Supplement to Outcome P8

MAPPING OF THE ABE PROGRAMME OF STUDIES IN ASIA

developed by Working Group 1
UNIVERSITIES IN ASIA OFFERING PROGRAMS OF STUDIES IN ABE OR RELATED DISCIPLINES

Antonio Comparetti
Dept. of Agricultural and Forestry Engineering and Technologies (ITAF),
University of Palermo, Italy

Palermo 2010
<table>
<thead>
<tr>
<th>University</th>
<th>Department</th>
<th>Program of Studies (links inside the document)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Scope of Program of Studies Undergraduate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Curriculum Studies</td>
</tr>
<tr>
<td><strong>University</strong></td>
<td><strong>Department</strong></td>
<td></td>
</tr>
<tr>
<td>CHINESE UNIVERSITIES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>China Agricultural University (CAU), Peking (Beijing)</td>
<td>College of Engineering. Departments: Mechanics and Aerospace Engineering, Biomedical Engineering, Energy and Resources Engineering, Industrial Engineering and Management, Advanced Materials and Nanotechnology</td>
<td>Bachelors of Science and Engineering (China Agricultural University)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Huazhong Agricultural University (HAU)</td>
<td>College of Engineering &amp; Technology. Departments: Agricultural Engineering, Mechanical Engineering, Electromechanical Engineering</td>
<td>Bachelors (Huazhong Agricultural University)</td>
</tr>
<tr>
<td>Institution</td>
<td>Departments/Colleges</td>
<td>Degrees Offered</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>South China Agricultural University (SCAU)</td>
<td>College of Engineering. Departments: Agricultural Engineering, Mechanics Engineering, Electronic Information Engineering, Vehicle Engineering, Automation, Engineering Basic Teaching, Continuing Education, Engineering Institute, Teaching Lab, Mechanics Engineering Centre</td>
<td>Bachelors (South China Agricultural University) 2 Bachelors: Agricultural Mechanisation and Automation; Electrical Engineering and Automation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 Masters (1 in Engineering). 6 PhD programs</td>
</tr>
<tr>
<td>Northwest Agriculture and Forestry University</td>
<td>Colleges: Water Resources and Architectural Engineering, Mechanical and Electronic Engineering, Food Science and Engineering</td>
<td>Bachelors (Northwest Agriculture and Forestry University) 15 Bachelors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 Masters. 5 PhD programs</td>
</tr>
<tr>
<td>Shandong Agricultural University (SDAU)</td>
<td>Colleges: Food Science and Engineering, Mechanical and Electronic Engineering</td>
<td>Bachelors (Shandong Agricultural University) 12 Bachelors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Masters. PhD programs</td>
</tr>
<tr>
<td>University</td>
<td>Department</td>
<td>Degree Programs</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Nanjing Agricultural University</td>
<td>Hydrology and Civil Engineering</td>
<td>Bachelors (Nanjing Agricultural University)</td>
</tr>
<tr>
<td></td>
<td>Faculty of Engineering. Faculty of Food Science and Technology</td>
<td></td>
</tr>
<tr>
<td>Jilin University</td>
<td>Division of Engineering. College of Biological and Food Science</td>
<td>Bachelors (Nanjing Agricultural University)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institutes</td>
<td>Engineering; Packaging Engineering; Bioengineering (Biological Resources); Agricultural Mechanisation and Automation</td>
<td>Power Engineering &amp; Engineering Thermophysics (Thermo-energy Engineering; Power Machinery &amp; Engineering); Hydraulic Engineering; Agricultural Engineering (Agricultural Mechanisation Engineering; Agricultural Water and Soil Engineering; Agricultural Bioenvironment and Energy Resource Engineering; Electrification and Automation of Agriculture); Food Science and Engineering (Food</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Agricultural Mechanisation Engineering, Engineering Bionics, Processing Technology and Analysis of Green Foods, Agricultural Biological Environment and Energy Resource Project, Agricultural Production Processing and Storage, Mechanical and Electrical Equipments, Jilin Provincial Pilot Scale Experimental Base of Terrain-Machine Bionics Technology and Bionic Function Materials Sino-French Joint Research Laboratory of High Technology Grain Processing, Precision Agriculture Research Centre</td>
<td>Engineering; Packaging Engineering; Bioengineering (Biological Resources); Agricultural Mechanisation and Automation</td>
<td>Power Engineering &amp; Engineering Thermophysics (Thermo-energy Engineering; Power Machinery &amp; Engineering); Hydraulic Engineering; Agricultural Engineering (Agricultural Mechanisation Engineering; Agricultural Water and Soil Engineering; Agricultural Bioenvironment and Energy Resource Engineering; Electrification and Automation of Agriculture); Food Science and Engineering (Food</td>
</tr>
</tbody>
</table>

http://en.jlu.edu.cn/University/MainPageAction_getAll.aspx
<table>
<thead>
<tr>
<th>Education and Research in Biosystems Engineering in Europe; a Thematic Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agreement No.: 2007-2564/001-001; Project No: 134306-LLP-1-2007-1-GR-ERASMUS-ENW</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td><strong>INDIAN UNIVERSITIES</strong></td>
</tr>
<tr>
<td><strong>Sam Higginbottom Institute of Agriculture, Technology &amp; Sciences (SHIATS)</strong></td>
</tr>
<tr>
<td><a href="http://www.aaidu.org/">http://www.aaidu.org/</a></td>
</tr>
<tr>
<td><strong>Faculty of Engineering &amp; Technology. Vaugh School of Agricultural Engineering &amp; Technology (VSAET).</strong></td>
</tr>
<tr>
<td>Departments: Soil, Water, Land Engg. &amp; Management; Farm Machinery &amp; Power Engineering; Food Process Engineering</td>
</tr>
<tr>
<td><strong>Bachelors (Sam Higginbottom Institute of Agriculture, Technology &amp; Sciences)</strong></td>
</tr>
<tr>
<td><strong>10 M.Tech.: Agricultural Engineering (Agricultural Process &amp; Food Engineering), Agricultural Engineering (Farm Machinery &amp; Power Engineering),</strong></td>
</tr>
<tr>
<td>Agricultural Engineering (Irrigation &amp; Drainage Engineering), Agricultural Engineering (Soil Water Conservation Engineering), Agricultural Water Management Energy Management, Remote Sensing and Geographical Information System (GIS), Agricultural Engineering (Renewable Energy), Water Resource Engineering, Food Technology Engineering (Food Process Engineering),</td>
</tr>
</tbody>
</table>
### ISRAELI UNIVERSITIES

<table>
<thead>
<tr>
<th>Institution</th>
<th>Faculty/Department</th>
<th>Program Options</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Israel Institute of Technology (Technion University)</strong></td>
<td>Faculty of Civil and Environmental Engineering. Department of Agricultural Engineering</td>
<td>Bachelor (Israel Institute of Technology)</td>
</tr>
</tbody>
</table>

### JAPANESE UNIVERSITIES

<table>
<thead>
<tr>
<th>Institution</th>
<th>Faculty/Department</th>
<th>Program Options</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tokyo University of Agriculture and Technology (TUAT)</strong></td>
<td>Faculty of Agriculture. Departments: Biological Production; Applied Biological Science; Environmental and Natural Resource Science; Ecoregion Science; Veterinary Medicine</td>
<td>Bachelor (Tokyo University of Agriculture and Technology)</td>
</tr>
<tr>
<td><a href="http://www.tuat.ac.jp/index-e.html">http://www.tuat.ac.jp/index-e.html</a></td>
<td>2 Bachelors: Eco-design; Environmental and Agricultural Engineering</td>
<td>Masters.</td>
</tr>
<tr>
<td></td>
<td>2 M.Sc.: Agricultural Engineering</td>
<td>PhD programs</td>
</tr>
<tr>
<td>Kyoto University</td>
<td>Graduate School of Agriculture. Divisions: Agronomy and Horticultural Science; Forest and Biomaterials Science; Applied Life Sciences; Applied Biosciences; Environmental Science and Technology; Natural Resource Economics; Food Science and Biotechnology. Faculty of Agriculture. Departments: Bioresource Science; Applied Life Sciences; Agricultural and Environmental Engineering;</td>
<td></td>
</tr>
<tr>
<td>Bachelors (Kyoto University)</td>
<td>Bachelors</td>
<td>Masters. PhD programs</td>
</tr>
</tbody>
</table>
| Education and Research in Biosystems Engineering in Europe; a Thematic Network
| Agreement No.: 2007-2564/001-001; Project No: 134306-LLP-1-2007-1-GR-ERASMUS-ENW |

<table>
<thead>
<tr>
<th>Okayama University</th>
<th>Faculty of Agriculture</th>
<th>Bachelors (Okayama University)</th>
<th>Bachelors</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Osaka Prefecture University (OPU)</th>
<th>School of Engineering. Departments: Mechanical Engineering; Aerospace Engineering; Marine System Engineering; Mathematical Sciences; Physics and Electronics; Electrical and Information Systems; Computer Science and Intelligent Systems; Applied Chemistry; Chemical Engineering;</th>
<th>Bachelors (Osaka Prefecture University)</th>
<th>Bachelors</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.osakafu-u.ac.jp/english/index.html">http://www.osakafu-u.ac.jp/english/index.html</a></td>
<td></td>
<td></td>
<td>Masters. PhD programs</td>
</tr>
</tbody>
</table>
**Materials Science.**
Graduate School of Engineering.
Departments:
- Mechanical Engineering;
- Aerospace and Marine System Engineering;
- Electronics, Mathematics and Physics;
- Electrical Engineering and Information Science;
- Materials Science and Engineering

**JORDANIAN UNIVERSITIES**

<table>
<thead>
<tr>
<th>Jordan University of Science and Technology</th>
<th>Faculty of Engineering. Departments: Biomedical Engineering; Aeronautical Engineering; Chemical Engineering; Civil Engineering; Electrical Engineering; Industrial Engineering; Mechanical Engineering; Nuclear Engineering Faculty of Agriculture.</th>
<th>B.Sc. (Jordan University of Science and Technology)</th>
<th>B.Sc. in Civil Engineering - Water Resources and Environment. B.Sc. in Mechanical Engineering - Thermal Power. B.Sc in Soil &amp; Irrigation.</th>
<th>M.Sc. in Civil Engineering - Water Demand Management. M.Sc in Civil Engineering - Water Resources &amp; Environment. M.Sc in Natural Resources &amp; Environment - Soil</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.just.edu.jo/Pages/default.aspx">http://www.just.edu.jo/Pages/default.aspx</a></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department</td>
<td>Water &amp; Environment. M.Sc. in Natural Resources &amp; Environment - Integrated Natural Resources Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Animal Production; Natural Resources and Environment; Nutrition and Food Technology; Plant Production</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MALAYSIAN UNIVERSITIES**

<table>
<thead>
<tr>
<th>University Putra Malaysia (UPM)</th>
<th>Faculty of Engineering. Departments: Aerospace Engineering; Civil Engineering; Biological and Agricultural Engineering; Electric and Electronic Engineering; Chemical and Environmental Engineering; Computer and Communication Systems Engineering;</th>
<th>B.Sc. (University Putra Malaysia)</th>
<th>Bachelor of Engineering in Agricultural and Biosystems Engineering</th>
<th>2 Master programs without thesis: Emergency, Response &amp; Planning; Water Management. 6 Master and 6 PhD programs with thesis: Soil &amp; Water Engineering; Safety, Health &amp;</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Korean Universities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seoul National University (SNU)</td>
<td>College of Agriculture and Life Sciences. Departments: Plant Science; Forest Sciences; Food and Animal Biotechnology; Applied Biology and Chemistry; Landscape Architecture and Rural System Engineering; Biosystems &amp; Biomaterials</td>
<td>Bachelors (Seoul National University)</td>
<td>2 Bachelors: Biosystems Engineering; Biomaterials Science.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.useoul.edu/">http://www.useoul.edu/</a></td>
<td></td>
<td>Master programs. PhD programs</td>
<td></td>
</tr>
</tbody>
</table>

**Mechanical and Manufacturing Engineering; Process and Food Engineering**

**Environment; Agricultural Mechanisation & Automation; Post-harvest Engineering; Farm Structure; Agricultural Waste Engineering**
| Science and Engineering; Agricultural Economics and Rural Development. Interdisciplinary Program in Agricultural Biotechnology |   |   |
Sources:

http://www.cau.edu.cn/cie/en/

http://www.hzau.edu.cn/en/home/

http://english.scau.edu.cn/envision2/Academics.asp

http://en.nwsuaf.edu.cn/

http://www.sdau.edu.cn/esdau/new/bi_gk.html

http://english.njau.edu.cn/common.php?Id=16

http://en.jlu.edu.cn/University/MainPageAction_getAll.aspx

http://www.study-in-china.org/SchoolSearch/SearchList.asp?SearchType=SearchIndex

http://www.winentrance.com/search/?q=Agricultural+Engineering+Courses

http://www.technion.ac.il/technion/agr/

http://www.tuat.ac.jp/index-e.html

http://www.kais.kyoto-u.ac.jp/english/
http://www.lif.kyoto-u.ac.jp/e/

http://mama.agr.okayama-u.ac.jp/english/index.html

http://www.osakafu-u.ac.jp/english/index.html

http://www.just.edu.jo/Pages/default.aspx

http://www.eng.upm.edu.my/

http://www.useoul.edu/

http://calseng.snu.ac.kr/eng/default.asp
A. SCOPE OF PROGRAM OF STUDIES

A1. Bachelors of Science and Engineering (China Agricultural University)

China Agricultural University (CAU), directly subordinated to the Ministry of Education, is a Key National University. As the origin of agricultural Higher Education, China Agricultural University's history could be traced back to 1905, when the College of Agriculture was founded in the former Jingshi Da Xuetang. The Beijing Agricultural University (BAU) was established in 1949, by merging of Peking University's College of Agriculture, Tsinghua University's College of Agriculture and North China University's College of Agriculture. In 1952 BAU’s Department of Agricultural Machinery, North China College of Agricultural Machinery and Ministry of Agriculture's Central Agricultural Mechanisation School merged together to form the Beijing Mechanized Agricultural College, which was renamed Beijing Agricultural Mechanisation Institute (BAMI) in 1953. In 1985 the BAMI was renamed again as Beijing Agricultural Engineering University (BAEU). In 1995, under the approval of the State Council, BAU and BAEU merged together to form the China Agricultural University (CAU). Based on a 100-year history, CAU covers a wide range of disciplines on a complementary basis, such as agriculture and life science, resources and environment, information and computer science, agricultural engineering and automation science, economic management and social sciences, etc. Currently, CAU is composed of 13 Colleges involving in 9 categories of agronomy, engineering, science, economics, law, literature, medicine and philosophy. In addition, CAU also has a Graduate School and a School of Continuing Education. Speaking educational sector, CAU owns 19 Key State Disciplines, 15 Key Ministerial Disciplines and 10 Post-Doctor Working Stations. A number of key labs were also established in CAU, including 3 Key State Labs, 22 Key Ministerial Labs, 4 State Research Centres, 10 Ministerial Research Centers and 5 Innovative Research Teams. CAU has so far established a complete and harmonised system for BSc, MSc and PhD education. The goal of the undergraduate programs offered by the College of Engineering is to educate future leaders in Engineering practice, research and education, provide each student with a good balance of intellectual and practical experiences, and accumulation of knowledge. Students are required to complete the curriculum for 4 years and fulfill the designated hours of credits. During the first year, students study some common core courses. Students enjoy flexibility in making decision on the program after the first year and have sufficient time to choose the program they like. Students are free to choose from 4 programs (Bachelor of Science in Theoretical and Applied Mechanics, Bachelors of Engineering in Engineering Structure Analysis, Energy and Resource Engineering, Aerospace Engineering) after being admitted.
The undergraduate programs offered by the College of Engineering are designed to provide background for a wide variety of careers. Most of the graduates pursue further their studies enrolling either for a research program or another postgraduate program. Graduates at all degree levels have traditionally entered energy industries, product manufacturing industries, transportation, commercial banks, government and a variety of academic positions.

A2. Bachelors (Huazhong Agricultural University)

Within Huazhong Agricultural University the College of Engineering & Technology was set up in 1997, originating from the Department of Agricultural Machinery of Huazhong Agricultural College of 1958, and now has 3 Departments: Agricultural Engineering, Mechanical Engineering and Electromechanical Engineering. The College offers 4 undergraduate degree study programs, 3 Masters and 1 PhD program.

A3. Bachelors (South China Agricultural University)

Within South China Agricultural University the College of Engineering was set up in 1992 and consists of:

- Department of Agricultural Engineering;
- Department of Mechanics Engineering;
- Department of Electronic Information Engineering;
- Department of Vehicle Engineering;
- Department of Automation;
- Department of Engineering Basic Teaching;
- Engineering Institute;
- Teaching Lab;
- Mechanics Engineering Centre;
- Department of Continuing Education.

It also has 1 post-doctoral research station in Agriculture Engineering and offers 10 Bachelor programs, 6 Master programs, 1 Engineering Masters and 6 PhD programs. Agricultural Mechanisation Engineering is the key discipline of the Ministry of Agriculture and Guangdong Province. In recent years the College has built teaching labs, bought a large quantity of instruments and facilities for experiments and teaching. For long time the College has carried out international cooperative projects and national scientific ones. The College has established wide academic exchange and cooperative relationships in scientific research with other Universities of foreign countries, such as Silsoe College and Silsoe Institute (UK), Kentucky University (USA), National Agriculture Research Centre (France), Tokyo University (Japan), etc.

Undergraduate education is the basis for training professionals of high quality and flexibility. SCAU aims at a quality education which stresses the importance of a solid foundation and a well-balanced knowledge structure of students. The management mechanism for undergraduate students is based on students' fulfilling credits, required for both a major and a minor to receive double degrees at the end of their studies.
A4. Bachelors (Northwest Agriculture and Forestry University)

Currently at Northwest Agriculture and Forestry University 18 Colleges of Northwest A&F University offer 64 4-year undergraduate programs, covering 11 academic disciplines in agriculture, science, engineering, economics, management, literature, law, philosophy, medicine, history and education.

The **College of Water Resources and Architectural Engineering** offers the following 8 Bachelor programs:

- Agricultural Water Conservancy Engineering;
- Hydrology and Water Resource Engineering;
- Civil Engineering;
- Water Conservancy and Hydropower Engineering;
- Thermal Energy and Power Engineering;
- Electrical Engineering and Automation;
- Urban Planning;

The **College of Mechanical and Electronic Engineering** offers the following 5 Bachelor programs:

- Agricultural Mechanisation and Automation;
- Machine Design & Manufacturing and Their Automation;
- Mechatronic Engineering;
- Electronic Information Engineering;
- Packaging Engineering.

The **College of Food Science and Engineering** offers the following 2 Bachelor programs:

- Food Science and Engineering;
- Food Quality and Safety Engineering.

The University established a national training base for life science and technology, and an experimental base for innovative talent cultivation and has formed talent training modes of undergraduate-master and master-doctor, by practicing cultivation mode of “2+X” with a flexible credit system.

In order to ensure individualised education for students, innovation funds have been set up, and in order to instruct students in their study and career design, a tutor system has been implemented. Meanwhile a complete subsidy system has been established, in order to reward the excellent and subsidise needy students.

Northwest A&F University is actively working to expand international cooperation and exchange in education, science and technology. Currently the University has established cooperative relationships with over 60 universities and research institutes from 30 countries or regions, such as U.S., U.K., Japan and Australia, and signed agreements to exchange students and study abroad. The University also has obtained support from some international foundations on study abroad and is entitled to receive international students supported by the Chinese Government Scholarship.

The graduates get employed across China. Every year about 30% of the graduates pass the graduate entrance exams and continue their study. In recent years the employment rate has
been over 93%, ranking top among the Universities directly under the jurisdiction of the Chinese Ministry of Education.

A5. Bachelors (Shandong Agricultural University)

Within Shandong Agricultural University the College of Food Science and Engineering offers the following 3 Bachelor programs:

1) Food Science and Engineering

The objective of this specialty is to cultivate the applied and compound qualified professionals, who can adapt to the industrialisation, urbanisation and national economic construction in China. They will not only master fundamental theory and skills of food science, food processing and storage, but also the theory and technology of food engineering, food packaging, food analysis and sanitation testing and food enterprise management. The related graduates are capable of doing material processing, edible oil processing, livestock product processing, freezing and refrigeration of fruits and vegetables, food analysis and testing and food enterprise management.

2) Food Quality and Safety

The objective of this specialty is to cultivate the applied and compound qualified professionals, who can adapt to people’s health. They will not only master fundamental theory and skills of food science, food testing and analysis, food safety and evaluation, environmental science and animal and plant production, but also the capability and quality of doing food analysis and testing, food safety and evaluation, food quality control and scientific research, and will be familiar with international food quality and safety standard system. The related graduates can obtain job positions in food quality and safety testing, evaluation, controlling, supervising, etc.

3) Grapes and Wine Engineering

The objective of this specialty is to cultivate the applied and compound qualified professionals, who can adapt to the industrialisation, urbanisation and national economic construction in China. They will master principles and skills of grape planting and management, brewing of all kinds of wines, and designing and managing the techniques of all kinds of wine factories. The related graduates are capable of doing wine production, marketing and trading, extension of wine culture, new product development, mechanical and engineering designing and management of wine factories.

The College of Mechanical and Electronic Engineering offers the following 6 Bachelor programs:
1) **Electrical Engineering and Automation**

Objective of this specialty is to cultivate the applied and compound qualified professionals with solid technology of electric engineering, information controlling and computer applications. They will master the skills of connecting strong with weak electric current, connecting electrician technology with electric technology, connecting software with hardware, and connecting element with system. They are competent to work in designing, exploring and managing of system running, automatic control, electric power and electric technology, signal disposal, electric and computer technology applying, testing and automatic instrument.

2) **Communication and Transportation**

Objective of this specialty is to cultivate the applied and compound qualified professionals with solid foundations of mechanics. They will master the basic knowledge and basic skill of using, refitting, repairing and capability testing of automobile. They are competent to work in automobile transportation, managing, using and capability designing.

3) **Agricultural Mechanisation and Automation**

Objective of this specialty is to cultivate the applied and compound qualified professionals with solid foundations of mechanics. They will master machine designing and making, micro-electronics, computer principles and applications. They are competent to work in machine designing and making, agricultural machine production and design techniques, exact machine and equipment designing, making, using, repairing and appraisal, etc.

4) **Automation**

Objective of this specialty is to cultivate the applied and compound qualified professionals with solid foundations of electric technology, controlling theory, automatic testing and instrument, information processing, computer technology application and network technology. They will master machine running control, industrial process control, electric technology, automatic testing and instrument, information processing, managing and decision-making. They can obtain job positions in system analysis, system designing, system running, scientific and technological extension, scientific research.

5) **Mechanical and Electrical Engineering**

The characteristic of this specialty is to integrate machine with electrics. Objective of this specialty is to cultivate the applied and compound qualified professionals with solid foundations of mechanical engineering and micro-electronics. They will master the basic skills of machine design, machine making, testing and controlling, information processing, and computer technology application. They can obtain job positions in operating integrated
instruments of linking machine, electricity, liquid and gas, and designing, developing, research and managing.

6) **Vehicle Engineering**

Objective of this specialty is to cultivate the applied and compound qualified professionals with solid foundations of mechanics, electronics, modern auto-structure and electric controlling technology. They will master the designing theory and skills of modern automobile. They will not only be competent in designing, making, scientific and technological development, capability testing, malfunction diagnosing and repairing, managing and marketing of modern automobile, but also computer skills.

The **College of Hydrology and Civil Engineering** offers the following 6 Bachelor programs:

1) **Hydraulic and Hydro-Power Engineering**

Objective of this specialty is to cultivate the high-class hydrology technology professionals with solid foundations of mathematics, mechanics, hydrology and hydro-electric engineering. The related graduates can work in Departments of hydrology, hydro-electric, civil engineering, traffic, city planning, water supply and agriculture, in water power engineering construction, irrigation equipment, water-saving irrigation, civil engineering, traffic, engineering reconnaissance, etc.

2) **Hydrology and Water Resources Engineering**

Objective of this specialty is to cultivate the high-class hydrology technology professionals with solid foundations of natural science and social science, and with good ability of computer and foreign languages. The related graduates can obtain job positions in reconnaissance, programming, design, management of hydrology, water resources, water environment, etc.

3) **Civil Engineering**

Objective of this specialty is to cultivate the applied and compound high-class professionals with solid foundations, good qualities and abilities of practice and innovation. This specialty is focused on civil engineering structure designing, constructing technology and constructing management. The related graduates can work in Departments of civil engineering, traffic, city planning, and hydrology, engineering reconnaissance, programming, designing, management, etc.

4) **Water-Supply and Drainage Engineering**

Objective of this specialty is to cultivate the applied and compound high-class professionals with solid foundations of water-supply and drainage engineering, good qualities and abilities
of practice and innovation. Students will accept the basic training as engineers. The related graduates can work in city construction bureau, city planning bureau, environment protection bureau, water resources protection bureau or other administrations, in construction, hydrology, chemical industry or other design units, in sewage disposal factories, purified water factories, real estate company and scientific research units. They can obtain job positions in water exploitation, processing, transportation and recycle, sustainable program, plan and construction, drainage reconnaissance, teaching, scientific research, etc.

5) Architectural Environment and Equipment Engineering

Objective of this specialty is to cultivate the applied and compound high-class professionals with good qualities and abilities of practice and innovation, solid foundations and skills of architectural environment and equipment engineering drainage engineering. Students will master skills of designing, construction and management of industry buildings, civil buildings (central heating and air-conditioner dredge, gas supply, buildings water supply and drainage), and city public facilities (city gas supply system, city heat energy supply system), building intelligentising and construction facilities automatisation. The related graduates can work in design institutes, scientific research institutes and Universities, Departments of city planning, fire protection, quality monitoring and environment evaluation, gas, energy, engineering and real estate companies, etc. They can obtain job positions in engineering design, scientific research, products exploiture, engineering construction, etc.

6) Road Bridge and River Crossing Engineering

Objective of this specialty is to cultivate the applied and compound high-class professionals with good qualities and abilities of practice and innovation, solid foundations of mathematics, mechanics, natural science, engineering technology, road bridge and river crossing engineering. They will not only master the basic knowledge of humanities and social sciences, regulations and laws, business administration, but will also be familiar with new theory and development actuality of this specialty in China and abroad. The related graduates can work in government planning departments, business administrations, construction units, design institutes, Universities, in planning, design, operation, investment, engineering consultation, engineering monitoring and teaching of road bridge and river crossing engineering.

A6. Bachelors (Nanjin Agricultural University)

The College of Engineering of Nanjing Agricultural University (NAU) traces its origin back to the 2 Departments of Agricultural Engineering at Central National University and Jinling University in 1940s. It is one of the earliest establishments in the field of Agricultural Engineering in China. In the restructuring of institutes of Higher Education in 1952, the 2 above mentioned Departments were merged to form the Department of Agricultural Mechanisation of Nanjing Agricultural College. In 1958 the Department developed into the Agricultural Mechanisation Branch of Nanjing Agricultural College, by merging with Nanjing Agricultural Mechanisation School of Jiangsu Province. In 1970 the Agricultural Mechanisation Branch was moved to Zhenjiang, a city 90 km away from Nanjing, and in
1985 it came back to its previous premise at Puzhen, Nanjing, and changed its name into the College of Agricultural Engineering of Nanjing Agricultural University. In 2000 the College was renamed as the College of Engineering of Nanjing Agricultural University.

The College is in Pukou campus, located at North bank of Yangtze River and 25 km from the main campus of Nanjing Agricultural University. Over many years’ construction and development, the College has obtained sound operating environment and resources.

The College consists of the following 6 Departments:
1) Agricultural Mechanisation;
2) Mechanical Engineering;
3) Electrical Engineering;
4) Management Engineering;
5) Basic Courses;
6) Training and Further Education.

Now the College offers 10 B.Sc. programs (Agricultural Mechanisation and Automation, Transportation Machinery Design, Manufacture and Automation, Industrial Designing, Material Molding and Control Technology, Agricultural Electrification and Automation, Automation, Electronic Information & Technology, Industrial Engineering, Logistics Engineering), 5 M.Sc. programs (Theory and Design of Machinery, Agricultural Mechanisation Engineering, Agricultural Bioenvironmental Engineering and Rural Energy, Agricultural Engineering, Agricultural Mechanisation) and 1 PhD program (Agricultural Mechanisation Engineering).

Over the recent 5 years the academic staff of the College has undertaken more than 50 national and provincial research projects and many cooperation research projects with other institutes and enterprises.

A7. Bachelors (Jilin University)

Within the Division of Engineering the College of Biological and Agricultural Engineering is a key training centre for specialists in Biological Engineering, Food Science and Engineering, Packaging Engineering, Mechanisation and Automation of Agriculture.

The undergraduate programs started in the 1950s, while the graduate programs started in the 1960s. It is one of the first institutions authorised by the State to confer doctoral degrees and is now offering post-doctoral programs.

The College is a multi-disciplinary institution, combining engineering and management, and covering agricultural engineering, food sciences, agricultural economic management, etc.

The State key discipline is Agricultural Mechanisation Engineering.

The Agricultural Mechanisation Engineering program has been awarded 2 national prizes and 22 provincial and ministerial prizes.

A8. Bachelors (Sam Higginbottom Institute of Agriculture, Technology & Sciences)

In 2009, as a tribute to the founder Dr. Sam Higginbottom, the Ministry of Human Resource Development of India has permitted Re-Christening of the Allahabad Agricultural Institute-Deemed University as: “Sam Higginbottom Institute of Agriculture, Technology & Sciences” (formerly Allahabad Agricultural Institute).
The Sam Higginbottom Institute of Agriculture, Technology & Sciences (SHIATS) is striving to acquire a place in the arena of International Science and Technology, while holding a pioneering status in India.

This institute is a united endeavor of the Christian community in India for promoting rural life and development in conformity with the Christian vision of human kind and the creation.

The University is constituted by the following Faculties:

- Agriculture;
- Engineering & Technology;
- Science;
- Business Studies;
- Veterinary Sciences & Animal Husbandry;
- Theology;
- Humanities, Social Science, Arts & Culture;
- Film, Media Studies & Technology;
- Health, Medical Sciences, Indigenous & Alternative Systems of Medicine.

Within the Faculty of Engineering & Technology the **Vaugh School of Agricultural Engineering & Technology (VSAET)** is committed to academic excellence in undergraduate and postgraduate education and research programs across a broad spectrum of disciplines in Agricultural Engineering.

This School was opened in 1943 and it became the pioneer to offer Agricultural Engineering degree in the whole of Asia and fourth in the world.

The study program emphasises a basic knowledge as well as its application. Programs cover the current frontiers of technology, along with learning to develop strong programs to meet the educational objectives. The School has a broad spectrum of disciplines, such as Soil and Water Engineering, GIS and Remote Sensing, Farm Machinery & Power Engineering, Food Process Engineering and Renewable Energy. The subject and skills learnt help students to play positive academic and professional roles in solving natural resource management problems. The School's mission of teaching, research and extension works to provide social, cultural and economic benefits to India and beyond. The School is a regionally and internationally reputed institution, offering unmatched comprehensiveness, diversity and quality.

The Vaugh School of Agricultural Engineering & Technology takes a flexible approach to its fields of study in M.Tech. and PhD programs and will be subject to resource requirements and students backgrounds, attempt to accommodate individuals. In addition to the 8 conventional fields of study, a student enrolled in any academic program, following the suggestion of his/her academic advisor, can select a combination of courses from the 8 fields of study, as well as some courses from other Schools, in order to fulfill the required background for research in the area of the interest.

The core values of the School are Excellence, Innovativeness, Interdisciplinary and Responsiveness.

This School consists of the following 3 Departments:

- Soil, Water, Land Engineering & Management;
- Farm Machinery & Power Engineering;
- Food Process Engineering.
The Sam Higginbottom Institute of Agriculture, Technology & Sciences also strives to prepare its students to take their places as farm managers, agricultural scientists, agricultural officers, extension workers, managers, educators, agricultural administrators, agricultural scientists, bio-technologists, microbiologists, biochemists, engineers, software professionals, dairy technologists, nutritionists, textile designers, theologians and pharmacists.

A9. Bachelors (Israel Institute of Technology)

The major task of Agricultural Engineering and, therefore, also of the Department of Agricultural Engineering of Israel Institute of Technology (Technion University) is to apply technological and engineering tools to increase the agricultural production and efficiency, improve product quality, while preserving the quality of the environment. Agricultural Engineering is applied to land development for new agricultural projects. It is responsible for enhancing the agricultural production by optimising irrigation, drainage and soil conservation. The Department of Agricultural Engineering pursues the development of new production and control systems, such as greenhouses and automated post-harvest processing methods. In fact, Israel, where high technology agriculture is practiced under conditions of limited water supply, develops and exports new varieties of agricultural products, agriculture-related industrial products and systems, and advanced know-how. In the future modern agriculture in Israel will face new challenges, following the peace process between Israel and its neighbours.

A10. Bachelors (Tokyo University of Agriculture and Technology)

The Faculty of Agriculture of Tokyo University of Agriculture and Technology has more than 120 years' history. The Faculty offers a diverse and wide range of specialties, in order to cover not only the original subjects but also humanities and sociology. This fact is highly beneficial to push ahead with the education and research, which aim at the harmonised development of analyses and syntheses of issues of food, resources and environment. Other features of this Faculty are: the system of credit interchange with 5 national Universities in the Tama district, the positive driving of international cooperation through 23 sister schools, and field education using nature in the attached institutes outside the campus. The Faculty consists of the following 5 Departments:

1) Biological Production;
2) Applied Biological Science;
3) Environmental and Natural Resource Science;
4) Ecoregion Science;
5) Veterinary Medicine.

The Department of Ecoregion Science is constituted by the following Divisions:

- Eco-design;
- Forest Environment;
- Environmental and Agricultural Engineering;
- Human and Social Studies of Man-Nature Relation.
A11. Bachelors (Kyoto University)

Since its founding, Kyoto University has been deeply committed to the principles of liberal education and academic freedom. In line with these principles, the Graduate School of Agriculture and the Faculty of Agriculture pursue education and research with the aim of contributing to the harmonious coexistence of the global community, by solving various challenges facing humankind, including the continuity of life from a generation to another, a stable supply of safe and high quality food, reduced environmental degradation and restoration. Therefore, both the Graduate School of Agriculture and the Faculty of Agriculture aim at nurturing capable human resources.

The Faculty of Agriculture is constituted by members of society who possess academic knowledge of agricultural sciences and related disciplines and a high sense of ethics, as well as the following capabilities:

- to think from a broad perspective about solutions for problems facing humankind;
- to understand the significance and importance of agriculture, forestry and fisheries industries, as well as food and life science-related industries, and to contribute to the development of these industries;
- to understand world-class research in natural and social sciences related to life, food and environment.

The Graduate School of Agriculture is constituted by educators, researchers, professional engineers working in businesses/public institutions, administrative officials/policy makers who have acquired highly specialised knowledge and research skills, by deepening their knowledge and sense of ethics through studies at the Faculty, and have a strong sense of mission to fulfill the following commitments:

- to play a leading role in creative scientific research for the clarification of life phenomena, production and use of living organisms, and environmental conservation at local and global levels;
- to achieve technological innovation that will contribute to the development of agriculture, forestry and fisheries industries, as well as to food and life science-related industries;
- to work on various problems facing modern society and proposing the ideal state of society, as well as measures to attain the sustainable development of society, while minimising the impact on the environment.

Within Kyoto University the Graduate School of Biostudies was opened in 1999 as the first independent graduate school for life science in Japan. The mission of this school is to nurture individuals who can assess the future of life and its dignity by attempts to constructively integrate and understand humans, animals, plants and the environment, through studies of the cells and genes, the constituent units of the living body. In this way the individual is to be naturally nurtured to have respect for human dignity and concern for the environment.

The Graduate School of Biostudies has the purpose of training people capable of supporting the human society in the 21st century, based on a general understanding of the life sciences. The Graduate School of Biostudies pursues the following 3 objectives:

1) to provide education for pursuing the new biostudies at the world top level;

28
2) to train individuals to apply the new life sciences for the protection of the global environment and for the human welfare;
3) to nurture individuals who can understand the various vital phenomena of the living organisms as a systemic function, and pursue these systemic functions.

In order to meet the demands of the changing society in the 21st century, which will be impossible to cope with in the current research academic system for the life sciences, a new research and education system is established, to breakdown the walls that have hindered the research in the life sciences in the past.

The Graduate School of Biostudies offers 2 degree study programs:
1) one dealing with cell development, cell growth, genetic information and cell cycle regarded as a multicellular system, and the totipotency, the mechanism of signal transduction and the responses among the cell, living being and environment, and offered by the Division of Integrated Life Sciences;
2) another dealing with neuroscience, animal development and physiology, immunobiology and others, and offered by the Division of Systemic Life Sciences.

Studies on life sciences have been highly developed for realising a better future of humankind. The school, as typified by the words “Cell, Molecule and Gene”, has been involved in the investigations on living organisms and their influences onto earth and human society by joining the fields of biology, medicine, pharmacology and other related areas.

The Graduate School of Biostudies aims at developing the following 3 human resources for realising better future of mankind:
1) researchers who pursue basic study in biology and its related field at the world-class level;
2) Engineers who work for global environmental protection, human health, welfare and happiness;
3) educators and strategists who contribute to the human society on the basis of their knowledge and experiences on life sciences at the educational institutes, industries, media and public administrations.

A12. Bachelors (Okayama University)

In the laboratories of Engineering in Agricultural and Biological systems (Laboratory of Agricultural Systems Engineering and Laboratory of Agricultural Machinery), the challenges are to solve the problems in agricultural and biological systems and to construct new bio-production systems through engineering methodologies.

It is needed that research objects are not only a mechanical system handling biological objects but also biological materials such as a growing plant and animal, a harvested plant and fruit, etc., in order to construct a new bio-production system. However, the properties of biological objects have high complexity and diversity. Even the behaviour of the same plant variety is often different, depending on time and place. Therefore, it is essential to measure and investigate physical, physiological and chemical properties of each object and to match them.

Simultaneously, some properties of growing plants and animals are changeable by environmental controls. For instance, cultivation methods and plant training systems have been changed, so that quality and quantity of products can be improved. When a new plant cultivation system is constructed with a new machine the cultivation method and the plant
training system should be changed, so that not only human beings but also the machine can work smoothly. In order to change them, it is essential to know the limitation of the plant potential capabilities to be changed.

Based on the fundamental measurement of the biological objects, the goals of the Laboratory of Agricultural Systems Engineering and Laboratory of Agricultural Machinery are the following:

- to carry out bio-production controls for improving its productivity;
- to automate and robotise bio-production operations for solving the labour shortage and for improving the quality of products and productivity;
- to develop new bio-production systems using new machines and robots;
- to construct controlled environment food production systems.

A13. **Bachelors (Osaka Prefecture University)**

Osaka Prefecture University (OPU) is located in the heart of Japan, in Kansai area. In 1949 the former Osaka Prefecture University (Naniwa University) was established by the merging of 7 technical schools. It placed a strong emphasis on “practical learning”, thus offering the courses in the areas of engineering, agriculture, economics, integrated arts and sciences and social welfare. Also in 1949 Osaka Women’s University was established in order to provide innovative education and research, that is still highly internationally evaluated in the area of women's studies today, producing a great number of women leaders.

In 1949 Osaka Prefecture College of Nursing was founded in order to develop advanced clinical specialists who can meet the fast changing needs of the medical field in an age of the declining birthrate and aging population. It originally started as Osaka Prefecture Junior College of Nursing in 1978.

In 2005 Osaka Prefecture University became a public University corporation through the integration of the former Osaka Prefecture University, Osaka Women’s University and Osaka Prefecture College of Nursing.

Within Osaka Prefecture University the **School of Engineering** aims at nurturing world-class researchers who can contribute to the development of science and technology. TECHNOVATION, which is a combination of technology, technopolis (technological metropolis) and innovation, is the challenge for cutting edge technological and scientific researchers at both the School of Engineering and the Graduate School of Engineering.

The School of Engineering is constituted by the following 10 Departments:

1) Mechanical Engineering;
2) Aerospace Engineering;
3) Marine System Engineering;
4) Mathematical Sciences;
5) Physics and Electronics;
6) Electrical and Information Systems;
7) Computer Science and Intelligent Systems;
8) Applied Chemistry;
9) Chemical Engineering;
10) Materials Science.
Within Osaka Prefecture University the **Graduate School of Engineering** is constituted by the following 5 Departments:

1) Mechanical Engineering;
2) Aerospace and Marine System Engineering;
3) Electronics, Mathematics and Physics;
4) Electrical Engineering and Information Science;
5) Materials Science and Engineering.

The Graduate School of Engineering offers 2 programs:

1) a Master program (normally 2 years);
2) a PhD program (normally 3 years).

A high level of knowledge and analytical ability is attained through attendance of courses and seminars given by the academic staff and through independent specialised research. The time required for the completion of the courses may be shortened for outstanding students.

### A14. Bachelors (Jordan University of Science and Technology)

Within the Jordan University of Science and Technology the **Faculty of Engineering** has the vision towards a leading College in quality engineering education and applied research.

The mission of this Faculty is to provide students with a broad stimulating and rigorous engineering education, professional skills, basic and applied research, and knowledge that will enable them to succeed in future careers, adapt to the working environment, deal with the challenges of the local, regional and global marketplace, and support the comprehensive sustainable national development plans.

This Faculty pursues the following objectives:

- to attain and maintain excellence and leadership in undergraduate and graduate education;
- to develop more student-centered programs;
- to provide a world class curriculum;
- to establish a state-of-art infrastructure for teaching and research;
- to build excellence in research and scholarship for graduate programs;
- to communicate and collaborate more effectively with the local industries and community;
- to build and improve alumni relations.

The Faculty of Engineering is constituted by the following 8 Departments:

- Biomedical Engineering;
- Aeronautical Engineering;
- Chemical Engineering;
- Civil Engineering;
- Electrical Engineering;
- Industrial Engineering;
- Mechanical Engineering;
- Nuclear Engineering.

Within the Jordan University of Science and Technology the **Faculty of Agriculture** has the vision towards a distinguished college of Agriculture, that will be recognised for excellence
in education, scientific research and leadership in food, agricultural and environmental sciences in Jordan and around the globe.

The mission of this Faculty is to offer outstanding agricultural education, scientific research and extension programs, in order to bring sustainable agriculture that fulfills the current needs, without affecting the needs of future generations, and to prepare students to become well qualified future agronomists having high-standard education, knowledge and skills, in order to enhance sustainable food, agricultural, community and natural resource systems.

This Faculty pursues the following objectives:

- to prepare graduates having scientific and practical skills and competencies and, therefore, capable of serving the agricultural sector in Jordan and the Arab region;
- to develop graduate programs and enable students to master methods and techniques of scientific research and its agricultural applications;
- to carry out basic and applied research, aimed at increasing the productivity of agriculture in Jordan and preserving the environment, while maintaining the optimal use of natural, agricultural and food resources used in production processes;
- to offer a Community service through the development of expertise in the Faculty, accessible to stakeholders and the community.

The Faculty of Engineering is constituted by the following 4 Departments:

- Animal Production;
- Natural Resources and Environment;
- Nutrition and Food Technology;
- Plant Production.

A15. Bachelors (University Putra Malaysia)

The Faculty of Engineering of Universiti Putra Malaysia (UPM) was established in 1975 at the main Serdang Campus, about 22 kilometers southbound of Kuala Lumpur. It is one of the largest Faculties at UPM. The campus location, in the heart of the Multimedia Super Corridor (MSC), provides the Faculty with the excellent access to the array of IT and multimedia facilities available in the Corridor. With the UPMNET providing sophisticated campus-wide broadband ATM network, coupled with the computing facilities at the Faculty, students and staff have ready access to the latest in IT, Multimedia, CAD/CAM and internet facilities.

The Serdang Campus, called “green campus”, aesthetically encapsulates UPM’s history as the nation’s first agriculture college. The 8 academic Departments housed within the Faculty offer a similar number of Bachelor of Engineering degree study programs. The Faculty is proud of the international character of its student population: almost 50% of postgraduate students are international.

Moreover, the Faculty has established a Research Centre for R&D on selected priority areas of Engineering and its related fields.

The Faculty of Engineering of UPM aims at being a leading institution for the development of Engineering in the world.
In order to achieve this vision, this Faculty will:

- develop the art and science of Engineering for the well-being of mankind;
- educate Engineers to high standards of scientific, managerial and professional competence in harmony with the environment;
- share its knowledge and skills with communities throughout the world.

The staff of the Faculty of Engineering of UPM are committed towards excellence through the practice of quality culture in teaching, research work and professional consultancy, through a continually improved quality management system, in order to meet customers’ expectations by:

- preparing and working on continuous improvement in all aspects of teaching, research work and professional consultancy in line with the highest global standards and practice;
- preparing quality Higher Education programs, in order to improve the learning of knowledge, in conformity with the Nation’s inspirations on development;
- enriching research fields with new findings that can improve the quality of life and the Nation’s economic development;
- establishing an efficient and effective quality management and a dynamic working and learning environment, in order to allow the staff and students to be more open-minded and develop their utmost potential;
- preparing professional consultancy to improve management effectiveness;
- providing equal space and opportunities to all individuals, despite their different beliefs, races and religions, in order to obtain quality Higher Education.

A16. **Bachelors (Seoul National University)**

Throughout its century-long history of education and research, the College of Agriculture and Life Sciences of Seoul National University has been the leading centre for Korean agriculture. It is well known for its dedication to the development and dissemination of scientific knowledge in many academic and professional fields.

The College of Agriculture and Life Sciences consists of the following Departments:

- Plant Science;
- Forest Sciences, Food and Animal Biotechnology;
- Applied Biology; Landscape Architecture and Rural System Engineering;
- Biosystems & Biomaterials Science and Engineering;
- Agricultural Economics and Rural Development;
- Interdisciplinary Program in Agricultural Biotechnology.

The Department of Biosystems & Biomaterials Science and Engineering, a promising engineering field fusing engineering, biology and biotechnology, offers 2 Bachelor programs: Biosystems Engineering and Biomaterials Engineering.

In the 21st century bio-related technologies are predicted to lead science and technology research. Accordingly, qualified men and women equipped with knowledge on both engineering and biotechnology are highly demanded.
The Department of Biosystems and Biomaterials Science and Engineering applies electric and electronic engineering, nanotechnologies, materials engineering, mechanical engineering and bioinformatics technology to biological products and materials. The Biomaterials Engineering major, based on biotechnology and material engineering, focuses its research and education on the development of new biomaterials and environmentally friendly biodegradable materials, biomaterials for artificial organs, biochips, and many other unique applications. The Biosystems Engineering major has branches of biomechanics, bio-processing, bio-production engineering, bio-environmental engineering, biosensors, and bioinformatics, and focuses its research and education on the development and optimisation of the biosystems. The extensive interdisciplinary research and excellent education programs will give much needed vision to future leaders in bio-related technology and unlimited prospects for scientists and Engineers in both education and industry.
## B. UNDERGRADUATE CURRICULA

### B1. Bachelors of Science and Engineering (China Agricultural University)

The courses included in the core of the Bachelor degree study programs are shown in the following table.

<table>
<thead>
<tr>
<th>N.</th>
<th>Course name</th>
<th>Credits</th>
<th>Hours per week</th>
<th>Total hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fluid Mechanics (A) (1)</td>
<td>2</td>
<td>3</td>
<td>51</td>
</tr>
<tr>
<td>2</td>
<td>Experiments in Solid Mechanics (1)</td>
<td>3</td>
<td>3</td>
<td>51</td>
</tr>
<tr>
<td>3</td>
<td>Experiments in Fluid Mechanics (2)</td>
<td>3</td>
<td>3</td>
<td>51</td>
</tr>
<tr>
<td>4</td>
<td>Theory of Vibration</td>
<td>3</td>
<td>3</td>
<td>34</td>
</tr>
<tr>
<td>5</td>
<td>Ordinary Differential Equations</td>
<td>3</td>
<td>4</td>
<td>68</td>
</tr>
<tr>
<td>6</td>
<td>Methods in Mathematical Physics (2)</td>
<td>2</td>
<td>3</td>
<td>51</td>
</tr>
<tr>
<td>7</td>
<td>Engineering Fluid Mechanics</td>
<td>2</td>
<td>3</td>
<td>51</td>
</tr>
<tr>
<td>8</td>
<td>Structural Mechanics and its Matrix Method</td>
<td>3</td>
<td>4</td>
<td>64</td>
</tr>
<tr>
<td>9</td>
<td>Aircraft Dynamics</td>
<td>2</td>
<td>2</td>
<td>32</td>
</tr>
<tr>
<td>10</td>
<td>Calculus I</td>
<td>4</td>
<td>4</td>
<td>64</td>
</tr>
<tr>
<td>11</td>
<td>Exercise of Calculus</td>
<td>0</td>
<td>2</td>
<td>32</td>
</tr>
<tr>
<td>12</td>
<td>Linear Algebra and Geometry</td>
<td>4</td>
<td>5</td>
<td>80</td>
</tr>
<tr>
<td>13</td>
<td>Introduction to Modern Engineering (I)</td>
<td>1</td>
<td>2</td>
<td>32</td>
</tr>
<tr>
<td>14</td>
<td>Advanced Calculus</td>
<td>3</td>
<td>4</td>
<td>64</td>
</tr>
<tr>
<td>15</td>
<td>Advanced Algebra</td>
<td>3</td>
<td>3</td>
<td>48</td>
</tr>
<tr>
<td>16</td>
<td>Probability and Mathematical Statistics</td>
<td>3</td>
<td>3</td>
<td>48</td>
</tr>
<tr>
<td>17</td>
<td>Theoretical Mechanics</td>
<td>3</td>
<td>4</td>
<td>64</td>
</tr>
<tr>
<td>18</td>
<td>Introduction to World Energy and Resources</td>
<td>3</td>
<td>3</td>
<td>48</td>
</tr>
<tr>
<td>19</td>
<td>Applied Analysis in Engineering Sciences</td>
<td>4</td>
<td>4</td>
<td>64</td>
</tr>
<tr>
<td>20</td>
<td>Engineering Economy</td>
<td>3</td>
<td>3</td>
<td>48</td>
</tr>
<tr>
<td>21</td>
<td>Theory of Vortex Sound</td>
<td>2</td>
<td>2</td>
<td>32</td>
</tr>
<tr>
<td>22</td>
<td>Water Treatment Engineering</td>
<td>2</td>
<td>2</td>
<td>32</td>
</tr>
<tr>
<td>23</td>
<td></td>
<td>3</td>
<td>4</td>
<td>64</td>
</tr>
<tr>
<td>24</td>
<td>Thermal Physics</td>
<td>2</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>25</td>
<td>Electromagnetism</td>
<td>3</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>26</td>
<td>Exercises of Thermal Physics</td>
<td>0</td>
<td>2</td>
<td>32</td>
</tr>
<tr>
<td>27</td>
<td>General Chemistry Practice</td>
<td>0</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>28</td>
<td>General Chemistry (B)</td>
<td>4</td>
<td>4</td>
<td>60</td>
</tr>
<tr>
<td>29</td>
<td>General Chemistry Lab B</td>
<td>2</td>
<td>4</td>
<td>60</td>
</tr>
<tr>
<td>30</td>
<td>Introduction to Computation (B)</td>
<td>3</td>
<td>3</td>
<td>54</td>
</tr>
<tr>
<td>31</td>
<td>Introduction to Computer (B) and Computer Operation</td>
<td>0</td>
<td>2</td>
<td>36</td>
</tr>
</tbody>
</table>
B2. Bachelors (Huazhong Agricultural University)

The courses included in the core of the Bachelor degree study programs (4 years) are shown in the following list:

1) Biology;  
2) Biotechnology;  
3) Agronomy;  
4) Plant Sciences;  
5) Plant and Animal Quarantine;  
6) Horticulture;  
7) Forestry;  
8) Animal Sciences;  
9) Veterinary Medicine;  
10) Environmental Science;  
11) Environmental Engineering;  
12) Aquaculture;  
13) Food Quality and Safety;  
14) Food Science and Engineering;  
15) Geographical Information System;  
16) Land Management;  
17) Agricultural and Forestry Economics & Management.

B3. Bachelors (South China Agricultural University)

The courses included in the Bachelor degree study programs (4 years) are shown in the following list:

1) Electronic Business;  
2) Business Management;  
3) Human Resources Management;  
4) Agricultural and Forestry Economics & Management;  
5) Economics;  
6) Finance;  
7) Accounting;  
8) Marketing;  
9) International Economics & Trade;  
10) Management of Land Resources;  
11) Sociology;  
12) Administrative Management;  
13) Public Utilities Management;  
14) Social Work;  
15) Labour and Social Security;  
16) Resources and Environmental Science;  
17) Pharmaceutics;

36
18) Environmental Science;
19) Plant Protection;
20) Environmental Engineering;
21) Biology;
22) Biotechnology;
23) Bio-chemistry & Molecular Biology;
24) Animal Biotechnology;
25) Animal Science;
26) Aquaculture;
27) Sericulture;
28) Food Quality and Safety;
29) Package Engineering;
30) Bio-engineering;
31) Food Science and Engineering;
32) Veterinary Medicine;
33) Veterinary Pharmacy;
34) Tea Science;
35) Facility Agricultural Science and Engineering;
36) Horticulture;
37) Ecology;
38) Pratacultural Science;
39) Agronomy;
40) Forestry Science;
41) Wood Science and Engineering;
42) Tourism Management;
43) Forest Resources Conservation & Recreation;
44) City Planning;
45) Gardens;
46) Vehicle Engineering;
47) Electronic Information Engineering;
48) Electrical Engineering & its Automation;
49) Agricultural Mechanisation and its Automation;
50) Machine Design and Manufacturing & their Automation;
51) Automation;
52) Telecommunication Engineering;
53) Electronic Science & Technology;
54) Transportation;
55) Industrial Design;
56) Civil Engineering;
57) Architecture;
58) Water Conservancy & Hydroelectric Engineering;
59) Chinese Literature;
60) Philosophy;
61) History;
62) Broadcasting & TV Directing;
63) Educational Technology;  
64) Material Chemistry;  
65) Electronic Information Science & Technology;  
66) Applied Chemistry;  
67) Mathematics & Applied Mathematics;  
68) Statistics;  
69) Optical Information Science & Technology;  
70) Information & Computing Science;  
71) Network Engineering;  
72) Surveying and Mapping Engineering;  
73) Computer Science & Technology;  
74) Software Engineering;  
75) Geographical Information System;  
76) Industrial Engineering;  
77) Information Management & Information System;  
78) Law;  
79) English;  
80) Music;  
81) Fashion Design & Engineering;  
82) Art Design;  
83) Flash Design.

B4. Bachelors (Northwest Agriculture and Forestry University)

The courses included in the Bachelor study programs (4 years) are shown in the following list:

1) Agronomy;  
2) Plant Science and Technology;  
3) Seed Science and Engineering;  
4) Plant Protection;  
5) Pharmaceutical Engineering;  
6) Horticulture;  
7) Protected-land Agriculture Science and Engineering;  
8) Grass Science;  
9) Animal Science;  
10) Animal Medicine;  
11) Biology (Animal Orientation);  
12) Forestry;  
13) Gardening;  
14) Tourism Management;  
15) Chemical Processing Engineering of Forest Products;  
16) Artistic Design;  
17) Wood Science & Engineering;  
18) Environmental Science;
19) Resources and Environment Science;  
20) Geographical Information System;  
21) Soil and Water Conservation and Desertification Control;  
22) Resources Environment and Management of Urban and Rural Areas Planning;  
23) Civil Engineering;  
24) Agricultural Water Conservancy Engineering;  
25) Hydraulics and Hydropower Engineering;  
26) Hydrology and Water Resources Engineering;  
27) Electrical Engineering and Automation;  
28) Mechatronic Engineering;  
29) Electronic Information Engineering;  
30) Agricultural Mechanization and Automation;  
31) Mechanical Designing, Manufacturing and Automation;  
32) Computer Science and Technology;  
33) Information Management and Information System;  
34) Software Engineering;  
35) Food Science and Engineering;  
36) Food Quality and Safety;  
37) Grape and Grape Wine Engineering;  
38) Bioscience;  
39) Bio-engineering;  
40) Biotechnology;  
41) Accounting;  
42) Finance;  
43) Economics;  
44) Business Administration;  
45) E-business;  
46) Economics and Management of Agriculture and Forestry;  
47) Land Resources Management;  
48) International Economics & Trade;  
49) Law;  
50) Sociology;  
51) Public Services Management;  
52) English.

B6. Bachelors (Nanjin Agricultural University)

The courses included in the core of the Bachelor study programs are shown in the following list:

1) Agronomy;  
2) Seed Science and Engineering;  
3) Statistics;  
4) Rural Regional Development;  
5) Bioscience;
6) Biotechnology;  
7) Plant Protection;  
8) Ecology;  
9) Food Science and Engineering;  
10) Bio-Engineering;  
11) Food Quality and Safety;  
12) Environmental Engineering;  
13) Environmental Science;  
14) Horticulture;  
15) Landscape Architecture;  
16) Chinese Pharmacy;  
17) Animal Science;  
18) Veterinary Medicine (5 years);  
19) Veterinary Pharmacy (5 years)  
20) International Economics and Trade;  
21) Finance;  
22) Agricultural and Forestry Economics and Management;  
23) Human Resource Management;  
24) Accounting;  
25) Marketing;  
26) Electronic Business;  
27) Land Resource Management  
28) Information and Computing Science;  
29) Sociology;  
30) Tourism Management  
31) Information Management and Information System;  
32) Computer Science and Technology.

B8. Bachelors (Sam Higginbottom Institute of Agriculture, Technology & Sciences)

The courses included in the B.Tech. study program in Agricultural Engineering (4 years, 8 semesters), offered by the Vaugh School of Agricultural Engineering & Technology, are shown in the following tables.

**SEMESTER I**

<table>
<thead>
<tr>
<th>Course name, L-T-P credits, Total credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Professional Communication &amp; Technical Writing 3-0-0 3</td>
</tr>
<tr>
<td>2) Moral &amp; Value Education 2-0-0 2</td>
</tr>
<tr>
<td>3) Engineering Drawing 0-0-2 2</td>
</tr>
<tr>
<td>4) Basic Electrical Engineering 2-1-1 4</td>
</tr>
<tr>
<td>5) Principles of Agriculture (PCM Group) 2-0-1 3</td>
</tr>
<tr>
<td>6) Basic Electronics 2-1-1 4</td>
</tr>
<tr>
<td>7) Elementary Mathematics (Ag. Group) 3-0-0 3</td>
</tr>
<tr>
<td>8) Engineering Physics 3-1-1 5</td>
</tr>
<tr>
<td>9) Computer and Languages 2-1-1 4</td>
</tr>
</tbody>
</table>
### SEMESTER II

**Course name, L-T-P credits, Total credits**
1) Principles of Soil Science 2-0-1 3  
2) Workshop Practice & Technology 2- 0-2 4  
3) Engineering Mechanics 3- 0-0 3  
5) Engineering Mathematics – I 3-1-0 4  
6) Engineering Thermodynamics 2- 0-1 3  
7) Horticultural & Field Crops 2-0-1 3  
8) Engineering Chemistry 2-0-1 3  

### SEMESTER III

**Course name, L-T-P credits, Total credits**
1) Farm Implements 2-0-1 3  
2) Surveying & Levelling 2-0-2 4  
3) Introductory Biotechnology 3-0-0 3  
4) Strength of Materials 2-1-0 3  
5) Electrical Machines 2-0-1 3  
6) Extension Education 2-0-1 3  
7) Engineering Mathematics - II 3-1-0 4  
8) Statistical Methods 2-0-1 3  
9) Database Management & Internet Applications 1-0-2 3  

### SEMESTER IV

**Course name, L-T-P credits, Total credits**
1) Fluid Mechanics 3-0-1 4  
2) Farm Machinery 3-0-1 4  
3) Engineering Hydrology 3-0-0 3  
4) Unit operations in Food Engineering 3-0-1 4  
5) Soil Mechanics 2-1-0 3  
6) Heat & Mass Transfer 3-0-1 4  
7) Soil Physics 2-0-1 3  
8) Theory of Machines 2-0-1 3  
9) Environmental Studies – I 2-0-0 2  

### SEMESTER V

**Course name, L-T-P credits, Total credits**
1) Refrigeration and Air Conditioning 2-0-1 3  
2) Building Materials and Structural Design 2-1-0 3  
3) Machine Design 3-1-0 4  
4) Agri-Business Management 3-0-0 3  
5) Field Operations and Maintenance of Tractors and Farm Machinery 1-0-2 3  
6) Engineering Properties of Biological Materials 2-0-1 3  
7) Well & Pumps 2-0-1 3
8) Environmental Studies – II 2-0-0 2
9) Training – I 0-0-1 1

SEMESTER VI
Course name, L-T-P credits, Total credits
1) Instrumentation and Control Engineering 2-0-1 3
2) Operation Research 3-0-0 3
3) Post-Harvest and Storage Engineering 3-0-1 4
4) Tractors and Power Units 3-0-1 4
5) Soil and Water Conservation Engineering 2-0-1 3
6) Crop Process Engineering 2-0-1 3
7) Irrigation Engineering 3-0-1 4

SEMESTER VII
Course name, L-T-P credits, Total credits
1) Renewable Energy 2-0-1 3
2) Farm Machinery Design and Testing 3-0-1 4
3) Drainage Engineering 2-0-1 3
4) Dairy and Food Engineering 3-0-1 4
5) Entrepreneurship Development on Agro-Industries 3-0-0 3
6) Hydraulics and Design of Irrigation Systems 3-0-0 3
7) Soil and Water Conservation Structures 2-0-0 2
8) Training – II 0-0-1 1
9) Seminar – I 0-0-1 1
10) Project (Project Formulation) 0-0-3 3
11) Educational Tour/Field Visit NC

SEMESTER VIII
Course name, L-T-P credits, Total credits
1) Elective – I Soil and Water Engineering (anyone) 3-0-0 3
2) Elective – II Farm Machinery & Power 3-0-0 3
3) Engineering (anyone)
4) Elective – III Agricultural Process & Food Engineering (anyone) 3-0-0 3
5) Seminar – II 0-0-1 1
6) Project (Project Execution and Report) 0-0-7 7

ELECTIVE I (Anyone)
Course name, L-T-P credits, Total credits
1) Integrated Watershed Management 2-0-1 3
2) Economic Evaluation of Water Resource Projects 3-0-0 3
3) Water Laws & Policies 3-0-0 3
4) Minor Irrigation 2-0-1 3
5) GIS and Remote Sensing 2-0-1 3
6) Landscape Irrigation Design & Management 3-0-0 3
7) Water Harvesting and Ground Water Recharge 3-0-0 3
8) Wasteland Management 3-0-0 3  
9) Operation, Maintenance & Economic Evaluation of Water Resource Projects 3-0-0 3  
10) Water Quality Management 2-0-1 3  
11) Reservoir & Pond Design 2-0-1 3  
12) Environmental Engineering 3-0-0 3

**ELECTIVE II (Anyone)**  
**Course name, L-T-P credits, Total credits**  
1) Human Factors Engineering 2-0-1 3  
2) Farm Machinery Management 3-0-0 3  
3) Fluid Machinery and Hydraulic Controls 3-0-0 3  
4) Tillage and Traction Engineering 2-0-1 3  
5) Manufacturing Processes of Agricultural Machinery 3-0-0 3  
6) Tractor Design & Testing 3-0-0 3  
7) System Engineering 3-0-0 3  
8) Agricultural Mechanisation 3-0-0 3

**ELECTIVE III (Anyone)**  
**Course name, L-T-P credits, Total credits**  
1) Food Plant Operations Management 3-0-0 3  
2) Beverages Technology 3-0-0 3  
3) Advanced Techniques in Food Processing 2-0-1 3  
4) Food Packaging Technology 2-0-1 3  
5) Food Process Equipment Design 2-1-0 3  
6) Food Laws and Legislation 2-0-0 2  
7) Entrepreneurship in Food Industry 2-0-0 2  
8) Food Plant Sanitation & Waste Management 2-0-1 3  
9) Food Plant Design & Maintenance 2-1-0 3  
10) Fermented Food Products 2-0-1 3 4

**B9. Bachelors (Israel Institute of Technology)**

The Department of Agricultural Engineering offers the following 3 B.Sc. study programs:  
1) the traditional B.Sc. in Agricultural Engineering;  
2) a B.Sc. in Environmental Engineering (jointly with 3 other Engineering Faculties at Technion University);  
3) a new B.Sc. in Quality Assurance in Bioprocessing Engineering (jointly with the Faculty of Food & Biotechnology Engineering).

**1) B.Sc. in Agricultural Engineering**

The program consists of 2 options: Agricultural Machinery; Water, Soil and Environment. Agricultural Engineers are trained in specific areas such as: farm and crop protection machinery, harvesting and processing, animal husbandry, irrigation, soil conservation, drainage, water resource systems, fertilisers and fertilisation, energy in agriculture,
automation and control, quality assurance, environmental protection, agricultural and environmental system management.

**Agricultural Machinery**

After completion of Basic Science and Engineering courses, which are common to all the programs, students take courses in mechanical engineering science, such as dynamics and vibrations, as well as specific Engineering courses related to field machines and tractors, soil compaction, earth moving machines, soil-machine interaction, physical properties of biological materials, processing, packaging and transportation of agricultural products, design of farm machinery, animal husbandry and aquaculture technology.

**Soil, Water & Environment**

After completion of the Basic Science and general Engineering courses, students take courses in specific subjects, such as soil science, transport phenomena in soil, agro-meteorology, water quality, agricultural and environmental systems management, as well as courses in planning and design of irrigation, drainage and soil conservation systems, and water reservoirs.

2) **B.Sc. in Environmental Engineering**

A new program, B.Sc. in Environmental Engineering, has been offered since 1996. The study program was jointly initiated and prepared by the Agricultural, Chemical, Civil, and Food and Biotechnology Engineering Faculties. Environmental engineering aims at providing technologies, practices and knowledge for reducing pollution, prevention of environmental deterioration and maintaining sound ecological conditions. The graduates of this program are expected to be integrated in a large variety of public, private and governmental activities, dealing with planning, performance, supervision and research, associated with environmental quality. The related graduates will be qualified for working in planning offices, industrial plants, environmental offices, local authorities and agricultural organisations.

3) **B.Sc. in Quality Assurance in Bioprocessing Engineering**

A new Engineering program, B.Sc. in Quality Assurance in Bioprocessing Engineering is being offered by the Department of Agricultural Engineering and the Faculty of Food and Biotechnology Engineering. The purpose of this new program is to prepare professionals in the area of quality control and quality assurance in the industries of agricultural processing, food engineering, pharmaceuticals and biochemical cosmetics. The graduated Engineers are prepared to face the challenges in maintaining and controlling quality, using new technology production methods. They gain understanding and expertise in using sensing and measuring devices and improve their knowledge in the process of development, production and marketing.
B10. **Bachelors (Tokyo University of Agriculture and Technology)**

The Department of Ecoregion Science of the Faculty of Agriculture offers the following 4 Bachelor study programs (4 years):
1) Eco-design;
2) Forest Environment;
3) Environmental and Agricultural Engineering;
4) Human and Social Studies of Man-Nature Relation.

B11. **Bachelors (Kyoto University)**

The formulation and implementation of Educational Course Policy for the undergraduate students of both the Faculty of Agriculture and the Graduate School of Agriculture is based on the following points:
1) to provide education in order to attain international and accomplished broad views, while acquiring the knowledge and scholarship in relation to the broad field of natural and social sciences, within the study of agriculture for the purpose of cultivating human resources;
2) to offer a 4-year unified education program (during the first and second year fundamental education will be cultivated through enrolment in courses with supervision in specialised areas, in order to develop linguistic ability, while during the third and fourth year further education will be cultivated through enrolment in courses of specialised areas);
3) to carry out classes of small sizes, in order to smoothly facilitate the discussion and understanding between professors and students;
4) to be affiliated with a research office and during the final year of the program, while pursuing research through close communication between Faculty members and co-workers;
5) to carry out practical field work, seminars and experimentation, aimed at developing an in-depth understanding of the contents of lectures;
6) to recommend exchange programs for students under the umbrella of international University student exchange programmes.

B14. **Bachelors (Jordan University of Science and Technology)**

The Department of Civil Engineering of the Faculty of Engineering offers also the **B.Sc. in Civil Engineering - Water Resources and Environment (2000)**, whose courses are shown in the following tables.

**University Compulsory Req. (16) Hours**

<table>
<thead>
<tr>
<th>Course Name, Hours, Prerequisite</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ARABIC LANGUAGE 3 Show</td>
<td></td>
</tr>
<tr>
<td>ARABIC LANGUAGE I 3 Equivalent</td>
<td></td>
</tr>
</tbody>
</table>
APPLIED ARABIC LANGUAGE STUDIES 1 ---
ENGLISH LANGUAGE (1) 3 Show
ENGLISH LANGUAGE (REMEDIAL COURSE) 3 Prerequisite / Pass
COMMUNICATION SKILLS I 3 Equivalent
ENGLISH LANGUAGE (2) 3 Show
ENGLISH LANGUAGE (1) 3 Prerequisite / Study
COMMUNICATION SKILLS II 3 Equivalent
MILITARY SCIENCES 3 ---
COMPUTER SKILLS 3 Show
INTRODUCTION TO COMPUTERS 3 Equivalent
COMPUTER SKILLS 3 Equivalent
INTRODUCTION TO COMPUTERS 3 Equivalent
COMPUTER SKILLS 3 Equivalent

University Elective Req. (9) Hours
Course Name, Hours, Prerequisite
ENVIRONMENT PROTECTION (3) ---
COMMUNITY HEALTH AND NUTRITION 3 ---
FIRST AID 3 Show
FIRST AID 3 Equivalent
FUNDAMENTALS OF AUTOMOBILE ENGINEERING (FOR NON-MECHANICAL
ENGINEERING STUDENTS) 3 ---
DRUGS & MEDICINAL PLANTS IN JORDAN 3 ---
HEALTH PROMOTION 3 ---
ORAL & DENTAL HEALTH 3 ---
FARM ANIMAL PRODUCTS AND PRODUCTION (FOR NON AGRICULTURE AND
VETERINARY STUDENTS) 3 ---
HOME GARDENS (FOR NON AGRICULTURE STUDENTS) 3 ---
BEE KEEPING (FOR NON AGRICULTURE STUDENT 3 ---
FOOD PRESERVATION "IN ENGLISH" (FOR NON NUTRITION&FOOD
TECHNOLOGY STUDENTS) 3 ---
NATURAL RESOURCES AND MAN (FOR NON AGRICULTURE STUDENTS) 3 ---
ANIMAL-HEALTH 3 ---
PET ANIMAL CARE 3 ---
AL-HADITH AL-SHAREEF 3 ---
FAITH 3 ---
FEKEH 3 ---
ISLAM AND RECENT PROBLEMS 3 ---
ECONOMIC SYSTEM IN ISLAM 3 ---
PRINCIPLES OF SOCIOLOGY 3 Show
SOCIOLOGY 3 Equivalent
INTRODUCTION TO ANTHROPOLOGY 3 ---
INTRODUCTION TO EDUCATIONAL SCIENCE 3 ---
EDUCATION SYSTEM IN JORDAN 3 ---
INTRODUCTION TO PHILOSOPHY 3 ---
<table>
<thead>
<tr>
<th>Course Name, Hours, Prerequisite</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRINCIPLES OF PSYCHOLOGY 3 Show</td>
<td></td>
</tr>
<tr>
<td>INTRODUCTION TO PSYCHOLOGY (IN ENGLISH) 3 Equivalent</td>
<td></td>
</tr>
<tr>
<td>EDUCATIONAL TECHNOLOGY 3</td>
<td></td>
</tr>
<tr>
<td>NATIONAL EDUCATION 3</td>
<td></td>
</tr>
<tr>
<td>ISLAMIC CIVILISATION 3</td>
<td></td>
</tr>
<tr>
<td>THE HISTORY OF THE CITY OF JERUSALEM 3</td>
<td></td>
</tr>
<tr>
<td>CIVILISATION AND RECENT CULTURES 3</td>
<td></td>
</tr>
<tr>
<td>HUMAN RIGHTS BASIC LIBERITIES 3</td>
<td></td>
</tr>
<tr>
<td>THE LAW IN OUR LIFE 3</td>
<td></td>
</tr>
<tr>
<td>INTRODUCTION TO ECONOMICS 3</td>
<td></td>
</tr>
<tr>
<td>LIBRARY AND INFORMATION RESEARCH 3</td>
<td></td>
</tr>
<tr>
<td>INTRODUCTION TO MANAGEMENT SCIENCES 3</td>
<td></td>
</tr>
<tr>
<td>CONTEMPORARY PROBLEMS 3</td>
<td></td>
</tr>
<tr>
<td>SOCIOLGY 3</td>
<td></td>
</tr>
<tr>
<td>ARAB SOCIETY 3</td>
<td></td>
</tr>
<tr>
<td>INDIVIDUAL AND SOCIETY 3</td>
<td></td>
</tr>
<tr>
<td>INTRODUCTION TO PSYCHOLOGY (IN ENGLISH) 3 Show</td>
<td></td>
</tr>
<tr>
<td>PRINCIPLES OF PSYCHOLOGY 3 Equivalent</td>
<td></td>
</tr>
<tr>
<td>HISTORY OF SCIENCES IN ISLAM 3</td>
<td></td>
</tr>
<tr>
<td>THE HISTORY OF MUSIC 3</td>
<td></td>
</tr>
<tr>
<td>THE SCIENCE OF CHILDREN BEHAVIOUR 3</td>
<td></td>
</tr>
<tr>
<td>ENVIRONMENT PROTECTION (FOR NON ENVIRONMENTAL SCIENCES STUDENTS) 3</td>
<td></td>
</tr>
<tr>
<td>WELLNESS &amp; LIFESTYLE (NOT FOR PHYSICAL &amp; OCCUPATIONAL THERAPY) 3</td>
<td></td>
</tr>
</tbody>
</table>

**Faculty Compulsory Req. (29) Hours**

<table>
<thead>
<tr>
<th>Course Name, Hours, Prerequisite</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CALCULUS (I) 3</td>
<td></td>
</tr>
<tr>
<td>CALCULUS (2) 3</td>
<td></td>
</tr>
<tr>
<td>CALCULUS (I) 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>INTERMEDIATE ANALYSIS 3</td>
<td></td>
</tr>
<tr>
<td>CALCULUS (2) 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>ORDINARY DIFFERENTIAL EQUATIONS 3 Show</td>
<td></td>
</tr>
<tr>
<td>CALCULUS (2) 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>GENERAL CHEMISTRY( I) 3</td>
<td></td>
</tr>
<tr>
<td>GENERAL CHEMISTRY 3 Equivalent</td>
<td></td>
</tr>
<tr>
<td>GENERAL CHEMISTRY (2) 3</td>
<td></td>
</tr>
<tr>
<td>GENERAL CHEMISTRY( I) 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>GENERAL CHEMISTRY 3 Equivalent</td>
<td></td>
</tr>
<tr>
<td>GENERAL CHEMISTRY LAB 1 Show</td>
<td></td>
</tr>
<tr>
<td>GENERAL CHEMISTRY (I) 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>GENERAL CHEMISTRY 3 Equivalent</td>
<td></td>
</tr>
<tr>
<td>GENERAL CHEMISTRY (2) 3 Concurrent</td>
<td></td>
</tr>
<tr>
<td>GENERAL PHYSICS (1) 3</td>
<td></td>
</tr>
<tr>
<td>GENERAL PHYSICS(1) 3 Equivalent</td>
<td></td>
</tr>
</tbody>
</table>
GENERAL PHYSICS (2) 3 Show
GENERAL PHYSICS (1) 3 Prerequisite / Study
GENERAL PHYSICS (2) (FOR PHARMACY, MED) 3 Equivalent
GENERAL PHYSICS (LAB) 1 Show
GENERAL PHYSICS (2) 3 Concurrent
C++ PROGRAMMING LANGUAGES 3 Show
THE C PROGRAMMING LANGUAGE 3 Equivalent
C++ PROGRAMMING LANGUAGE 3 Equivalent
C++ PROGRAMMING (FOR NON COMPUTER SCIENCE INFORMATION STUDENTS) 3 Equivalent
COMPUTER SKILLS 3 Prerequisite / Study

Department Compulsory Req. (85) Hours
Course Name, Hours, Prerequisite
ENGINEERING DRAWING 3 Show
ARCHITECTURAL DRAWING 3 Equivalent
ENGINEERING DRAWING 3 Equivalent
ENGINEERING DRAWING 3 Equivalent
STATICS 3 Show
GENERAL PHYSICS (1) 3 Prerequisite / Study
STATICS 3 Equivalent
STRENGTH OF MATERIALS 3 Show
STATICS 3 Prerequisite / Study
MECHANICS OF MATERIALS (1) 3 Equivalent
STRENGTH OF MATERIALS 3 Equivalent
DYNAMICS 2 Show
STATICS 3 Prerequisite / Study
DYNAMICS 3 Equivalent
ENGINEERING GEOLOGY 3 Show
GENERAL CHEMISTRY (2) 3 Prerequisite / Study
ENGINEERING GEOLOGY LABORATORY 1 Show
ENGINEERING GEOLOGY 3 Concurrent
ENGINEERING CALCULATIONS 3 Show
NUMERICAL METHODS FOR ENGINEERS 3 Equivalent
ORDINARY DIFFERENTIAL EQUATIONS 3 Prerequisite / Study
C++ PROGRAMMING LANGUAGES 3 Prerequisite / Study
MATERIALS OF CONSTRUCTION 3 Show
ENGINEERING GEOLOGY 3 Prerequisite / Study
CONCRETE TECHNOLOGY 3 Equivalent
MATERIALS OF CONSTRUCTION LABORATORY 1 Show
MATERIALS OF CONSTRUCTION 3 Concurrent
MATERIALS LAB 1 Equivalent
STRUCTURAL ANALYSIS (1) 3 Show
STRENGTH OF MATERIALS 3 Prerequisite / Study
SURVEYING 3 Show
PROBABILITY & STATISTICS (FOR ENGINEERING STUDENTS) 3 Prerequisite / Study
SURVEYING LABORATORY 1 Show
SURVEYING 3 Concurrent
HIGHWAY DESIGN 3 Show
SURVEYING 3 Prerequisite / Study
HIGHWAYS GEOMETRIC 3 Equivalent
FLUID MECHANICS 3 Show
STATICS 3 Prerequisite / Study
FLUID MECHANICS 3 Equivalent
FLUID MECHANICS 3 Equivalent
FLUID MECHANICS (1) 3 Equivalent
FLUID MECHANICS 3 Equivalent
HYDRAULICS 3 Show
FLUID MECHANICS 3 Prerequisite / Study
APPLIED HYDRAULICS 3 Equivalent
FLUID MECHANICS AND HYDRAULICS LABORATORY 1 Show
FLUID MECHANICS 3 Prerequisite / Study
HYDRAULICS 3 Concurrent
BUILDING CONSTRUCTION 3 Show
ENGINEERING DRAWING 3 Prerequisite / Study
STRENGTH OF MATERIALS 3 Prerequisite / Study
ENGINEERING ECONOMICS 2 Show
ENGINEERING ECONOMIC 2 Equivalent
ENGINEERING ECONOMY 2 Equivalent
PROBABILITY & STATISTICS (FOR ENGINEERING STUDENTS) 3 Prerequisite / Study
STRUCTURAL ANALYSIS (2) 3 Show
STRUCTURAL ANALYSIS (1) 3 Prerequisite / Study
REINFORCED CONCRETE (1) 3 Show
MATERIALS OF CONSTRUCTION 3 Prerequisite / Study
STRUCTURAL ANALYSIS (2) 3 Prerequisite / Study
STEEL DESIGN 3 Show
BUILDING CONSTRUCTION 3 Prerequisite / Study
STRUCTURAL ANALYSIS (2) 3 Prerequisite / Study
TRANSPORTATION ENGINEERING 3 Show
SURVEYING 3 Prerequisite / Study
TRANSPORTATION ENGINEERING 3 Equivalent
PAVEMENT DESIGN AND MATERIALS 2 Show
TRANSPORTATION ENGINEERING 3 Prerequisite / Study
PAVEMENT MATERIALS & DESIGN (1) 3 Equivalent
HIGHWAY LABORATORY 1 Show
TRANSPORTATION ENGINEERING 3 Prerequisite / Study
PAVEMENT DESIGN AND MATERIALS 2 Concurrent
SANITARY ENGINEERING 3 Show
HYDRAULICS 3 Prerequisite / Study
ENVIRONMENTAL ENGINEERING 3 Equivalent
SANITARY ENGINEERING LABORATORY 1 Show
SANITRY ENGINEERING 3 Concurrent
ENVIRONNEMENTAL ENGINEERING LAB 1 Equivalent
SOIL MECHANICS (1) 3 Show
STRENGTH OF MATERIALS 3 Prerequisite / Study
ENGINEERING GEOLOGY 3 Prerequisite / Study
GEOTECHNICAL ENGINEERING 3 Equivalent
SOIL MECHANICS LAB 1 Show
SOIL MECHANICS (1) 3 Concurrent
GEOTECHNICAL ENGINEERING LAB 1 Equivalent
FOUNDATION ENGINEERING (1) 3 Show
SOIL MECHANICS (1) 3 Prerequisite / Study
CONTRACTS, SPECIFICATIONS AND QUANTITY SURVEYING 3 Show
REINFORCED CONCRETE (1) 3 Prerequisite / Study
APPLIED ENGINEERING PRACTICES 3 ---
GRADUATION PROJECT (1) 1 ---
GRADUATION PROJECT (2) 3 Show
GRADUATION PROJECT (1) 1 Prerequisite / Study
GRADUATION PROJECT (2) 3 Equivalent
ENGINEERING WORKSHOPS 2 Show
ENGINEERING WORKSHOPS 2 Equivalent
ENGINEERING WORKSHOP (LAB) 0 Show
ENGINEERING WORKSHOP (LAB) 0 Equivalent
ENGINEERING WORKSHOPS 2 Concurrent
ENGINEERING WORKSHOPS LAB 0 Equivalent
PROBABILITY & STATISTICS (FOR ENGINEERING STUDENTS) 3 Show
CALCULUS (2) 3 Prerequisite / Study

Specialisation Compulsory Req. (17) Hours

Course Name, Hours, Prerequisite
ENVIRONMENTAL ENGINEERING 3 Show
SANITRY ENGINEERING 3 Prerequisite / Study
WATER RESOURCES 3 Show
HYDRAULICS 3 Prerequisite / Study
SURFACE AND GROUNDWATER HYDROLOGY 3 Show
HYDRAULICS 3 Prerequisite / Study
WATER CHIMESTRY 3 Show
SANITARY ENGINEERING 3 Prerequisite / Study
ENGINEERING 3 Show
HYDRAULICS 3 Prerequisite / Study
SOIL MECHANICES (1) 3 Prerequisite / Study
ENGINEERING 3 Equivalent
DESIGN OF DRINKING & WASTE WATER SYSTEMS 2 Show
SANITARY ENGINEERING LABORATORY 1 Prerequisite / Study
DESIGN OF ENVIRONMENTAL & WASTEWATER SYSTEMS 3 Equivalent
Specialisation Elective Req. (3) Hours
Course Name, Hours, Prerequisite
MATERIALS SCIENCE 2 ---
ADVANCED MATERIALS OF CONSTRUCTION 3 ---
REINFORCED CONCRETE (2) 3 ---
MATRIX ANALYSIS OF STRUCTURES 3 ---
BRIDGE ENGINEERING 3 ---
PAVEMENT MATERIALS AN DESIGN (2) 3 ---
TRANSPORTATION ENGINEERING 3 Show
TRAFFIC PLANNING & ENGINEERING 3 Equivalent
PHOTOGRAMMETRY & GEODESY 3 ---
ADVANCED TRANSPORTATION ENGINEERING 3 ---
TRANSPORTATION PLANNING 3 ---
GEOGRAPHIC INFORMATION SYSTEMS 3 Show
SURVEYING 3 Prerequisite / Study
GEOGRAPHIC INFORMATION SYSTEM GIS 3 Equivalent
HIGHWAY MAINTENANCE 3 ---
IRRIGATION AND DRAINAGE 3 ---
HAZARDOUS MATERIALS AND SOILD WASTE ENG. 3 ---
SOIL MECHANICS (2) 3 ---
SUBSURFACE EXPLORATION 3 ---
FOUNDATION ENG (2) 3 ---
SOIL STABILISATION 3 ---
ROCK MECHANICS 3 ---
CONSTRUCTION MANAGEMENT 3 Show
ENGINEERING PROJECTS &CONSTRUCTION MANAGEMENT 3 Equivalent
SPECIAL TOPICS IN CIVIL ENGINEERING 1 ---

The Department of Mechanical Engineering of the Faculty of Engineering offers also the
B.Sc in Mechanical Engineering - Thermal Power (2007), whose courses are shown in the
following tables.

University Compulsory Req. (16) Hours
Course Name, Hours, Prerequisite
ARABIC LANGUAGE 3 Show
ARABIC LANGUAGE I 3 Equivalent
APPLIED ARABIC LANGUAGE STUDIES 1 Show
CULTURE AND UNIVERSITY BEHAVIOR 1 Equivalent
ENGLISH LANGUAGE (1) 3 Show
ENGLISH LANGUAGE (REMEDIAL COURSE) 3 Prerequisite / Pass
COMMUNICATION SKILLS I 3 Equivalent
ENGLISH LANGUAGE (2) 3 Show
ENGLISH LANGUAGE (1) 3 Prerequisite / Study
COMMUNICATION SKILLS II 3 Equivalent
MILITARY SCIENCES 3 ---
COMPUTER SKILLS 3 Show
INTRODUCTION TO COMPUTERS 3 Equivalent
COMPUTER SKILLS 3 Equivalent
INTRODUCTION TO COMPUTERS 3 Equivalent
COMPUTER SKILLS 3 Equivalent

University Elective Req. (9) Hours
Course Name, Hours, Prerequisite
ENVIRONMENT PROTECTION (3) ---
COMMUNITY HEALTH AND NUTRITION 3 ---
FIRST AID 3 Show
FIRST AID 3 Equivalent
DRUGS & MEDICINAL PLANTS IN JORDAN 3 ---
HEALTH PROMOTION 3 ---
ORAL & DENTAL HEALTH 3 ---
FARM ANIMAL PRODUCTS AND PRODUCTION (FOR NON AGRICULTURE AND VETERINARY STUDENTS) 3 ---
HOME GARDENS (FOR NON AGRICULTURE STUDENTS) 3 ---
BEE KEEPING (FOR NON AGRICULTURE STUDENT 3 ---
FOOD PRESERVATION "IN ENGLISH" (FOR NON NUTRITION & FOOD TECHNOLOGY STUDENTS) 3 ---
NATURAL RESOURCES AND MAN (FOR NON AGRICULTURE STUDENTS) 3 ---
ANIMAL-HEALTH 3 ---
PET ANIMAL CARE 3 ---
AL HADITH AL SHAREEF 3 ---
FAITH 3 ---
FEKEH 3 ---
ISLAM AND RECENT PROBLEMS 3 ---
ECONOMIC SYSTEM IN ISLAM 3 ---
PRINCIPLES OF SOCIOLOGY 3 Show
SOCIOLOGY 3 Equivalent
INTRODUCTION TO ANTHROPOLOGY 3 ---
INTRODUCTION TO EDUCATIONAL SCIENCE 3 ---
EDUCATION SYSTEM IN JORDAN 3 ---
INTRODUCTION TO PHILOSOPHY 3 ---
PRINCIPLES OF PSYCHOLOGY 3 Show
INTRODUCTION TO PSYCHOLOGY (IN ENGLISH) 3 Equivalent
EDUCATIONAL TECHNOLOGY 3 ---
NATIONAL EDUCATION 3 ---
ISLAMIC CIVILISATION 3 ---
THE HISTORY OF THE CITY OF JERUSALEM 3 ---
CIVILISATION AND RECENT CULTURES 3 ---
HUMAN RIGHTS BASIC LIBERITIES 3 ---
The LAW IN OUR LIFE 3 ---
INTRODUCTION TO ECONOMICS 3 ---
LIBRARY AND INFORMATION RESEARCH 3 ---
INTRODUCTION TO MANAGEMENT SCIENCES 3 ---
CONTEMPORARY PROBLEMS 3 ---
MAN AND SCIENCE 3 ---
STUDIES ON WOMEN 3 ---
SOCIOLOGY 3 ---
ARAB SOCIETY 3 ---
INDIVIDUAL AND SOCIETY 3 ---
INTERNATIONAL GLOBAL ISSUES 3 ---
INTRODUCTION TO PSYCHOLOGY (IN ENGLISH) 3 Show
PRINCIPLES OF PSYCHOLOGY 3 Equivalent
CREATIVITY AND PROBLEMS SOLVING 3 ---
LEADERSHIP AND COMM. SKILLS 3 ---
HISTORY OF SCIENCES IN ISLAM 3 ---
ECONOMY IN THE THIRD WORLD 3 ---
INFORMATION AND RESEARCH 3 ---
The HISTORY OF MUSIC 3 ---
The SCIENCE OF CHILDREN BEHAVIOUR 3 ---
ENVIRONMENT PROTECTION (FOR NON ENVIRONMENTAL SCIENCES
STUDENTS) 3 ---
WELLNESS & LIFESTYLE (NOT FOR PHYSICAL & OCCUPATIONAL THERAPY) 3 -
---

Faculty Compulsory Req. (32) Hours
Course Name, Hours, Prerequisite
PROFESSIONAL ETHICS FOR ENGINEERS 1 ---
COMMUNICATION SKILLS FOR ENGINEERS 2 ---
CALCULUS (I) 3 ---
CALCULUS (2) 3 Show
CALCULUS (I) 3 Prerequisite / Study
INTERMEDIATE ANALYSIS 3 Show
CALCULUS (2) 3 Prerequisite / Study
ORDINARY DIFFERENTIAL EQUATIONS 3 Show
CALCULUS (2) 3 Prerequisite / Study
GENERAL CHEMISTRY(I) 3 ---
GENERAL CHEMISTRY (2) 3 Show
GENERAL CHEMISTRY(I) 3 Prerequisite / Study
GENERAL CHEMISTRY 3 Equivalent
GENERAL CHEMISTRY LAB 1 Show
GENERAL CHEMISTRY(I) 3 Pre./Con.
GENERAL PHYSICS (1) 3 ---
GENERAL PHYSICS (2) 3 Show
GENERAL PHYSICS (1) 3 Prerequisite / Study
GENERAL PHYSICS (LAB) 1 Show
GENERAL PHYSICS (2) 3 Pre./Con.
<table>
<thead>
<tr>
<th>Course Name, Hours, Prerequisite</th>
<th>75 Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>THERMODYNAMICS 3 Show</td>
<td></td>
</tr>
<tr>
<td>THERMODYNAMICS 3 Equivalent</td>
<td></td>
</tr>
<tr>
<td>ORDINARY DIFFERENTIAL EQUATIONS 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>GENERAL PHYSICS (1) 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>STATICS 3 Show</td>
<td></td>
</tr>
<tr>
<td>STATICS 3 Equivalent</td>
<td></td>
</tr>
<tr>
<td>GENERAL PHYSICS (1) 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>PRINCIPLES OF ELECTRICAL ENGINEERING 3 Show</td>
<td></td>
</tr>
<tr>
<td>PRINCIBLES OF ELECTRICAL ENGINEERING (NON EE-STUDENTS ) 3 Equivalent</td>
<td></td>
</tr>
<tr>
<td>GENERAL PHYSICS (2) 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>ELECTRIC DRIVE 3 Show</td>
<td></td>
</tr>
<tr>
<td>PRINCIPLES OF ELECTRICAL ENGINEERING 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>NUMERICAL METHODS FOR ENGINEERS 3 Show</td>
<td></td>
</tr>
<tr>
<td>APPLIED MATHEMATICS FOR ENGINEERS 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>NUMERICAL METHODS 3 Equivalent</td>
<td></td>
</tr>
<tr>
<td>C++ PROGRAMMING LANGUAGES 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>ELECTRICAL ENGINEERING LAB 1 Show</td>
<td></td>
</tr>
<tr>
<td>ELECTRIC DRIVE 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>ELECTRICAL MACHINES LAB (FOR NON EE STUDENTS) 1 Equivalent</td>
<td></td>
</tr>
<tr>
<td>ENGINEERING WORKSHOPS 2 Show</td>
<td></td>
</tr>
<tr>
<td>ENGINEERING WORKSHOPS 2 Equivalent</td>
<td></td>
</tr>
<tr>
<td>ENGINEERING WORKSHOPS 2 Equivalent</td>
<td></td>
</tr>
<tr>
<td>ENGINEERING WORKSHOP ( LAB) 0 Show</td>
<td></td>
</tr>
<tr>
<td>ENGINEERING WORKSHOPS 2 Concurrent</td>
<td></td>
</tr>
<tr>
<td>ENGINEERING WORKSHOP (LAB) 0 Equivalent</td>
<td></td>
</tr>
<tr>
<td>ENGINEERING DRAWING (B) 2 Show</td>
<td></td>
</tr>
<tr>
<td>ENGINEERING DRAWING 3 Equivalent</td>
<td></td>
</tr>
<tr>
<td>ENGINEERING DRAWING 2 Equivalent</td>
<td></td>
</tr>
<tr>
<td>COMPUTER SKILLS 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>MECHANICAL DRAWING 2 Show</td>
<td></td>
</tr>
<tr>
<td>MECHANICAL DRAWING 2 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>STATICS 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>STRENGTH OF MATERIALS 3 Show</td>
<td></td>
</tr>
<tr>
<td>STATICS 3 Prerequisite / Study</td>
<td></td>
</tr>
</tbody>
</table>
MECHANICS OF MATERIALS (1) 3 Equivalent
APPLIED MATHEMATICS FOR ENGINEERS 3 Show
APPLIED MATHEMATICS FOR ENGINEERING (2) 3 Equivalent
INTERMEDIATE ANALYSIS 3 Prerequisite / Study
ORDINARY DIFFERENTIAL EQUATIONS 3 Prerequisite / Study
MECHANICS OF MACHINES 3 Show
DYNAMICS 3 Prerequisite / Study
MECHANICS OF MATERIALS 1 Show
STRENGTH OF MATERIALS 3 Prerequisite / Study
STRENGTH OF MATERIALS LAB 1 Equivalent
ENGINEERING MATERIALS 3 Prerequisite / Study
MACHINE DESIGN (1) 3 Show
MECHANICAL DRAWING 2 Prerequisite / Study
STRENGTH OF MATERIALS 3 Prerequisite / Study
MACHINE DESIGN 3 Equivalent
FLUID MECHANICS 3 Show
FLUID MECHANICS (1) 3 Equivalent
ORDINARY DIFFERENTIAL EQUATIONS 3 Prerequisite / Study
GENERAL PHYSICS (1) 3 Prerequisite / Study
MACHINE DESIGN (2) 3 Show
MACHINE DESIGN (1) 3 Prerequisite / Study
MACHINE DESIGN (2) 2 Equivalent
MACHINE DESIGN (2) 3 Equivalent
MACHINE DESIGN (2) 3 Equivalent
THERMOFLUIDS LAB 1 Show
THERMOFLUID LAB 1 Equivalent
HEAT TRANSFER (1) 3 Pre./Con.
HEAT TRANSFER (1) 3 Show
APPLIED MATHEMATICS FOR ENGINEERS 3 Prerequisite / Study
FLUID MECHANICS 3 Prerequisite / Study
HEAT TRANSFER 3 Equivalent
HEAT TRANSFER (1) 3 Equivalent
AUTOMATIC CONTROL (1) 3 Show
AUTOMATIC CONTROL 3 Equivalent
MECHANICAL VIBRATIONS 3 Pre./Con.
MECHANICAL VIBRATIONS 3 Show
DYNAMICS 3 Prerequisite / Study
APPLIED MATHEMATICS FOR ENGINEERS 3 Prerequisite / Study
MECHANICAL VIBRATIONS 3 Equivalent
INSTRUMENTATION 3 Show
INSTRUMENTATION 3 Equivalent
PRINCIPLES OF ELECTRICAL ENGINEERING 3 Prerequisite / Study
INSTRUMENTATION 2 Equivalent
FLUID MECHANICS 3 Prerequisite / Study
INSTRUMENTATION 3 Equivalent
<table>
<thead>
<tr>
<th>Course Name</th>
<th>Hours</th>
<th>Prerequisite/Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>INSTRUMENTATION AND DYNAMIC SYSTEMS</td>
<td>1</td>
<td>Show</td>
</tr>
<tr>
<td>INSTRUMENTATION AND DYNAMIC SYSTEMS LAB</td>
<td>1</td>
<td>Equivalent</td>
</tr>
<tr>
<td>MECHANICAL VIBRATIONS</td>
<td>3</td>
<td>Prerequisite/Study</td>
</tr>
<tr>
<td>INSTRUMENTATION</td>
<td>3</td>
<td>Prerequisite/Study</td>
</tr>
<tr>
<td>AUTOMATIC CONTROL</td>
<td>1</td>
<td>3 Show</td>
</tr>
<tr>
<td>ENGINEERING PRACTICE</td>
<td>3</td>
<td>Equivalent</td>
</tr>
<tr>
<td>GRADUATION PROJECT (1)</td>
<td>1</td>
<td>---</td>
</tr>
<tr>
<td>GRADUATION PROJECT</td>
<td>3</td>
<td>Show</td>
</tr>
<tr>
<td>PROJECTS IN MECHANICAL DESIGN</td>
<td>2</td>
<td>Show</td>
</tr>
<tr>
<td>PROJECTS IN MACHINE DESIGN</td>
<td>1</td>
<td>Equivalent</td>
</tr>
<tr>
<td>MACHINE DESIGN (2)</td>
<td>3</td>
<td>Prerequisite/Study</td>
</tr>
<tr>
<td>ENGINEERING ECONOMICS</td>
<td>2</td>
<td>Show</td>
</tr>
<tr>
<td>ENGINEERING ECONOMICS</td>
<td>2</td>
<td>Equivalent</td>
</tr>
<tr>
<td>ENGINEERING ECONOMICS</td>
<td>2</td>
<td>Equivalent</td>
</tr>
<tr>
<td>INTERMEDIATE ANALYSIS</td>
<td>3</td>
<td>Prerequisite/Study</td>
</tr>
<tr>
<td>ENGINEERING MATERIALS</td>
<td>3</td>
<td>Show</td>
</tr>
<tr>
<td>ENGINEERING WORKSHOPS</td>
<td>2</td>
<td>Prerequisite/Study</td>
</tr>
<tr>
<td>STRENGTH OF MATERIALS</td>
<td>3</td>
<td>Prerequisite/Study</td>
</tr>
<tr>
<td>ENGINEERING MATERIALS</td>
<td>3</td>
<td>Equivalent</td>
</tr>
<tr>
<td>MANUFACTURING PROCESSES</td>
<td>1</td>
<td>3 Show</td>
</tr>
<tr>
<td>ENGINEERING MATERIALS</td>
<td>3</td>
<td>Prerequisite/Study</td>
</tr>
<tr>
<td>ENGINEERING MATERIALS</td>
<td>3</td>
<td>Equivalent</td>
</tr>
<tr>
<td>MANUFACTURING PROCESSES</td>
<td>1</td>
<td>3 Equivalent</td>
</tr>
<tr>
<td>SPECIALISATION Compulsory Req. (12) Hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGINEERING THERMODYNAMICS</td>
<td>3</td>
<td>Show</td>
</tr>
<tr>
<td>THERMODYNAMICS</td>
<td>3</td>
<td>Prerequisite/Study</td>
</tr>
<tr>
<td>ENGINEERING THERMODYNAMICS</td>
<td>3</td>
<td>Equivalent</td>
</tr>
<tr>
<td>THERMODYNAMICS</td>
<td>3</td>
<td>2 Equivalent</td>
</tr>
<tr>
<td>THERMODYNAMICS (2)</td>
<td>3</td>
<td>2 Equivalent</td>
</tr>
<tr>
<td>THERMODYNAMICS</td>
<td>3</td>
<td>3 Equivalent</td>
</tr>
<tr>
<td>FLUID MECHANICS FOR MECHANICAL ENGINEERS</td>
<td>3</td>
<td>Show</td>
</tr>
<tr>
<td>FLUID MECHANICS</td>
<td>3</td>
<td>Prerequisite/Study</td>
</tr>
<tr>
<td>FLUID MECHANICS (2)</td>
<td>3</td>
<td>Equivalent</td>
</tr>
<tr>
<td>HEAT TRANSFER (2)</td>
<td>3</td>
<td>Show</td>
</tr>
<tr>
<td>HEAT TRANSFER (2)</td>
<td>3</td>
<td>3 Equivalent</td>
</tr>
<tr>
<td>HEAT TRANSFER (1)</td>
<td>3</td>
<td>Prerequisite/Study</td>
</tr>
<tr>
<td>DESIGN OF THERMAL SYSTEMS</td>
<td>3</td>
<td>Show</td>
</tr>
<tr>
<td>NUMERICAL METHODS FOR ENGINEERS</td>
<td>3</td>
<td>Prerequisite/Study</td>
</tr>
<tr>
<td>HEAT TRANSFER (2)</td>
<td>3</td>
<td>Prerequisite/Study</td>
</tr>
<tr>
<td>DESIGN OF THERMAL SYSTEMS</td>
<td>3</td>
<td>Equivalent</td>
</tr>
</tbody>
</table>
### Specialisation Elective Req. (15) Hours

**Course Name, Hours, Prerequisite**

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Hours</th>
<th>Prerequisite/Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECIAL TOPICS IN THERMAL POWER 1</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>SPECIAL TOPICS IN ARONAUTICS 1</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>FINITE ELEMENTS ANALYSIS 3</td>
<td>Show</td>
<td>---</td>
</tr>
<tr>
<td>NUMERICAL METHODS FOR ENGINEERS 3 Prerequisite/Study</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>INTRODUCTION TO AERONAUTICS ENGINEERING (NON AER 3 ---)</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>INTRODUCTION TO MECHATRONICS (NON - MECHATRONICS 3 Show</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>INTRODUCTION TO MECHATRONICS 3 Equivalent</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>INTRUMENTATION 3 Prerequisite/Study</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>AIR POLLUTION 3 Show</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>ENGINEERING THERMODYNAMICS 3 Prerequisite/Study</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>MECHANICS OF MATERIALS (2) 3 Show</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>STRENGTH OF MATERIALS 3 Prerequisite/Study</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>MECHANICS OF MATERIALS (2) 3 Equivalent</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>FUEL AND COMBUSTION 3 Show</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>ENGINEERING THERMODYNAMICS 3 Prerequisite/Study</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>FUEL AND COMBUSTION 3 Equivalent</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>INTERNAL COMBUSTION ENGINES 3 Show</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>ENGINEERING THERMODYNAMICS 3 Prerequisite/Study</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>INTERNAL COMBUSTION ENGINES 3 Equivalent</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>THERMAL POWER PLANTS 3 Show</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>ENGINEERING THERMODYNAMICS 3 Prerequisite/Study</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>THERMAL POWER PLANTS 3 Equivalent</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>INDUSTRIAL HEAT EXCHANGERS 3 Show</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>HEAT TRANSFER (2) 3 Prerequisite/Study</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>WATER DESALINATION 3 Show</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>HEAT TRANSFER 3 Prerequisite/Study</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>HEAT TRANSFER (1) 3 Prerequisite/Study</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>WATER DESALINATION 3 Equivalent</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>WATER DESALINATION 3 Equivalent</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>REFRIGERATION 3 Show</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>REFRIGERATION 3 Equivalent</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>TURBOMACHINERY 3 Show</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>ENGINEERING THERMODYNAMICS 3 Prerequisite/Study</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>FLUID MECHANICS FOR MECHANICAL ENGINEERS 3 Prerequisite/Study</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>TURBOMACHINERY 3 Equivalent</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>AIRCRAFT SENSORS AND ACTUATORS 3 Show</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>INTRUMENTATION 3 Prerequisite/Study</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>AIRCRAFT SENSORS AND ACTUATORS 3 Equivalent</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>AUTOTRONICS 3 Show</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>AUTOMATIC CONTROL (1) 3 Prerequisite/Study</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>INTRUMENTATION 3 Prerequisite/Study</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>SPECIAL TOPICS IN THERMAL POWER 3 Show</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td>SPECIAL TOPICS IN THERMAL POWER 3 Prerequisite/Study</td>
<td></td>
<td>---</td>
</tr>
</tbody>
</table>
SUSTAINABLE ENERGY CONVERSION 3 Show  
ENGINEERING THERMODYNAMICS 3 Prerequisite / Study  
ENERGY CONVERSION 3 Equivalent  
PROPULSION 3 Show  
PROPULSION 3 Equivalent  
FLIGHT DYNAMICS (1) 3 Show  
AERODYNAMICS (1) 3 Prerequisite / Study  
AERODYNAMICS (2) 3 Show  
AERODYNAMICS (1) 3 Prerequisite / Study  
AIRCRAFT DESIGN 3 ---  
ACOUSTICS 3 Show  
MECHANICAL VIBRATIONS 3 Prerequisite / Study  
ENGINEERING MATERIALS 3 ---  
HEATING VENTILATION AND AIR CONDITIONING 3 Show  
HEATING, VENTILATION AND AIR CONDITIONING 3 Equivalent  
FLUID POWER CONTROL 3 ---  
DESIGN OF MECHATRONIC SYSTEMS I 3 ---  
SYSTEM MODELLING AND SIMULATION 3 ---  
ROBOTICS IN MANUFACTURING SYSTEMS 3 ---  
SPECIAL TOPICS IN MECHATRONIC 3 ---  
SPECIAL TOPICS IN THERMAL MPOWER 2 ---  
SPECIAL TOPICS IN AERONAUTICS 2 ---  
SPECIAL TOPICS IN MECHATRONICS 1 ---  
SPECIAL TOPICS IN MECHATRONICS 2 ---  
SAFETY ENGINEERING AND MANAGEMENT 3 Show  
SAFETY ENGINEERING AND MANAGEMENT 3 Equivalent  
INTRODUCTION TO PROJECT MANAGEMENT 3 Show  
INTRODUCTION TO PROJECT MANAGEMENT 3 Equivalent  
RELIABILITY AND MAINTENANCE MANAGEMENT 3 Show  
RELIABILITY AND MAINTENANCE MANAGEMENT 3 Equivalent  

The Department of Natural Resources and Environment of the Faculty of Agriculture offers also the B.Sc in Soil & irrigation (2007), whose courses are shown in the following tables.

**University Compulsory Req. (16) Hours**

**Course Name, Hours, Prerequisite**

ARABIC LANGUAGE 3 ---
APPLIED ARABIC LANGUAGE STUDIES 1 Show
CULTURE AND UNIVERSITY BEHAVIOUR 1 Equivalent
ENGLISH LANGUAGE (1) 3 Show
ENGLISH LANGUAGE (REMEDIAL COURSE) 3 Prerequisite / Pass
ENGLISH LANGUAGE (2) 3 Show
ENGLISH LANGUAGE (1) 3 Prerequisite / Study
COMMUNICATION SKILLS II 3 Equivalent
MILITARY SCIENCES 3 ---
COMPUTER SKILLS 3

University Elective Req. (9) Hours
Course Name, Hours, Prerequisite
ENVIRONMENT PROTECTION (3)
COMMUNITY HEALTH AND NUTRITION (3)
FIRST AID 3 Show
FIRST AID 3 Equivalent
FUNDAMENTALS OF AUTOMOBILE ENGINEERING (FOR NON-MECHANICAL ENGINEERING STUDENTS)
DRUGS & MEDICINAL PLANTS IN JORDAN (3)
HEALTH PROMOTION (3)
ORAL & DENTAL HEALTH (3)
FOOD PRESERVATION "IN ENGLISH "(FOR NON NUTRITION & FOOD TECHNOLOGY STUDENTS)
PET ANIMAL CARE (3)
AL HADITH AL SHAREEF (3)
FAITH (3)
FEKEH (3)
ISLAM AND RECENT PROBLEMS (3)
ECONOMIC SYSTEM IN ISLAM (3)
PRINCIPLES OF SOCIOLOGY (3) Show
SOCIOLOGY 3 Equivalent
INTRODUCTION TO ANTHROPOLOGY (3)
INTRODUCTION TO EDUCATIONAL SCIENCE (3)
EDUCATION SYSTEM IN JORDAN (3)
INTRODUCTION TO PHILOSOPHY (3)
PRINCIPLES OF PSYCHOLOGY (3) Show
INTRODUCTION TO PSYCHOLOGY (IN ENGLISH) (3) Equivalent
PRINCIPLES OF PSYCHOLOGY 3 Equivalent
EDUCATIONAL TECHNOLOGY (3)
NATIONAL EDUCATION (3)
ISLAMIC CIVILISATION (3)
THE HISTORY OF THE CITY OF JERUSALEM (3)
CIVILISATION AND RECENT CULTURES (3)
HUMAN RIGHTS BASIC LIBERITIES (3)
The LAW IN OUR LIFE (3)
INTRODUCTION TO ECONOMICS (3)
LIBRARY AND INFORMATION RESEARCH (3)
INTRODUCTION TO MANAGEMENT SCIENCES (3)
CONTEMPORARY PROBLEMS (3)
INDIVIDUAL AND SOCIETY (3)
INTERNATIONAL GLOBAL/issues (3)
HISTORY OF SCIENCES IN ISLAM (3)
The HISTORY OF MUSIC (3)
THE SCIENCE OF CHILDREN BEHAVIOUR 3 ---
ENVIRONMENT PROTECTION (FOR NON ENVIRONMENTAL SCIENCES STUDENTS) 3 ---
WELLNESS & LIFESTYLE (NOT FOR PHYSICAL & OCCUPATIONAL THERAPY) 3 -
--

**Faculty Compulsory Req. (21) Hours**

<table>
<thead>
<tr>
<th>Course Name, Hours, Prerequisite</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRINCIPLES OF AGRICULTURAL ECONOMICS</td>
<td>3</td>
</tr>
<tr>
<td>EXTENSION AND TRANSFER OF AGRICULTURAL TECHNOLOGY</td>
<td>3</td>
</tr>
<tr>
<td>CALCULUS (FOR BIO.SCI. STUDENTS)</td>
<td>3</td>
</tr>
<tr>
<td>GENERAL CHEMISTRY</td>
<td>3</td>
</tr>
<tr>
<td>GENERAL PHYSICS</td>
<td>3</td>
</tr>
<tr>
<td>GENERAL BIOLOGY</td>
<td>3</td>
</tr>
<tr>
<td>SELECTED PROGRAMMING LANGUAGES (FOR NON COMPUTER SCIENCE INFORMATION STUDENTS)</td>
<td>3</td>
</tr>
<tr>
<td>COMPUTER SKILLS</td>
<td>3</td>
</tr>
</tbody>
</table>

**Department Compulsory Req. (77) Hours**

<table>
<thead>
<tr>
<th>Course Name, Hours, Prerequisite</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRINCIPLES OF PLANT SCIENCE</td>
<td>3</td>
</tr>
<tr>
<td>GENERAL BIOLOGY</td>
<td>3</td>
</tr>
<tr>
<td>PRINCIPLES OF PLANT SCIENCE (LABORATORY)</td>
<td>0</td>
</tr>
<tr>
<td>PRINCIPLES OF PLANT SCIENCE</td>
<td>3</td>
</tr>
<tr>
<td>INTRODUCTION TO BIOSTATISTICS</td>
<td>3</td>
</tr>
<tr>
<td>CALCULUS (FOR BIO.SCI.STUDENTS)</td>
<td>3</td>
</tr>
<tr>
<td>ELEMENTS OF STATISTICS</td>
<td>3</td>
</tr>
<tr>
<td>PRINCIPLES OF SOIL SCIENCE</td>
<td>3</td>
</tr>
<tr>
<td>GENERAL CHEMISTRY</td>
<td>3</td>
</tr>
<tr>
<td>PRINCIPLES OF IRRIGATION AND DRAINAGE</td>
<td>3</td>
</tr>
<tr>
<td>PRINCIPLES OF SOIL SCIENCE</td>
<td>3</td>
</tr>
<tr>
<td>PRINCIPLES OF IRRIGATION AND DRAINAGE (LAB)</td>
<td>0</td>
</tr>
<tr>
<td>PRINCIPLES OF IRRIGATION AND DRAINAGE</td>
<td>3</td>
</tr>
<tr>
<td>SOIL PHYSICS</td>
<td>3</td>
</tr>
<tr>
<td>PRINCIPLES OF SOIL SCIENCE</td>
<td>3</td>
</tr>
<tr>
<td>SOIL PHYSICS (LAB)</td>
<td>0</td>
</tr>
<tr>
<td>SOIL PHYSICS</td>
<td>3</td>
</tr>
<tr>
<td>SOIL PLANT WATER RELATIONS</td>
<td>3</td>
</tr>
<tr>
<td>SOIL PHYSICS</td>
<td>3</td>
</tr>
<tr>
<td>ENVIRONMENTAL SOIL CHEMISTRY</td>
<td>3</td>
</tr>
<tr>
<td>PRINCIPLES OF SOIL SCIENCE</td>
<td>3</td>
</tr>
<tr>
<td>ANALYTICAL CHEMISTRY</td>
<td>3</td>
</tr>
<tr>
<td>RANGE MANAGEMENT</td>
<td>3</td>
</tr>
<tr>
<td>GENERAL BIOLOGY</td>
<td>3</td>
</tr>
<tr>
<td>SOIL CONSERVATION AND LAND MANAGEMENT</td>
<td>3</td>
</tr>
</tbody>
</table>
PRINCIPLES OF SOIL SCIENCE 3 Prerequisite / Study
PRINCIPLES OF HYDRAULICS 3 Show
PRINCIPLES OF IRRIGATION AND DRAINAGE 3 Prerequisite / Study
HYDROLOGY 3 Show
PRINCIPLES OF IRRIGATION AND DRAINAGE 3 Prerequisite / Study
GEOGRAPHICAL INFORMATION SYSTEMS (GIS) AND REMOTE SENSING 3 Show
CALCULUS (FOR BIO.SCI. STUDENTS) 3 Prerequisite / Study
COMPUTER SKILLS 3 Prerequisite / Study
GEOGRAPHICAL INFORMATION SYSTEMS (GIS) AND REMOTE SENSING (LAB) 0 Show
GEOGRAPHICAL INFORMATION SYSTEMS (GIS) AND REMOTE SENSING 3 Concurrent
SUMMER TRAINING 6 ---
SOIL FERTILITY AND FERTISERS 3 Show
PRINCIPLES OF PLANT SCIENCE 3 Prerequisite / Study
PRINCIPLES OF SOIL SCIENCE 3 Prerequisite / Study
SOIL CHEMISTRY AND FERTILITY LABORATORY 2 Show
ENVIRONMENTAL SOIL CHEMISTRY 3 Prerequisite / Study
SOIL CHEMISTRY AND FERTILITY LABORATORY (LAB) 0 Show
SOIL CHEMISTRY AND FERTILITY LABORATORY 2 Pre./Con.
SOIL RECLAMATION 3 Show
ENVIRONMENTAL SOIL CHEMISTRY 3 Prerequisite / Study
ENVIRONMENTAL MICROBIOLOGY 3 Show
GENERAL MICROBIOLOGY (LABORATORY) 1 Prerequisite / Study
SOIL GENESIS AND CLASSIFICATION 3 Show
PRINCIPLES OF SOIL SCIENCE 3 Prerequisite / Study
AGRICULTURAL DRAINAGE 2 Show
PRINCIPLES OF IRRIGATION AND DRAINAGE 3 Prerequisite / Study
WATER RESOURCES 2 Show
HYDROLOGY 3 Prerequisite / Study
WATER RESOURCES 2 Equivalent
IRRIGATION SYSTEMS DESIGN 3 Show
PRINCIPLES OF HYDRAULICS 3 Prerequisite / Study
SEMINAR 1 ---
GENERAL CHEMISTRY LAB 1 Show
GENERAL CHEMISTRY 3 Pre./Con.
ORGANIC CHEMISTRY 3 Show
GENERAL CHEMISTRY 3 Prerequisite / Study
ANALYTICAL CHEMISTRY 3 Show
GENERAL CHEMISTRY 3 Prerequisite / Study
ANALYTICAL CHEMISTRY LAB. 1 Show
GENERAL CHEMISTRY LAB 1 Prerequisite / Study
ANALYTICAL CHEMISTRY 3 Pre./Con.
GENERAL BIOLOGY (PRACTICAL) 1 Show
GENERAL BIOLOGY 3 Pre./Con.
GENERAL MICROBIOLOGY 3 Show
GENERAL BIOLOGY 3 Prerequisite / Study
GENERAL MICROBIOLOGY 3 Equivalent
GENERAL MICROBIOLOGY (LABORATORY) 1 Show
GENERAL MICROBIOLOGY (LAB) 1 Equivalent
GENERAL MICROBIOLOGY 3 Pre./Con.

**Department Elective Req. (9) Hours**

<table>
<thead>
<tr>
<th>Course Name, Hours, Prerequisite</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>VEGETABLE PRODUCTION 3 Show</td>
<td></td>
</tr>
<tr>
<td>PRINCIPLES OF PLANT SCIENCE 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>VEGETABLE PRODUCTION (LABORATORY) 0 Show</td>
<td></td>
</tr>
<tr>
<td>VEGETABLE PRODUCTION 3 Concurrent</td>
<td></td>
</tr>
<tr>
<td>DECIDUOUS FRUIT TREES 3 Show</td>
<td></td>
</tr>
<tr>
<td>PRINCIPLES OF PLANT SCIENCE 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>DECIDUOUS FRUIT TREES 0 Show</td>
<td></td>
</tr>
<tr>
<td>DECIDUOUS FRUIT TREES 3 Concurrent</td>
<td></td>
</tr>
<tr>
<td>DECIDUOUS FRUIT TREES (LABORATORY) 0 Equivalent</td>
<td></td>
</tr>
<tr>
<td>LANDSCAPE HORTICULTURE (LABORATORY) 0 Show</td>
<td></td>
</tr>
<tr>
<td>LANDSCAPE HORTICULTURE 3 Concurrent</td>
<td></td>
</tr>
<tr>
<td>LANDSCAPE HORTICULTURE 3 Show</td>
<td></td>
</tr>
<tr>
<td>PRINCIPLES OF PLANT SCIENCE 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>INTRODUCTION TO NATURAL RESOURCES MANAGEMENT 3 Show</td>
<td></td>
</tr>
<tr>
<td>PRINCIPLES OF SOIL SCIENCE 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>INTRODUCTION TO PROBLEMS OF NATURAL RESOURCES AND ENVIRONMENT 3 Equivalent</td>
<td></td>
</tr>
<tr>
<td>FOREST SCIENCE 3 Show</td>
<td></td>
</tr>
<tr>
<td>PRINCIPLES OF PLANT SCIENCE 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>DRAWING ENGINEERING 3 ---</td>
<td></td>
</tr>
<tr>
<td>SOIL SURVEY AND LAND USE 3 Show</td>
<td></td>
</tr>
<tr>
<td>SOIL GENESIS AND CLASSIFICATION 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>ENVIRONMENTAL AGRICULTURAL MANAGEMENT 3 ---</td>
<td></td>
</tr>
<tr>
<td>IRRIGATION MANAGEMENT 3 Show</td>
<td></td>
</tr>
<tr>
<td>IRRIGATION SYSTEMS DESIGN 3 Pre./Con.</td>
<td></td>
</tr>
<tr>
<td>RANGE DEVELOPMENT AND PROTECTION 3 Show</td>
<td></td>
</tr>
<tr>
<td>RANGE MANAGEMENT 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>INSTRUMENTAL ANALYSIS IN SOIL SCIENCE 3 Show</td>
<td></td>
</tr>
<tr>
<td>ENVIRONMENTAL SOIL CHEMISTRY 3 Prerequisite / Study</td>
<td></td>
</tr>
<tr>
<td>SELECTED TOPICS IN SOIL,WATER AND ENVIRONMENT 1 ---</td>
<td></td>
</tr>
<tr>
<td>SELECTED TOPICS IN SOIL,WATER AND ENVIRONMENT 2 ---</td>
<td></td>
</tr>
<tr>
<td>SELECTED TOPICS (A) 3 ---</td>
<td></td>
</tr>
</tbody>
</table>
B15. Bachelors (University Putra Malaysia)

The Department of Biological and Agricultural Engineering of UPM offers a 4-year Bachelor of Engineering in Agricultural and Biosystems Engineering. Agricultural and Biosystems Engineering is a discipline of Engineering fundamentals and Biological Sciences, in the analysis and solution of problems in the agricultural and biological systems. It encompasses all Engineering activities related to agricultural production and the processing of agricultural and other biological products. It also encompasses the management and monitoring of natural (including land, water, air and energy) and biological resources.

The program objectives are the following:

- to produce graduates in Biological and Agricultural Engineering, as well as Agricultural and Biosystems Engineering, having a strong scientific background, and innovative, technically and professionally competent;
- to produce graduates able to become successful future industry and social community leaders;
- to produce graduates able to adapt to the international and global work environment, as well as to pursue research and lifelong learning.

The 15 program outcomes, which students should achieve upon graduating, are related to their abilities to:

1) apply knowledge of mathematics and engineering sciences;
2) design and carry out experiment;
3) analyse and interpret data;
4) design a system, component or process to meet a requirement;
5) apply the principles of sustainable design and development;
6) function effectively as an individual in a group;
7) demonstrate the characteristics of a leader or a manager;
8) identify, formulate and provide creative/innovative/effective solution to a problem;
9) explain professional and ethical responsibility;
10) communicate effectively with Engineers, other professionals and community;
11) explain the impact of Engineering solutions on the society, culture and environment;
12) recognise the need to be engaged in lifelong learning;
13) discuss the relevant contemporary issues;
14) use the skills, techniques and modern Engineering tools for Engineering practice;
15) solve problems in advanced design and development.

Academic linkages with overseas institutions of Higher Education have been established, in order to exchange information and experience in teaching, research and other related activities. Good relations with industries are developed through industrial training for students and joint research activities.

The Department is also certified with ISO 9001:2000 for all operations, including matters pertaining to teaching and learning processes. Outcome Based Education (OBE) has also been adopted as the main approach of teaching and learning at the Department.
Unlike other Engineering programs, this Agricultural and Biosystems curriculum has been designed with the focus not only on Engineering design and analysis but also on creativity and entrepreneurial aspects. This 4-year curriculum has a total of 140 credit hours required for graduation, including a 5-credit industrial training (10 weeks) and 6-credit final year project. During the first and second year of the program students are exposed to the Basic Engineering Sciences and the Biological and Agricultural Engineering core courses.

Each student is required to undergo a 10-week training session in a private company or a government agency during the third year semester break. In their fourth year the students will take courses in project and business management and other courses related to their individual specialisation option.

The following 5 specialisation options are offered:

1) **Bioprocess and Environment**
   Design of agricultural waste handling and treatment systems. Managing and optimising the utilisation of natural and biological resources, re-use and recycling of disposed materials, and application of zero pollution technology. Importance of safety and health in agricultural production activities.

2) **Infrastructure and Resources Conservation**
   Area development for agriculture, settlement and recreation. Design of irrigation and drainage systems. Design of a mutually beneficial ecosystem of life and environment. Study and analysis of the agricultural system as an integrated component of landscape. Monitoring and conservation of natural resources. Rehabilitation of forests, lakes, rivers and idle lands, and the sustainable development and exploitation of the agricultural ecosystem.

3) **Biomechanical Systems**
   Mechanisation and machine development for a modern, high-technology farm production structure. Design, development and adaptation of machines and dissemination of innovations capable to reduce labour, maximise earnings and guarantee quality work and environment friendliness.

4) **Robotics and Automation**
   Design of agricultural and biosystems sensors for control and automation in the agricultural production industry and the biological systems. Design of robots for farm operation when use of machines is difficult or impossible.

5) **Bioinformation System**
   Development of a database of all Engineering knowledge on agriculture. Biological systems modelling aimed at understanding the mutual response between life and the environment. Application of GIS technology for the inventory, analysis and management of biological resources and remote sensing technology for observation and examination of the landscape and its local forms and agricultural activities.
B16. Bachelors (Seoul National University)

The Department of Biosystems & Biomaterials Science and Engineering offers 2 Bachelor programs:

1) Biosystems Engineering;
2) Biomaterials Science.

1) **Biosystems Engineering** is an engineering field dealing with foods, living organisms and environments. Biosystems Engineers incorporate innovative technology (computer vision, remote sensing, GPS, GIS, robotics, and control engineering) into the production and use of biological resources, such as plants and livestock, the development of biosensors, and biomedical engineering applications. Biosystems Engineers are well aware of the needs of life: plenty of safe food to eat, pure water to drink, clean fuel and energy resources, and a safe and healthy environment where to live. In order to satisfy these needs, Biosystems Engineers apply engineering principles to many processes associated with the production of agricultural products and the management of natural resources.

The Bachelor program in Biosystems Engineering deals with engineering based technologies, required for the development of much equipment and many systems used for the production, processing, storage, transportation and management of agricultural products, as well as for their production and use, by applying modern engineering technologies, such as machinery, electrical and electronic engineering, and computer technology.

Biosystems Engineering will significantly contribute to the future agricultural, livestock and food industries, by training highly qualified Engineers well equipped with knowledge on both biosystems and engineering.

Biosystems Engineering has made our farms very competitive through the mechanisation of agriculture during the industrialisation period. It has been evolving into a unique academic discipline, where to apply engineering skills to not only agriculture but also general biological systems, in accordance with the recent development of bio-engineering.

Teaching and research topics covered in the Bachelor program in Biosystems Engineering include farm power and automation, off-road equipment design, plant product ion machinery, agricultural process systems, engineering properties of biomaterials, electronics and sensors, and bioprocess systems.

Currently, highly focused research is being carried out on farm machinery design via computer technology, cereal and fruit process systems, agricultural robotics, biosensor, image process applications, artificial intelligence applications, environmentally friendly precision farming and bioprocess system development. Active and effective collaborations are carried out with various related areas, such as horticulture, animal science, food science and forest products.

2) As one of the top programs in Biomaterials Science in the nation, the Bachelor program in **Biomaterials** provides a superior interdisciplinary research and education environment, that prepares graduates to be leaders in the art of integrating materials science and biology, in order to develop environmentally friendly polymer materials and bio-inspired ones. Through its Faculty and graduates, the Bachelor program in Biomaterials is a driving force in creating basic science knowledge and new technology, fulfilling the vision of SNU Biomaterials.
SNU Biomaterials Faculty collaborates for the interdisciplinary research projects pursuing research and development and providing a core curriculum of enviro, nano, and bio-materials on the basis of principle courses: organic chemistry, physical chemistry, biochemistry, applied analysis, mechanics and bioengineering. SNU Biomaterials Faculty focuses research activity on the development of systematic functional biomaterials useful in human society, based on the technology derived from fusing life science and materials engineering. SNU Biomaterials proudly offers a unique aspect of the integration of research and education. The undergraduates are given opportunities for independent research projects and the graduate program offers students early immersion in research. Well trained graduates from the Department build their career in a variety of professional sectors, including private industry, research or educational institutions, patent law and government.
C. GRADUATE STUDIES

C1. Master and PhD programs (China Agricultural University)

Within China Agricultural University the College of Engineering aims at providing students with the best educational background, in order that they can reach their full potential both in the study of Engineering science and as persons. The professors use the resources of Peking University, in order to educate students to become academic leaders, innovative Engineers and leading entrepreneurs.

Master programs

The College of Engineering offers the following 2 Master programs:
1) Biomedical Engineering;
2) Control Theory and Control Engineering.

The courses included in the core of the Master study programs are shown in the following table.

<table>
<thead>
<tr>
<th>N.</th>
<th>Course name</th>
<th>Credits</th>
<th>Hours per week</th>
<th>Total hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Topics on Control of Complex Systems</td>
<td>3</td>
<td>3</td>
<td>54</td>
</tr>
<tr>
<td>2</td>
<td>Impact Dynamics</td>
<td>3</td>
<td>3</td>
<td>54</td>
</tr>
<tr>
<td>3</td>
<td>Fracture Mechanics</td>
<td>3</td>
<td>3</td>
<td>54</td>
</tr>
<tr>
<td>4</td>
<td>Micromechanics and Nanomechanics</td>
<td>3</td>
<td>3</td>
<td>54</td>
</tr>
<tr>
<td>5</td>
<td>Stability of Elastic Systems</td>
<td>3</td>
<td>3</td>
<td>54</td>
</tr>
<tr>
<td>6</td>
<td>Continuum Mechanics</td>
<td>4</td>
<td>4</td>
<td>64</td>
</tr>
<tr>
<td>7</td>
<td>Dynamic Experimental Mechanics</td>
<td>4</td>
<td>4</td>
<td>64</td>
</tr>
<tr>
<td>8</td>
<td>Advanced Fluid Mechanics</td>
<td>3</td>
<td>3</td>
<td>48</td>
</tr>
<tr>
<td>9</td>
<td>Heat and Mass Transfer</td>
<td>3</td>
<td>3</td>
<td>54</td>
</tr>
<tr>
<td>10</td>
<td>Environmental Thermodynamics</td>
<td>3</td>
<td>3</td>
<td>54</td>
</tr>
<tr>
<td>11</td>
<td>Control Mathematical Foundation</td>
<td>3</td>
<td>3</td>
<td>54</td>
</tr>
<tr>
<td>12</td>
<td>Computer Aided Design of Control Systems</td>
<td>3</td>
<td>3</td>
<td>54</td>
</tr>
<tr>
<td>13</td>
<td>Modern Mathematical Foundation</td>
<td>3</td>
<td>3</td>
<td>54</td>
</tr>
<tr>
<td>14</td>
<td>Linear System</td>
<td>3</td>
<td>3</td>
<td>54</td>
</tr>
<tr>
<td>15</td>
<td>Mathematical Foundations of Materials Science</td>
<td>3</td>
<td>3</td>
<td>54</td>
</tr>
<tr>
<td>16</td>
<td>Introduction to Materials Physics</td>
<td>2</td>
<td>2</td>
<td>36</td>
</tr>
<tr>
<td>17</td>
<td>Thermodynamics of Materials</td>
<td>2</td>
<td>2</td>
<td>32</td>
</tr>
<tr>
<td>18</td>
<td>Advanced Materials Chemistry</td>
<td>3</td>
<td>3</td>
<td>54</td>
</tr>
<tr>
<td>19</td>
<td>Aerospace Materials</td>
<td>2</td>
<td>2</td>
<td>36</td>
</tr>
<tr>
<td>20</td>
<td>Functional Materials and Devices I</td>
<td>3</td>
<td>3</td>
<td>54</td>
</tr>
<tr>
<td>21</td>
<td>Combustion &amp; Pollution Control</td>
<td>2</td>
<td>2</td>
<td>32</td>
</tr>
<tr>
<td>22</td>
<td>Energy Materials</td>
<td>2</td>
<td>2</td>
<td>32</td>
</tr>
<tr>
<td>23</td>
<td>Fluid Flow in Porous Media</td>
<td>3</td>
<td>3</td>
<td>48</td>
</tr>
</tbody>
</table>
The College of Engineering offers the following 8 PhD programs:
1) Advanced Materials and Mechanics;
2) Biomechanics and Biomedical Engineering;
3) Dynamics and Control;
4) Energy and Resources Engineering;
5) Engineering Mechanics;
6) Fluid Mechanics;
7) General Mechanics and Foundation of Mechanics;
8) Solid Mechanics.

Moreover, authorised by the Academic Degrees Committee of the State Council, the College of Engineering launched the first joint PhD program, together with the Georgia Institute of Technology and Emory University (USA).

C2. Master and PhD programs (Huazhong Agricultural University)

Master programs

The courses included in the core of the Master degree study programs (2-3 years) are shown in the following list:

7) Botany;
1) Microbiology;
2) Genetics;
3) Zoology;
4) Developmental Biology;
5) Cell Biology;
6) Biochemistry & Molecular Biology;
7) Genomics;
8) Food Science;
9) Crop Genetics and Breeding;
10) Crop Biotechnology;
11) Pomology;
12) Olericulture;
13) Tea Science;
14) Agrology;
15) Plant Nutrition;
16) Animal Genetics, Breeding and Reproduction;
17) Garden Plant and Ornamental Horticulture;
18) Entomology;
19) Preventive Veterinary Medicine;
20) Hydrobiology;
21) Environmental Engineering;
22) Crop Cultivation and Farming System;
23) Pesticide Science;
24) Ecology.

PhD programs

The courses included in the PhD programs (3 years) are shown in the following list:

1) Botany;
2) Microbiology;
3) Genetics;
4) Developmental Biology;
5) Cell Biology;
6) Biochemistry & Molecular Biology;
7) Genomics;
8) Crop Genetics and Breeding;
9) Agricultural Economics & Management;
10) Zoology;
11) Food Biotechnology;
12) Crop Biotechnology;
13) Pomology;
14) Agrology;
15) Plant Nutrition;
16) Animal Genetics, Breeding, and Reproduction;
17) Garden Plant and Ornamental Horticulture;
18) Hydrobiology;
19) Food Science;
20) Veterinary Medicine;
21) Ecology;
22) Food Nutrition and Safety.
C3. Master and PhD programs (South China Agricultural University)

Since 2008 SCAU is authorised to confer Doctoral degrees in 9 primary disciplines, which encompass 76 Master degree programs and 49 PhD programs in secondary disciplines, covering research fields in philosophy, economics, law, agriculture, humanities, science, engineering and management.

Master programs

The courses included in the Master degree study programs (3 years, of which 1-year General Scholar) are shown in the following list:

1) Industrial Economics;
2) International Trade;
3) Study of Marxism in China;
4) Cartography and Geography Information System;
5) Botany;
6) Animal Sciences;
7) Physiology;
8) Hydrobiology;
9) Microbiology;
10) Genetics;
11) Biochemistry and Molecular Biology;
12) Biophysics;
13) Ecology;
14) Biomathematics;
15) History of Science and Technology;
16) Mechatronic Engineering;
17) Machine Design and Theory;
18) Vehicle Engineering;
19) Pattern Recognition and Intelligent System;
20) Applied Computer Technology;
21) Applied Chemistry;
22) Agricultural Mechanisation;
23) Agricultural Soil and Water Engineering;
24) Agricultural Biological Environment and Energy Engineering;
25) Agricultural Electrification and Automation;
26) Modern Agricultural Equipment and Facilities;
27) Wood Science and Technology;
28) Environment Sciences;
29) Environment Engineering;
30) Food Sciences;
31) Grain, Fat and Plant Protein Engineering;
32) Agricultural Products Processing and Storage Engineering;
33) Aquatic Products Processing and Storage Engineering;
34) Crop Cultivation and Geoponics;
35) Crop Genetics and Breeding;
36) History of Crop;
37) Pomology;
38) Olericulture;
39) Tea Science;
40) Post-harvest Processing for Horticultural Products;
41) Ornamental Horticulture;
42) Soil Science;
43) Crop Nutrition;
44) Agricultural Environment Sciences;
45) Fertilisers;
46) Plant Pathology;
47) Agricultural Entomology and Pest Control;
48) Pesticides Science;
49) Animal Genetics and Breeding;
50) Animal Nutrition and Feed Science;
51) Praticultural Science;
52) Special Animal Breeding and Raising (including Silkworm and Bee);
53) General Veterinary;
54) Preventive Veterinary;
55) Clinical Veterinary;
56) Veterinary Pharmacy;
57) Forest Cultivation;
58) Forest Protection;
59) Forest Management;
60) Gardening Plants and Ornamental Horticulture;
61) Aquaculture;
62) Management Science and Engineering;
63) Corporate Management;
64) Agricultural Economics and Management;
65) Forestry Economics and Management;
66) Land Resources Management.

**PhD programs**
The courses included in the PhD programs (3 years, of which 1-year Senior Scholar) are shown in the following list:

1) Botany;
2) Animal Sciences;
3) Physiology;
4) Hydrobiology;
5) Microbiology;
6) Genetics;
7) Biochemistry and Molecula Biology;
8) Ecology;
9) Biomathematics;
10) Agricultural Mechanisation;
11) Agricultural Soil and Water Engineering;
12) Agricultural Biological Environment and Energy Engineering;
13) Agricultural Electrification and Automation;
14) Modern Agricultural Equipment and Facilities;
15) Food Science;
16) Agricultural Products Processing and Storage Engineering;
17) Products Post-harvest Physiology, Storage and Transportation Engineering;
18) Crop Cultivation and Geoponics;
19) Crop Genetics and Breeding;
20) History of Crop;
21) Pomology;
22) Olericulture;
23) Post-harvest Processing for Horticultural Products;
24) Ornamental Horticulture;
25) Soil Science;
26) Crop Nutrition;
27) Agricultural Environment Sciences;
28) Fertilisers;
29) Plant Pathology;
30) Agricultural Entomology and Pest Control;
31) Pesticides Science;
32) Animal Genetics and Breeding;
33) Animal Nutrition and Feed Science;
34) Pratacultural Science;
35) Special Animal Breeding and Raising (Including Silkworm and Bee);
36) General Veterinary;
37) Preventive Veterinary;
38) Clinical Veterinary;
39) Veterinary Medicine;
40) Agricultural Economics and Management;
41) Forestry Economics and Management;
42) Rural Industrial Economics and Institutional Economics;
43) Agricultural Trade and Rural Banking;
44) Agricultural Technological Economics and Project Management.

C4. Master and PhD programs (Northwest Agriculture and Forestry University)

The graduate education at Northwest A&F University has a long history, which can be traced back to 1941.
Since the implementation of the degree system in 1981, the University has become one of the earliest establishments of Higher Education which can confer Master Degree and second for PhD. Under the approval of the Ministry of Education in 2003, Northwest A&F University established Graduate School on a trial basis, and in 2007 it was officially approved. Northwest A&F University has 7 state key disciplines and 24 key disciplines at provincial or ministerial level, and 11 post-doctoral research stations. The University has 11 first-class disciplines of PhD degree authorisations, which offer 71 PhD programs, and 18 first-class disciplines of Master degree authorisations, which offer 105 Master programs. Currently the graduate programs involve 11 disciplines, including Agriculture, Science, Engineering, Economics, Management, Law, Education, Medicine, History, Philosophy and Literature. The University offers 4 professional Master degrees in the following areas:

1) Engineering;
2) Agricultural Extension;
3) Veterinary Medicine;
4) Landscape and Gardening.
Moreover, the University confers Master degrees for “on-the-job” study of HEIs and secondary vocational school teachers.
## Master programs

<table>
<thead>
<tr>
<th>College</th>
<th>Level I Academic Discipline</th>
<th>Level II Academic Discipline</th>
</tr>
</thead>
<tbody>
<tr>
<td>College of Water Resources and Architectural Engineering</td>
<td>Civil Engineering</td>
<td>Geotechnical Engineering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Structural Engineering</td>
</tr>
<tr>
<td></td>
<td>Hydraulic Engineering</td>
<td>Hydrology and Water Resources</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hydraulics and River Dynamics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hydraulic Structure Engineering</td>
</tr>
<tr>
<td></td>
<td>Agricultural Engineering</td>
<td>Hydraulic and Hydro-Power Engineering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Harbor, Coastal and Offshore Engineering</td>
</tr>
<tr>
<td></td>
<td>Agricultural Engineering</td>
<td>Agricultural Water Resources and Environment Engineering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agricultural Water-Soil Engineering</td>
</tr>
<tr>
<td>College of Mechanical and Electronic Engineering</td>
<td>Agricultural Engineering</td>
<td>Agricultural Mechanisation Engineering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agricultural Biological Environmental and Energy Engineering</td>
</tr>
<tr>
<td></td>
<td>Mechanical Engineering</td>
<td>Agricultural Electrification and Automation</td>
</tr>
<tr>
<td></td>
<td>Forestry Engineering</td>
<td>Biomaterials Science and Engineering</td>
</tr>
<tr>
<td></td>
<td>Food Science and Engineering</td>
<td>Mechanical Design and Theory</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wood Science and Technology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Processing and Storage of Agriculture Products</td>
</tr>
<tr>
<td>College of Food Science and Engineering</td>
<td>Food Science and Engineering</td>
<td>Food Science</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cereals, Oils and Vegetable Protein Engineering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Processing and Storage of Aquatic Products</td>
</tr>
</tbody>
</table>

The courses included in the Master degree study programs (2-3 years) are shown in the following list:
1) Seed Engineering;
2) Plant Resource Science;
3) Crop Genetics and Breeding;
4) Crop Cultivation and Tillage;
5) Plant Pathology;
6) Agricultural Insect & Pest Control;
7) Pesticide Science;
8) Utilisation of Plant Resources;
9) Eco-engineering of Integrated Pest Management;
10) Tea Science;
11) Pomology;
12) Olericulture;
13) Ornamental Plants & Horticulture;
14) Gardening Plant Germplasm Resources;
15) Neurobiology;
16) Developmental Biology;
17) Cell Biology;
18) Basic Veterinary Medicine;
19) Preventive Veterinary Medicine;
20) Clinical Veterinary Medicine;
21) Biology (animal orientation);
22) Physiology;
23) Animal Science;
24) Genetics;
25) Grass Science;
26) Hydrobiology;
27) Animal Genetic Breeding and Reproduction;
28) Animal Nutrition and Feed Science;
29) Forest Silviculture;
30) Forest Protection;
31) Forest Management;
32) Forest Tree Genetics and Breeding;
33) Wood Science & Engineering;
34) Chemical Processing Engineering of Forest Products;
35) Protection and Utilisation of Wild Animals and Plants;
36) Pedology;
37) Fertiliser Science;
38) Environmental Science;
39) Plant Nutrition;
40) Biology of Resources and Environment;
41) Soil and Water Conservation and Desertification Control;
42) Cartology and Geographic Information System;
43) Agricultural Environment Protection and Food Safety;
44) Land Resources and Spatial Information Technology;
45) Geotechnical Engineering;
46) Hydraulic and Hydropower Engineering;
47) Agricultural Hydraulic and Soil Engineering;
48) Hydrology and Water Resources;
49) Hydraulics and River Dynamics;
50) Wood Science & Technology;
51) Agricultural Mechanisation Engineering;
52) Mechanical Design and Theory;
53) Agricultural Electrification and Automation;
54) Biomaterial Science and Engineering;
55) Agricultural Products Processing and Storage;
56) Agricultural Bio-environment and Energy Engineering;
57) Computer Application Technology;
58) Food Science;
59) Food Stuff, Grease and Vegetable Protein Engineering;
60) Grape and Wine;
61) Fermentation Engineering;
62) Botany;
63) Biochemistry and Molecular Biology;
64) Microbiology;
65) Bioinformatics;
66) Pharmaceutical Botany;
67) Traditional Chinese Medicine;
68) Finance;
69) Regional Economics;
70) Land Resource Management;
71) Agricultural Economics and Management;
72) Economics and Management of Forestry;
73) Agricultural Technological Economics and Program Management;
74) Sociology;
75) History of Science and Technology;
76) Vocational Education Science;
77) Environment and Resources Protection Law;
78) Development of Agriculture and Rural Area.
PhD programs

<table>
<thead>
<tr>
<th>College</th>
<th>Name of Level 1 Discipline</th>
<th>Name of Level 2 Discipline</th>
</tr>
</thead>
<tbody>
<tr>
<td>College of Water Resources and Architectural Engineering</td>
<td>Hydraulic Engineering</td>
<td>Hydrology and Water Resources</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hydraulic and Hydropower Engineering</td>
</tr>
<tr>
<td></td>
<td>Agricultural Engineering</td>
<td>Agricultural Water Resources and Water Environment Engineering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agricultural Water-Soil Engineering</td>
</tr>
<tr>
<td>College of Mechanical and Electronic Engineering</td>
<td>Agricultural Engineering</td>
<td>Agricultural Mechanisation Engineering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agricultural Biological Environment and Energy Engineering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agricultural Electrification and Automation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biomaterials Science and Engineering</td>
</tr>
<tr>
<td>College of Food Science and Engineering</td>
<td>Food Science and Engineering</td>
<td>Processing and Storage of Agricultural Products</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Food Science</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cereals, Oils and Vegetable Protein Engineering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Processing and Storage of Aquatic Products</td>
</tr>
</tbody>
</table>

The courses included in the PhD study programs (3-4 years) are shown in the following list:

1) Seed Engineering;
2) Plant Resource Science;
3) Crop Genetics and Breeding;
4) Crop Cultivation and Tillage;
5) Plant Pathology;
6) Agricultural Insect & Pest Control;
7) Pesticide Science;
8) Utilisation of Plant Resources;
9) Eco-engineering of Integrated Pest Management;
10) Tea Science;
11) Pomology;
12) Olericulture;
13) Gardening Plant Germplasm Resources;
14) Basic Veterinary Medicine;
15) Preventive Veterinary Medicine;
16) Clinical Veterinary Medicine;
17) Biology (animal orientation);
18) Developmental Biology;
19) Neurobiology;
20) Cell Biology;
21) Physiology;
22) Genetics;
23) Animal Science;
24) Hydrobiology;
25) Forest Protection;
26) Forest Silviculture;
27) Pedology;
28) Fertiliser Science;
29) Environmental Science;
30) Plant Nutrition;
31) Biology of Resources and Environment;
32) Soil and Water Conservation and Desertification Control;
33) Agricultural Environment Protection and Food Safety;
34) Land Resources and Spatial Information Technology;
35) Agricultural Hydraulic and Soil Engineering;
36) Agricultural Mechanisation Engineering;
37) Biomaterial Science and Engineering;
38) Agricultural Electrification and Automation;
39) Agricultural Products Processing and Storage;
40) Agricultural Bio-environment and Energy Engineering;
41) Food Science;
42) Grape and Wine;
43) Botany;
44) Biochemistry and Molecular Biology;
45) Microbiology;
46) Bioinformatics;
47) Pharmaceutical Botany;
48) Agricultural Economics and Management;
49) Economics and Management of Forestry;
50) Agricultural Technological Economics and Program Management;
51) Development of Agriculture and Rural Area.
C5. Master and PhD programs (Shandong Agricultural University)

Shandong Agricultural University offers both Master and PhD programs.

C6. Master and PhD programs (Nanjin Agricultural University)

Master programs
The courses included in the core of the Master study programs (3 years) are shown in the following list:

1) Botany;
2) Microbiology;
3) Genetics;
4) Growth Biology;
5) Cyto-Biology;
6) Biochemistry and Molecular Biology;
7) Ecology;
8) History of Science and Technology;
9) Food Science;
10) Crop Cultivation and Farming;
11) Crop Genetics & Breeding;
12) Pomology;
13) Vegetable Science;
14) Soil Science;
15) Plant Nutrition;
16) Plant Pathology;
17) Agricultural Chemicals;
18) Animal Genetics, Breeding and Reproduction;
19) Animal Nutrition and Feed Science;
20) Theoretical Veterinary Medicine;
21) Preventive Veterinary Medicine;
22) Clinical Veterinary Medicine;
23) Agricultural Economics and Management;

PhD programs
The courses included in the PhD study programs (3 years) are shown in the following list:

1) Genetics;
2) Crop Cultivation and Farming System;
3) Crop Genetics and Breeding;
4) Applied Plant Genomics;
5) Eco-Agricultural Science and Technology;
6) Crop Genetic Resources;
7) Seed Science and Technology;
8) Crop Informatics;
9) Plant Pathology;
10) Agricultural Insects and Pets Control;
11) Pesticide;
12) Plant Quarantine and Bio-Safety;
13) Ecology;
14) Soil Science;
15) Plant Nutrition;
16) Pomology;
17) Vegetable Science;
18) Tea Science;
19) Ornamental Horticulture;
20) Animal Genetics, Breeding and Reproduction;
21) Animal Nutrition and Feed Science;
22) Agricultural Economics and Management;
23) Rural Development;
24) Theoretical Veterinary Medicine;
25) Preventive Veterinary Medicine;
26) Clinical Veterinary Medicine;
27) Veterinary Biology;
28) Animal Quarantine and Safety of Animal Product Food;
29) Bioengineering;
30) Food Science;
31) Land Resources Management;
32) History Of Science and Technology;
33) Botany;
34) Zoology;
35) Microbiology;
36) Growth Biology;
37) Cellular Biology;
38) Biochemistry and Molecular Biology;
39) Biotechnology.

C7. Master and PhD programs (Jilin University)

Jilin University offers the following Master and PhD programs:

- Power Engineering & Engineering Thermophysics (Thermo-energy Engineering; Power Machinery & Engineering);
- Hydraulic Engineering;
- Agricultural Engineering (Agricultural Mechanisation Engineering; Agricultural Water and Soil Engineering; Agricultural Bioenvironment and Energy Resource Engineering; Electrification and Automation of Agriculture);
Food Science and Engineering (Food Science; Granary, Oil and Botanical Protein Engineering; Agricultural Produce Processing and Storage Engineering; Aquatic Produce Processing and Storage Engineering).

C8. Master and PhD programs (Sam Higginbottom Institute of Agriculture, Technology & Sciences)

Master programs

The courses included in the M.Tech. study program in Farm Machinery & Power Engineering (2 years, 4 semesters), offered by the Vaugh School of Agricultural Engineering & Technology, are shown in the following tables.

Basic Supporting Courses
Course Name, L-T-P credits, Total credits
Computer Programming 2-0-1 3
Statistics – I 2-0-1 3
Advanced Engineering Mathematics 3-1-0 4
Optimisation Techniques & Quality Management 3-0-0 3

Core Courses
Course Name, L-T-P credits, Total credits
Research Institution / Industrial Visit 0-0-1 1
Farm Machinery Design 2-0-1 3
Soil Dynamics in Tillage and Traction 2-0-1 3
Ergonomics in Agro-systems 2-0-1 3
Farm Machinery and Power Testing 2-0-1 3
Farm Machinery & Power Management 2-0-1 3
Seminar – I 0-0-1 1
Field/Industrial Training 0-0-1 1
Seminar – II 0-0-1 1
Dissertation 0-0-15 15

Specialised Courses
Course Name, L-T-P credits, Total credits
Tractor Design Principles 2-0-1 3
Alternative Energy Sources 2-0-1 3
Land Grading & Heavy Earth Moving Machinery 2-0-1 3
Experimental Stress Analysis 2-0-1 3
Advanced Internal Combustion Engine 2-0-1 3
Advanced Mechanic of Solids 2-0-1 3
Advanced Farm Machinery and Power Engineering 2-0-1 3
PhD programs

The Vaugh School of Agricultural Engineering & Technology offers regular PhD programs in relevant subjects.

C9. Master and PhD programs (Israel Institute of Technology)

Graduate students represent a substantial part of the academic activities in the Department of Agricultural Engineering. In fact, as teaching assistants, they are involved in laboratory and class exercises. In addition, much of the research in Agricultural Engineering is carried out by the graduate students as part of their advanced degree requirements. The more outstanding graduate students are a resource from which future Agricultural Engineering members can be recruited.

The purpose of the graduate study programs is to provide qualified graduates with an opportunity to expand their scientific basis in Agricultural Engineering, to gain experience in research activities and to deepen their chosen field of specialisation. The graduate students must report on the progress of their research, by presenting their work at seminars of the Department of Agricultural Engineering.

Master programs

The Department of Agricultural Engineering offers the following 2 Master degree study programs:
1) Master of Science in Agricultural Engineering;
2) Master of Science in Agricultural Engineering Sciences.

PhD programs

The Department of Agricultural Engineering offers regular PhD programs (Doctor of Science) in relevant subjects.

C10. Master and PhD programs (Tokyo University of Agriculture and Technology)

Tokyo University of Agriculture and Technology offers both Master and PhD programs.

C11. Master and PhD programs (Kyoto University)

The formulation and implementation of Educational Course Policy for the Master students of both the Faculty of Agriculture and the Graduate School of Agriculture is based on the following points:
1) to teach lectures and seminars organised for each specialisation and provide a high level of field-specific knowledge through specialised techniques;
2) to give importance to the development of research thesis, based on the dialogue between each student and Faculty member;
3) to cultivate the ability to debate, give presentations and communicate, while supporting results through presentations at academic societies, etc.;
4) to enthusiastically carry out classes taught in English.

The formulation and implementation of Educational Course Policy for the PhD students of both the Faculty of Agriculture and the Graduate School of Agriculture is based on the following points:
1) to have the ability to learn scientific logic and establish theories of developmental problems, theories of logical thought and problem-solving techniques for problems faced, through original cutting edge research and the creation of a dissertation;
2) to create opportunities for objective evaluation of personal research, while increasing linguistic capability and the ability to give presentations, enthusiastically participate and present research to national and international societies and academies;
3) to assist in regional cooperation for experience in societal contributions, develop research opportunities and, when needed, collaborate with other research institutions on relevant problems.

The Graduate School of Biostudies offers:

- Master programs, allowing students to obtain specialised knowledge on life sciences and research competency;
- PhD programs, allowing students to obtain advanced knowledge and research competences on life sciences and, therefore, training them to become researchers who play an internationally active role as group leaders.

The students are trained to become mature and highly capable researchers, who can actively cooperate with foreign partners.

The Graduate School of Biostudies offers a variety of educational curricula, including biology, medicine and related areas.

During Master programs students must attend the lectures offered by the school and perform the required experiments and practices for 2 years. Students must take 1 class from compulsory subjects and more than 9 classes from elective subjects. For lab experiment and practice 20 classes are required in order to finish the program.

During Master programs, in order to achieve the related degree, students must obtain the knowledge and capability required for professional researchers.

During PhD programs students must attend the lectures offered by the school and perform the research for PhD thesis for 3 years (or less by way of exception). Students must take 1 class from compulsory subjects and more than 1 class from elective subjects. For lab experiments and practices 8 classes are required.

During PhD programs, in order to achieve the related degree, students are obliged to prove their ability to work as independent researchers.

C12. Master and PhD programs (Okayama University)
Okayama University offers both Master and PhD programs.

C13. Master and PhD programs (Osaka Prefecture University)
Osaka Prefecture University offers both Master and PhD programs.
C14. Master and PhD programs (Jordan University of Science and Technology)

Master programs

The Department of Civil Engineering of the Faculty of Engineering offers also the following 2 Master study programs, whose courses are shown in the following tables.

1) M.Sc in Civil Engineering - Water Demand Management (2005)

Department Compulsory Req. (16) Hours

Course Name, Hours, Prerequisite

SEMINAR 1 ---
INTRODUCTION TO BEST MANAGEMENT PRACTICES IN WDM 3 ---
STRATEGIC PLANNING FOR WDM 3 ---
RESEARCH METHODOLOGY 3 Show
RESEARCH METHODS IN ARCHITECTURE 3 Equivalent
WATER DEMAND MANAGEMENT IN AGRICULTURE 3 ---
DEMAND FORECASTING AND ANALYSIS 3 ---

Department Elective Req. (9) Hours

Course Name, Hours, Prerequisite

ALTERNATIVE WATER SUPPLY 3 ---
PLANNING URBAN DEMAND MANAGEMENT PROGRAMS 3 ---
PRICING OF WDM PROGRAMS 3 ---
SURFACE HYDROLOGY 3 Show
SURFACE HYDROLOGY 3 Equivalent
GROUNDWATER HYDROLOGY 3 Show
GROUNDWATER HYDROLOGY 3 Equivalent
WATER RESOURCES HYDROLOGY 3 Show
WATER RESOURCES ENGINEERING 3 Equivalent
APPLICATION OF GEOGRAPHIC INFORMATION SYSTEMS (GIS) 3 Show
GEOGRAPHIC INFORMATION SYSTEMS 3 Equivalent
PRINCIPLES OF PROJECTS ECONOMY 3 ---
ADVANCED APPLIED MATHEMATICS 3 Show
ADVANCED APPLIED MATHEMATICS 3 Equivalent
APPLIED STATISTICS 3 Show
APPLIED STATISTICS FOR CIVIL ENGINEERS 3 Equivalent
SPECIAL TOPICS IN WATER DEMAND MANAGEMENT 3 ---
PUBLIC EDUCATION AND PARTICIPATION 1 ---

Specialisation Compulsory Req. (9) Hours

Course Name, Hours, Prerequisite

MASTER THESIS 3 ---
MASTER THESIS 6 ---
MASTER THESIS 9 ---
MASTER THESIS 0 ---

2) M.Sc. in Civil Engineering - Water Resources & Environment (1999)
Department Compulsory Req. (13) Hours
Course Name, Hours, Prerequisite
SEMINAR 1 ---
SURFACE HYDROLOGY 3 ---
OPEN CHANNEL HYDRAULICS 3 ---
WASTEWATER ENGINEERING 3 ---
CHEMISTRY FOR ENVIRONMENTAL ENGINEERS 3 ---

Department Elective Req. (12) Hours
Course Name, Hours, Prerequisite
ADVANCED APPLIED MATHEMATICS 3 ---
PHYSICAL AND CHEMICAL PROCESSES 3 ---
GROUNDWATER HYDROLOGY 3 ---
INDUSTRIAL AND HAZARDOUS WASTE 3 ---
SURFACE AND SUBSURFACE MODELING 3 ---
WATER RESOURCES ENGINEERING 3 ---
SPECIAL TOPICS IN WATER AND ENVIRONMENTAL ENGINEERING 3 ---

Specialisation Compulsory Req. (9) Hours
Course Name, Hours, Prerequisite
MASTER THESIS 9 ---
MASTER THESIS 6 ---
MASTER THESIS 3 ---
MASTER THESIS 0 ---

The Department of Natural Resources and Environment of the Faculty of Agriculture offers also the following 2 Master study programs, whose courses are shown in the following tables.

1) M.Sc. in Natural Resources & Environment - Soil Water & Environment (1999)

Department Compulsory Req. (10) Hours
Course Name, Hours, Prerequisite
ADVANCED SOIL PHYSICS 3 ---
ADVANCED SOIL CHEMISTRY 3 ---
ADVANCED ENVIRONMENTAL MICROBIOLOGY 3 ---
SEMINAR 1 ---

Department Elective Req. (15) Hours
Course Name, Hours, Prerequisite
PHYSICAL AND CHEMICAL PROCESSES 3 ---
EXPERIMENTAL DESIGN AND STATISTICAL ANALYSIS 3 Show
EXPERIMENTAL DESIGN & STATISTICAL ANALYSIS 3 Equivalent
FIELD CROPS MANAGEMENT 3 ---
ADVANCED VEGETABLE PRODUCTION 3 ---
ADVANCED FRUIT PRODUCTION 3 ---
ADVANCED PLANT NUTRITION 3 Show
ADVANCED SOIL FERTILITY 3 Equivalent
SOIL AND SOIL MOISTURE MANAGEMENT 3 ---
ADVANCED PEDOLOGY 3 ---
SOIL SURVEY AND LAND USE 3 ---
SURFACE WATER HYDROLOGY 3 Show
GROUNDWATER HYDROLOGY 3 Equivalent
MANAGEMENT OF WATER QUALITY 3 ---

Specialisation Compulsory Req. (9) Hours
Course Name, Hours, Prerequisite
MASTER THESIS 9 ---
MASTER THESIS 6 ---
MASTER THESIS 3 ---
MASTER THESIS 0 ---

2) M.Sc. in Natural Resources & Environment - Integrated Natural Resources Management (2008)

Department Compulsory Req. (10) Hours
Course Name, Hours, Prerequisite
QUANTITATIVE SKILLS FOR INTEGRATED NATURAL RESOURCES MANAGEMENT 3 ---
INTEGRATED ECOLOGY 3 ---
INTEGRATED MANAGEMENT TOOLS 3 ---
SEMINAR 1 ---

Department Elective Req. (15) Hours
Course Name, Hours, Prerequisite
ECOLOGICAL CONSERVATION 3 ---
ECOSYSTEM MANAGEMENT 3 ---
WATERSHED MANAGEMENT 3 ---
WATER RESOURCES MANAGEMENT 3 ---
LAND MANAGEMENT 3 ---
SOIL AND ENVIRONMENTAL QUALITY 3 ---
ENVIRONMENTAL POLLUTION 3 ---
PUBLIC AWARENESS AND PARTICIPATION 3 ---
ENVIRONMENTAL SOCIOLOGY 3 ---
STRATEGY FORMULATION AND IMPLEMENTATION 3 ---
SYSTEM ANALYSIS AND SIMULATION MODELING 3 ---
NATURAL RESOURCES SAMPLING AND MONITORING 3 ---
GEOGRAPHICAL INFORMATION SYSTEMS AND REMOTE SENSING 3 ---
WASTE AND THE ENVIRONMENT 3 ---
ECONOMIC MODELLING 3 ---
SPECIAL TOPICS 3 ---
PROFESSIONAL INTERNISHIP 3 ---

Specialisation Compulsory Req. (9) Hours
Course Name, Hours, Prerequisite
MASTER THESIS 9 ---
MASTER THESIS 6 ---
MASTER THESIS 3 ---
MASTER THESIS 0 ---

PhD programs

Jordan University of Science and Technology offers regular PhD programs in relevant subjects.

C15. Master and PhD programs (University Putra Malaysia)

The Department of Biological and Agricultural Engineering offers the following postgraduate programs.

Master programs without thesis

1) Emergency, Response & Planning;
2) Water Management.

Master and PhD programs with thesis

1) Soil & Water Engineering;
2) Safety, Health & Environment;
3) Agricultural Mechanisation & Automation;
4) Post-harvest Engineering;
5) Farm Structure;
6) Agricultural Waste Engineering.

1) Soil & Water Engineering
This field of study concerns soil and water as valuable resources. Engineering helps to conserve these two resources, as researchers study the interactions between soils, plants and water, that influence the way these resources are used in planning irrigation and drainage systems, soil and water conservation and agricultural production facilities.

Engineering and design skills using tools such as artificial intelligence, remote sensing and GIS modelling are applied to solve problems involving soil and water affecting production agricultural communities.

Research focus is towards better solutions to problems in land and water resources development, management of irrigation and drainage systems, methods to reduce and control erosion and sedimentation and methods to reduce and control pollution of streams, rivers and lakes. Relevant issues include increasing productivity through irrigation and drainage system
design and management, control of soil erosion and sedimentation, water quality and quantity, geospatial information system and non-point source pollution control.

2) Safety, Health & Environment
Safety, health and environment (SHE) is a multi-disciplinary field of study which requires inputs from various fields of Engineering for improving the safety of workers and the quality of the natural environment. It covers various aspects of the natural eco-system, and human activities and settings. Typical settings include small and medium industries, agricultural activities, biosystems, work place, ergonomic innervations, mental stress reduction, and physical and psycho-social environments. This field of study also covers the evaluation of hazards, risk, and the effectiveness and the ethical aspect of responds to crisis and disaster. Research areas cover various types of human activities, such as manufacturing, processing and agricultural industries. For example, intensive cropping, aquaculture and animal farms, whereby many different chemicals and biological inputs, such as soil and water treatment products, pesticides and disinfectants, are being used. Many of these pesticides, disinfectants and antibiotics could have negative effects on products, food safety, occupational health and the adjacent ecosystems.

The design and operation of agricultural tractors, implements, processing facilities, factories, buildings and infrastructures are affecting the frequency and magnitude of the accidents and ergonomic problems. Other natural disasters like flood will drastically affect the safety, health and wellbeing of affected population, apart from the surrounding environment.

3) Agricultural Mechanisation & Automation
This field of study emphasises research on agricultural mechanisation systems and models. Design and application of automation includes application of computers, controllers, sensors, GIS, GPS and mechatronics in agricultural and plantation based industries. Topics include advanced machinery design and development in bioproduction robots, harvesters, planters, chemical sprayers and other agricultural implements for plantation and agricultural field operation, and impact of design of controllers and automated systems used in bioproduction and greenhouses.

Research also emphasises on the machine vision systems, sensing elements, autonomous travelling devices, master slave tractor, field server, control algorithms, soil conductivity and mapping, automatic water blending, soil structure detection and prediction, soil tractability for the application of smart farming and precision farming.

4) Post-harvest Engineering
This field of study will enrich the students’ research skills by the application of their scientific knowledge and Engineering technology in sorting, packaging, temperature management, transporting and temporary storage of biological materials.
Post-harvest Engineering emphasises research on post-harvest physiology, handling, storage and processing of fruit, vegetables and flowers, quality management of medicinal herbs and manufactured products, nutritional evaluation of foods. Post-harvest technology means methods or facilities to preserve food at and after the point of harvest, in order to increase food availability and to prevent or minimise food losses. It also covers activities in crop processing, such as threshing, cleaning, grading, drying, storage systems, pest control and
management, quality control, standardisation, transportation, milling, processing, packaging and handling.

5) Farm Structure
This field of study emphasises research on appropriate structures for agricultural produce storage, structures for animal husbandry, structures where the environment is specifically controlled to enhance animal comfort and increase productivity in agricultural practices. For the controlled environment structures research is needed, in the design and application of automation, including the application of computers, controllers and sensors, aimed at enhancing lighting requirements, temperature controls, and automated water requirements control. Other areas of interest are semi-mechanically control environment structures, cooling systems for naturally ventilated tropical greenhouse, naturally ventilated tropical greenhouse and fertilisation systems for temperate crop production, mechanised systems for production under greenhouses, emerging technologies in control environment production systems, etc.

6) Agricultural Waste Engineering
This field of study will enrich the students’ research skill by the application of their scientific knowledge and Engineering technology related to the efficient management of agricultural wastes.
Research area is focused on the aspect of Engineering knowledge, in order to minimise the adverse impacts of agriculture wastes on the environment, groundwater and public health, and to make use of the agriculture waste as by-products, as raw materials for new products or as bio-resources of energy production. The aims are to achieve integrated local recycling and reuse of agricultural waste, i.e. for environmental protection, energy development, fertiliser production and water saving. It is hope that the outcome of this research will bring economic and social benefits, along with environmental friendly technology and systems. This area of research also covers wastewater treatment and disposal, water pollution control, water recycling technology, water quality, air quality control and solid waste management.

C16. Master and PhD programs (Seoul National University)
The Department of Biosystems & Biomaterials Science and Engineering of the College of Agriculture and Life Sciences offers both Master and PhD programs.