCADA system control

**Elective Courses:**

**EP 431 - Variable Speed Drives**

D.C motors fed from 1-Φ converters, D.C motors fed from 3-Φ converters - D.C motors fed from chopper circuits - Closed loop control of D.C motors - Control of induction motors by voltage and frequency control – Control of different types of synchronous motors – Feedback control for A.C motors.

**EP 432 - Theory of Unified Electric Machines**


**EP 433 - Linear Electric Machines**

**EP 434 - Dynamics of Electric Machines**
Dynamics of DC machines, Dynamics of Induction machines, Dynamics of synchronous machines, Phenomena of synchronism and sustained vibrations in synchronous machines, Machines performance after sudden loading, Machines performance after short circuits inside the machine.

**EP 435 - Electrical Machines Design**
Design of Transformers, Design of three-phase induction motor, Design of DC machine, Design of synchronous machine

**EP 436 - Power Systems Voltage Stability**
Voltage definitions, Two nodes systems analysis, Load representation for voltage stability studies, Voltage instability phenomena (Causes – mechanism - consequences), Load instability interrelation with voltage instability, Criteria for detection of steady-state voltage instability, Induction motor role in provoking voltage instability, Influence of loads representation on voltage instability, Blackouts, Blackout Preventive measures in typical power systems.

**EP 437 - Introduction to Synchronous Stability**

**EP 438 - Introduction to FACTS**
Meaning of flexible AC transmission systems (FACTS) – Aims – Types – Functions – Control – Modeling – Applications – Thyristor controlled series capacitors (TCSC) – Unified power flow controller (UPFC) – IPC – SMES.

**EP 439 - Static VAR Compensators and HVDC Systems**
Mining and Metallurgical Engineering
First Year

MATH 101 - Mathematics

A. Algebra:
B. Calculus:
Advanced methods of integration – Properties and applications of definite integrals – Linear integrals - Taylor expansion with remainder – Curvature – Multiple integrals and its applications.

M 101 - Thermodynamics

M 102 - Machine Drawing and Design

I 121 - Engineering Geology

C 101 - Theory of Structures

C 102 - Plane Surveying

E 101 - Electrical Engineering
**GE 101 - Mineralogy and Petrology**
Basis of crystallography – Crystal systems of minerals – Introduction to mineralogy – Physical properties of minerals, rock forming minerals – Economic minerals - Optics – Optical properties of minerals under both ordinary and polarised microscope - Types of rocks (igneous, sedimentary and metamorphic rocks).

**I 122 - Introduction to Mining Engineering**
Survey in the sources and origin of some Egyptian ores – Methods of ore explorations depending on their physical properties – Methods of ore sampling and its evaluation – Different mining methods – Drilling principles – Different types of explosives and blasting – Types of tunnel support and ventilation.

**E 102 - Computer**
Design and construction of computer programs by using the FORTRAN language – Imagine of solution methods – Methods of solution of the problems and their confirmation by using FORTRAN language.
Mining & Metallurgical Engineering
Second Year

C 201 - Topographic Surveying and Photogrammetry

I 221 - Rock Mechanics

I 222 - Principles of Metallurgical Engineering

M 201 - Fluid Mechanics and its Applications

I 223 - Applications of Computer in Mining

MATH 201 - Mathematics and Statistics
A. Differential equations:
Differential equations of the first order – Geometric applications Differential equations of higher order

B. Statistics:
I ٢٢٤ - Mining Geology (١)
Geologic structures (folds, faults and fractures) – Unconformity – Criteria of ores (stratification, chemical compositions, models and examples of rupture, contacts and folds, dislocation of ore bodies by faults, extension of ores in depth) – Exercises: to understand and interpret the geological maps, structure-contour maps – Application of descriptive geometry in solving mining problems.

I ٢٢٥ - Drilling and Blasting Engineering

I ٢٢٦ - Mine Development
Opening up of coal and stratified deposits – Division of mining property into levels and panels – Optimum height of levels and panels – Development of inclined thin and thick layers – Choice of methods of opening up by variant method – Basic rules to determine the dimensions of the mining area – Finding the position of the main shaft – Dimensions of development workings – Design of operating and organization chart.

I ٢٢٧ - Physical Metallurgy
Mining & Metallurgical Engineering
Third Year

I 321 - Surface Mining Engineering
The essence and elements of surface mining – Glossary of surface mining terms – Comparative study of production by surface and underground mining – Advantages and disadvantages of surface mining – Slope stability of the faces – Different stripping ratios – Types of trenches and development schemes – Planning and engineering design for surface mining – Different classification of mining systems – Mining loading equipment transportation.

I 322 - Mining Geology (*)
Economic mineral deposits: origin, types, properties characteristics, etc. – Economic geology of Egypt. - Exercises: identification of mineral deposits in hand specimens and under the ore-microscope, solving mining problems by stereographic projection, interpretation of geologic maps.

I 323 - Rock Mechanics and Supporting

I 324 - Extraction and Production of Metals
Extraction and production of iron by blast furnace and direct reduction processes – Batch and continuous steel-making – Extraction of non-ferrous metals, e.g. aluminum, copper, titanium, uranium and manganese – Metals refining – Melting and solidification of metals – Design of some units and role of transport phenomena in metallurgical processes – Site and layout of metallurgical plants – Production economics – Pollution control – Waste heat recovery.

I 331-a - Elective Course (¹) “Mining Engineering”

I 331-a - Mineral Resources Exploration
Geological and photo geological survey – Interpretation of aerial images – Plotting the prospecting guides – Geochemical radiometric and geothermal prospecting – Use of remote sensing technique and the electro- magnetic spectrum to investigate the areas under study – Mineral resources – Water resources and environments, as well as geothermal and global tectonics – Selection of the more detailed and suitable prospecting methods – Correlation and analysis of the results of the integrated program – Reserve estimation – Economic evaluation of the project.

I 331-b - Geology of Underground Water
Sources, occurrence and properties of water bearing strata - Water chemistry and properties – Excavations for groundwater – Different methods of sampling and analysis - Application of the suitable geophysical methods, well logging - Groundwater flow and Darcy’s law – Case studies to problems regarding the effect of ground and engineering projects such as tunnels and underground mine operations.
I 331-c - Block Theory
Vector methods – Stereographic projection – Classification and types of blocks – Application of key block theory in surface, underground mining, tunnel and other constructions.

I 331-d - Method of Finite Element

I 331-e - Geodynamics History of the Earth Structures

I 331-f - Surface Subsidence in Mining Areas

I 331-g - Mine Drainage
Principles of flowing fluid – Subsurface water and ground conditions – ground water lowering and drainage techniques – Classes of under ground water – Properties of underground water – Occurrence of underground water – Handling of water for mining purposes – Cost of mine drainage.

I 331-h - Rock Fragmentation

I 331-I - Drilling Methods and Their Applications
Percussive drilling machines (technical specification – Percussive drilling bits) – Rotary drilling (rotary bits – rotary drilling machines) - Diamond drilling machines and equipment (diamond drilling bits – reaming shells – core barrels – properties of drilling fluid) – Drilling for prospecting and sample recovery (Auger drilling – core and non core drilling – core drilling for rock testing) – Drilling for mine design (drilling pattern – the suitable distance between the bore holes – calculation of the sample recovery) – Data collection from the samples drill evaluation for lowest cost (calculation of the drilling rates – the drilling costs – the suitable number of drills for production plan).
I 314 - Physical and Mechanical Properties of Rocks

I 320 - Underground Mining Engineering

I 325 - Geodesy and Mine Surveying

A. Geodesy:
Introduction (Figure & size of the earth – Co-ordinates systems) –Triangulation’s - Eccentric observations - Simple adjustment of triangulation’s - Base line measurements – Its corrections - Towers of sighting & target and Intervisibility - Theory of errors and probabilities -Introduction to Matrices algebra -Least Squares and adjustment of surveying observations: Adjustment of indirect observations, Adjustment of conditional observations, adjustment of leveling nets, Trilaterations, its adjustment in accordance with least squares- GPS observations, Geodetic Astronomy.

B. Mine Surveying:
Introduction - Tasks of mine surveying – Organization of surveying workings – Optimization of measurements (selection of instrument and measuring method) - Orientation of Underground Surveying (tunnel – inclined shafts - vertical shafts) - Adjustment of observations (approximately – according to least squares) - Determination of rest position of swinging wires - Different workings of underground mine surveying - Different workings of mine surveying at surface mines & quarries - Specific mine surveying workings (tunneling – development).

I 327 - Ore Dressing (1)
Flow sheets of different unit operations in mineral processing – Crushing & grinding (theory & equipment’s) – Liberation – Energy consumed during grinding – Laboratory and industrial screening – Particles movement in fluids and liquids – Classification by sizing – Cyclone – Evaluation of mineral processing operation - Heavy liquid separation.

I 328 - Mine Surveying Project
Field training for four weeks on mine surveying works in a certain mine – Triangulation or trilateration net – Base line – Connection between surface and underground – Surface and underground traverses – Topographic observation – Cadastral surveying – Topographic mapping.
1ⅢⅢ- Elective Course (*) “re Dressing”

1ⅢⅢ-a - Gravity Separation

1ⅢⅢ-b - Crushing and Grinding Operations

1ⅢⅢ-c - Coal Preparation and Concentration
Mineralogical description of coal deposit - Preparation and analysis of coal sample - Crushing and grinding of coal - Coal screening and size classification - Removal of gangue from coal by hand picking and its examination - Dry washing and removal of dusts from coal - Coal washing using heavy medium separation - Coal washing using jiggling process - Other methods used in coal washing (Flotation,.....etc.).

1ⅢⅢ-d - Automation of Mineral Processing Plants
Automation of crushing operations – Automation of grinding and classification operations – Automation of froth flotation – Automation of dewatering processes.

1ⅢⅢ-e - Material Handling in Ore Dressing Plants
Solid materials handling – Pulp handling – Tailing disposal – Handling in comminution section - Storing – Hydraulic transportation of solids and slurries in pipelines.

1ⅢⅢ- Elective Course (*) “Engineering Metallurgy”

1ⅢⅢ-a - Powder Metallurgy
Introduction and historical background – Production and characterization of metallic powders – Pressing technology – Sintering theory of metallic compacts and its applications – Mechanical properties of sintered parts – Investigation and quality control of products – Properties and applications fields of some powder systems.

1ⅢⅢ-b - Fuels, Refractories and Furnaces

1ⅢⅢ-c - Mathematical Modelling and Computer Applications in Metallurgy
Building a mathematical model – Solution of mathematical models and numerical analysis techniques – Use of computers in solution – Mathematical models for some cases like; the sintering process, the blast furnace – Direct reduction of iron ores – Casting and solidification of alloys – Heat treatment – Steel-making furnace
I 333-d - Corrosion and Protection of Materials
Corrosion; principles, types and influencing factors – Inspection, testing and recording – Corrosion of different materials - Ferrous and non-ferrous alloys - Non-metallic materials (polymers, ceramics and composites) – Prevention and control of corrosion.

I 333-e - Defects and Failures in Metals and Alloys
Manufacturing defects and failure due to manufacturing processes (segregation, flaws and pores, piping, internal or residual stresses, embrittlement, cracks, hot tears and surface defects) – Defects and failure due to bad performance (decarbonization, corrosion, chemical erosion) – Defects and failure due to high stresses (fatigue, creep, impact and wear) – Defects and failure during thermal treatment (overheating, burning, quenching, annealing and preheating before hot working).

I 333-f - Ferroalloys
Furnaces for production of ferroalloys and their facilities – Production of ferroalloys like ferrosilicon, manganese, chromium, tungsten, titanium, molybdenum, vanadium...etc) – Waste heat recovery – Environmental control – Uses and economics of ferroalloys.

I 333-g - Transport Phenomena
Momentum transfer – A brief on the principles of momentum transfer and overall balances for flow in fixed beds and fluidized beds – Non Newtonian fluids – Heat transfer: principles of steady state heat transfer by conduction, convection and radiation – Principles of unsteady state heat transfer – Mass transfer – Unsteady state diffusion – Convective mass transfer.

I 333-h - Heat Treatments of Alloys
Mining & Metallurgical Engineering  
Fourth Year

I 421 - Geostatistics  

I 422 - Mining Geophysics  
Geophysical methods of exploration; including Gravity, magnetic, electric seismic, radiometric, geothermic and bore hole geophysics Seminars – Covering the application in civil engineering and geotechnics site investigation of projects – Physical and dynamic properties of rocks – Exploration for ore deposits, ground water, petroleum, solving problems encountered in mines and waste disposals – Interpretation and use of computer programming.

I 423 - Ore Dressing (1)  

I 424 - Mine Ventilation  

I 431 - Elective Course (1) “Ore Dressing”

I 431-a - Modelling and Simulation of Mineral Processing Operations  
Mathematical modeling (definition, types and construction) – Modeling of hydrocyclone and screening – Simulation of mineral processing circuits – Modeling of liberation process – Automation of wet grinding circuits – Case study.

I 431-b - Concentration of Egyptian Ores  
Economic ores in Egypt and its location – Different methods of concentration the following ores (phosphate, iron, coal, manganese, chromites, nightline cyanide, kaolin, lead-zinc, white and black sands and other ores) – Design of flow sheets.

I 431-c - Froth Flotation of Ores and Its Applications  
Parameters of froth flotation process - Flotation equipment’s - Principles of froth flotation - Sorption and adsorption processes - Flotation reagents - Sulphides flotation - Flotation of metallic ores - Flotation of non - metallic ores (coal and phosphate) - Evaluation the results of flotation process - Simulation of flotation plants - Case study of flotation plant.
I 431-d - Dewatering and Treatment of Mineral Processing Plant Reject

I 431-e - Evaluation of Mineral Processing Operations

I 431-f - Electrical and Magnetic Separations
Apparatus used in magnetic separation – Low and high intensity magnetic apparatus – Application of magnetic separation to beneficiate some ores - Electrostatic separation equipment’s – High-tension separation - Application of electrostatic separation to beneficiate some ores – Flow sheets on magnetic and electrostatic separation.

I 431-g - Physical and Chemical Properties of Froth Flotation

I 432-a - Tunnel Engineering

I 432-b - Engineering Models
Numerical analysis – Physical models – Mathematical models – Models of photoelasticity – Principles of models design – Use of models to solve some engineering problems in mining.

I 432-c - Mining Technology
Analysis of mining work regime – Principles of economic and planning of mining work – Control of mineral quality availability – Production and systems engineering.
I 432-d - **Geometry of Ore Deposits**
Introduction to geometry of ore deposits – Introduction to field and potential theory – Application of geo-chemical and geotectonic fields – Fundamentals of geometrization of ore deposits – Examples for application of recent possibilities for winning information’s about ore deposits and its evaluation – Geostatistical investigations of ore deposit parameters - Some applications of stationary random functions for ore deposit geometrization.

I 432-e - **Photoelasticity and Its Applications in Mining**

I 432-f - **Engineering Geophysics**
Shallow geophysical techniques as applied to engineering projects as for example: geologic structures, ground water aquifers bedrock determination and parameter evaluation - Applications regarding ground vibration to delineate seismic hazards in mines as well as plotting isothermal maps around tunnels and mine openings to obtain ventilation design - Rock age determination and control of disposal of radio active material - Micro measurements of gravity, magnetic, electric, electromagnetic to investigate holes, cover, buried monument and ancient findings of archaeological interest.

I 432-g - **Petroleum Geophysics**
Origin, source, migration and accumulation – Reservoir and types of traps - Regional studies leading to selection of sedimentary basins – Properties of reservoir rocks, temperature and pressure condition - Deep seismic exploration - Data acquisition – Energy – Noise study – Field layout of shots and geophones – Enhancement and processing of data – Velocity analysis – Migration of reflection points - Bore-hole measurement of electric, nuclear, acoustic and others – Interpretation and correlation of results.

I 432-h - **Design of Stratified Mines**

I 432-i - **Study and Management of Mining Projects**
Organization structure - Administration, Supervision and Training - Staff services and research, company formational organization - Companies, annual reports and accounts management – Control of operations - Feasibility study of mining projects.
I 432-j  -  Stability and Design of Rock Slopes
Geological and engineering considerations for design the optimum slope angles – Theoretical analysis of stability – Monitoring and control of present slopes.

I 432-k  -  Effect of Mining Operation on Earth’s Crust

I 432-L  -  Ventilation Design

I 432-m  -  Technology of Surface Mining and Quarries

I 432-n  -  Special Methods of Ore Extraction
Hydraulic mining methods – Coal gasification – Solution of mining – Leaching methods of mining.

I 433  -  Elective Course (*) “Engineering Metallurgy”

I 433-a  -  Engineering Materials

I 433-b  -  Solidification and Casting of Metals and Alloys
I ٤٣٣-c - Metallurgical Equipment Plant Design

I ٤٣٣-d - Phase Equilibrium
Introduction to metallurgical thermodynamics of metals and alloys – Phase rule and its applications – Phase equilibrium in binary alloys – Phase equilibrium in ternary alloys – Non-equilibrium phenomenon in metallurgical systems and its usefulness for industrial applications.

I ٤٣٣-e - New Materials
Types of engineering materials, properties and applications – Importance of modern materials in the technology of aerospace, biotechnology and electronic as well as information technologies – Case studies (ceramics, composites, polymeric, rapidly solidified materials, … etc).

I ٤٣٣-f - Electro Metallurgy

I ٤٣٣-g - Materials Testing and Processing

I ٤٣٣-h - Manufacturing Processes

I ٤٣٣-i - Recovery and Recycling of Energy and Materials
Waste management – Recycling of gaseous, Liquid and solid wastes – Energy conservation and waste heat recovery – Design of some recycling and recovery units – Case studies (aluminium smelters, casting houses, iron and steel industry, etc.)
**I 426 - Mining Economics and Evaluation**
Assessment of mineral resources – The estimation of recoverable ore reserves - Calculation of the average ore grade – Ore and waste selection and grade control – Introduction to the basic concepts of economics, time value of money – concepts of present worth – Future worth – Annual worth and rate of return – Methods of estimating depreciation and depletion allowances – Evaluation techniques and mine feasibility study – Risk and sensitivity analysis (analysis of risk associated with mining projects and its impact on the evaluation process and analysis of the sensitivities of mining projects to grade – mineral price – costs and other relevant items) – Introduction to the science of decision making and risk theory – The use of stochastic and option pricing techniques in mineral asset evaluation.

**I 427 - Planning and Design of Ore Dressing Plants**
Introduction to statistical analysis - Economics of mineral processing operations - Separation functions (distribution and frequency function) - Evaluation of different mineral processing operations (screening, crushing & grinding, classification, hydrocyclone, tabling, jiggling, Humphry spirals, Flotation, thickening and, filtration) - Flow sheets design for processing of some ores and minerals.

**I 428 - Mine Machinery**

**I 429 - Pollution and Environmental Control**
Gas & Dust pollution in mining & related industries: measurements, characterization, control techniques, meteorology factors and air pollution modeling - Environmental impacts in mining industry, noise, fires, radiation, blasting hazards & their control and safety rules to avoid their hazards - Treatment of wastewater from mining industry.

**I 430 - Project**
A 121- Basics of Architectural Design
Drawing practice of architectural figures - Studying the design elements of buildings - Studying the design elements and dimensions of interior furniture - Studying the architectural form of a classical architectural example.

A 122- Building Construction (1)
Methods of building construction - Bearing-walls construction - Skeleton construction - Building with bricks - Building with Stone - Insulation - Flooring - Staircases - Studying the different stages of building construction theoretically - Practical observation of the different stages of building construction in site.

A 123- Visual Drawing and Colours
Proportions and compositions of surfaces and objects - Freehand drawing of pictures and objects - Basics of visual design - Theory of colour - Practicing the use of different kinds of colours - The function of colour in architectural design.

A 124- Theories of Architecture (1)

C 101 - Surveying
Mapping systems - Drawing scales - Linear measurements and their corrective methods - Calculation and subdivision of areas - Compass - Polygons - Contour lines - Principles of tachometry.

A 125- Architectural Design (1)
Studying the building facades - Design of simple architectural projects composed of one building with emphasis on interior furniture - Studying the functional relationships - Projects such as: detached house / small rest house.

A 126- Shade, Shadow and Perspective Drawing
Point Shadow - Line shadow - Plane shadow - Shades of objects - Shades of architectural compositions - Defining perspectives in terms of perspective angle - Interior perspective - Methods of perspective drawing.

A 127- History of Architecture (1)
Pre-historic architecture and art - Ancient Egyptian Architecture - West-Asiatic architecture - Greek architecture - Roman architecture.

C 102- Theory of Structures
Loads and reactions - Axial forces - Sheer force and moments - Statically defined frames - Properties of plane surfaces - Introduction to perpendicular strains.

A 128- Introduction to Computing
Components of computers - Computers in architecture - Architectural software and its use.
Architectural Engineering Department
Second Year

A 221 - Architectural Design (†)
Studying architectural projects composed of one building with emphasis on solving problems of circulation - Space - Mass - Facades - Long-span roofing methods - Projects such as: bank / post-office / cafeteria / exhibition hall / museum.

A 222 - Building Construction (†)
Foundations - Roofing - Expansion and settlement joints - Wooden windows and doors - Metal windows and doors - Finishing work.

A 223 - Applications of Computer
Studying the use of two-dimensional software - Introduction to three-dimensional software - Word programmes - Statistical analysis and its use.

A 224 - History of Architecture (†)
Architecture at the dawn of Christianity - Byzantine architecture - Renaissance architecture - Islamic architecture.

C 201 - Theory of Structures (†)
Perpendicular stress - Sheer stresses and torsion stresses - United and main stresses - Deflection of beams - Continuous beams - Dynamic loads and beams - Introduction to instability.

A 225 - Architectural Design (‡)
Studying the architectural projects of multiple detached or attached buildings with emphasis on the circulation, the form relationships and interior-exterior spaces. Projects such as: kindergarten / primary school / hotel.

A 226 - Theories of Architecture (†)
Interior space: elements, composition and circulation - Exterior space, nature and site - Forms and their organization in space and site - Environment and architecture.

A 227 - Urban Planning (†)
History of urban planning from the ancient times until the industrial revolution - Principles of city planning - Comprehensive planning studies - Fieldwork: a study of a residential site.

C 202 - Material Properties
Engineering materials - Stresses and strains - Behaviour of different statically-strained materials - Concrete: materials, properties, mixture designs and industry.

A 228 - Building Physics (Acoustics - Lighting - Air-Conditioning)
Architectural Engineering Department  
Third Year

A 321 - Architectural Design (4)  
Studying complex architectural projects of multiple detached/attached and/or multi-store buildings with emphasis on the development of alternatives and rational thinking. Projects such as: cultural center / office building / commercial center.

A 322 - Working Drawings (1)  
Preparation of the architectural and working drawings of a middle-size building (Plans - Elevations - Cross-sections).

A 323 - Environmental and Climatologic Studies  

A 324 - Building Laws and Regulations  
Urban legislations in Egypt - Urban planning Laws - Building regulations - Industrial building regulations - Public building regulations (educational - medical).

C 301 - Structural Engineering  
Concrete Construction:  
Mechanical properties of elements of reinforced concrete - Cross-sections of reinforced concrete - Sheer, bending and axial forces - Load distribution on beams - Slabs.  
Steel Construction:  
Design of tension and compression elements - Joints - Structural details.  
Foundations:  
Natural properties of soil - Different soil layers - Compression of soil - Soil mechanics - Design of foundations.

A 325 - Architectural Design (5)  
Studying architectural projects related to the real estate. Multiple buildings - Emphasis on the application of building laws and principles of economics.

A 326 - Working Drawings (2)  
Electrical and Sanitary installations - Design and drawing of doors and windows - Architectural details.

A 327 - Urban Planning (2)  
Levels of planning - City structure - Planning principles - New towns - Detailed planning of city centers and residential neighborhoods.

A 328 - Theories of Architecture (3)  
Architectural movements after the first industrial revolution - Modern society, the new technological and cultural potentials and architectural design - Theories, principles and works of first-, second- and third-generation pioneers of modern architecture.

C 302 - Sanitary Engineering  
Sanitary and environmental engineering - Supplying cities with water - liquid disposal - Supplying buildings with water - Planning sanitary works in buildings - Liquid disposal in remote areas.
Architectural Engineering Department
Fourth Year

A 421 - Architectural Design (1)
Studying architectural projects with complex circulations built on large areas - Projects such as: hospital / tourist resort / airport.

A 422 - Urban Design

A 423 - Management of Building Operations
Site preparation - Site management - Administration - Technology - Organizational structure of a site - Construction control - Implementation programme - Cost - Performance criteria - Incentives.

A 424 - Quantities and Specifications
Cost estimation - Work sequence - Contracts - Building works specifications.

A 425 - Housing
Concept of housing - Housing problems in Egypt - Factors and criteria of housing in Egypt and the world - Housing solutions - A study of a housing project in a given area.

A 426 - Working Drawings (1)
Detailed interior and exterior working drawings of elements of public buildings.

A 427 - Urban and Regional Planning
Planning at the regional level - Planning of rural villages - Structural, master and detailed planning of cities - Redevelopment of old areas.

A 428 - Project
Preliminary study of an architectural composition - Site analysis - Programme formulation - Project design - Analytical studies - Drawing and rendering.

Elective Course
The student selects one of the following courses:

A 431 - Methods of Scientific Research in Architecture and Urbanisation
Different theories and methods - Practice.

A 432 - Environmental Pollution
Environment - Pollution - Urban Environment - Pollutants - Remedies.

A 433 - Geography of Cities
City locations - City forms - City functions - Future cities and planning - Upgrading cities.
A ٤٣٤- Building Economics
Principles of building economics - Factors influencing building economics.

A ٤٣٥- Acoustic Design of Buildings
Principles of acoustic design - Examples.