Shatt Al-Arab University College/Basrah

كلية شط العرب الجامعة/البصرة

First Cycle – Bachelor's Degree (B.Sc.) –

Fuel and Energy Techniques Engineering Department

بكالوريوس – هندسة تقنيات الوقود والطاقة (الدورة الأولى)

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1. Mission & Vision Statement

Vision Statement

The Department of Fuel and Energy Technologies Engineering at Shatt Al-Arab University College was founded in response to the increasing need for competent engineers in the petroleum, natural gas, and power industries in Iraq, as well as to meet the needs of the local labor market and to improve both the public and private sectors. The Department additionally graduates and develops engineering staff specializing in fuel and energy, uses engineering knowledge in energy to improve the scientific and technical capabilities of the country's energy industry, promotes the efficient and effective use of energy and natural energy resources necessary for sustainable development in Iraq, and promotes national and international collaboration. The Department additionally graduates and develops engineering staff specializing in fuel and energy, uses engineering knowledge in energy to improve the scientific and technical capabilities of the country's energy industry, promotes the efficient and effective use of energy and natural energy resources necessary for sustainable development in Iraq, and promotes national and international collaboration.

Mission Statement

The Fuel and Energy techniques engineering department is a unique department at Shat Al-Arab Unversity College that focuses on energy and earth resources. The Department aspires to develop and implement academic plans and conduct applied research in the field of renewable energy to preserve the environment by contributing to innovation and intellectual creativity in research and studies. Additionally, it works on the spread of knowledge and experience throughout society, the delivery of scientific support to educational and industrial institutions, and the endeavoring to localize and develop fuel and renewable energy technologies that are appropriate to the nature of Iraq, raising energy efficiency, and managing it to serve sustainable development in our nation.

2. Program Specification

Programme code:	BSc-FET	**ECTS**	240
Duration:	4 levels, 8 Semesters	**Method of Attendance:**	Full Time

Fuel and Energy Technologies Engineering prepares students for careers in the fuel and energy industries by providing them with skills to improve themselves. Thus, the student will have extensive knowledge of refinery processing, petrochemicals, crude oil, and natural gas processing. Fuel and energy courses are integrated into the curriculum. Developing and testing solutions to improve industrial equipment to maximize petroleum refining Students will have the opportunity to learn the principles of chemical engineering, energy engineering, and related materials, and they will be prepared to keep pace with the development of modern methods required in the labor market and companies dealing with the design, implementation, and operation of plants and refineries. In addition, students will be equipped with knowledge of modern design techniques or optimization of technical calculations for renewable energy in industrial settings.

Level 1 exposes students to the fundamental principles of chemical engineering and chemistry, which are suitable for progression to all programs within the department.

Course-specific core topics are covered at Level 2 and prepare for research-oriented subject modules at Levels 3 and 4. FET graduates are therefore trained to understand how research influences teaching, according to the university's and department's mission statements.

In levels 2, 3 and 4 FET students cover mass balance and energy balance after taking basic principles and covers knowledge of chemistry topics. Students acquire skills in oil refining. Ultimately, FET graduates will acquire knowledge and skills in analyzing the thermodynamic cycles of steam power plants and understanding their construction.

The development of research principles begins and is developed through the implementation of practical assignments, which are either integrated into lecture units or delivered through specialized practical units, research seminars and tutorials.

In levels 5 to 8, students acquire comprehensive knowledge and skills related to equipment and reactor design. They develop the ability to analyze and solve problems. In addition, they acquire knowledge of software applications and do their own study to meet final project requirements.

3. Program Goal

1. Preparing technical engineers specialized in the fields of fuel production and finding sustainable energy sources.
2. Design and development of industrial units to maximize the petroleum refinery and energy.
3. The ability to deal with the different types of sustainable energy sources such as solar energy, biogas, wind energy, geothermal energy, and, energy storage.
4. Design or optimization of technical calculations for renewable energy in industrial applications

5. Integrate academic preparation with oil and gas refinery engineering technology developments.
6. Ability to deal with renewable and non-renewable energy sources.
7. The ability to deal with risks such as pollution, identify and assess risks in the workplace and estimate damage and risks as a result of the explosion

4. Student Learning Outcomes

The FET program provides students with a solid foundation in the fuel and energy technology field, envisaging various employment capabilities and careers. Graduates have knowledge and skills in general FET issues and, depending on the selected specialization, the knowledge and technical skills of FET. They know the principles of fuel and sustainable energy and are well acquainted with the devices cooperating with refineries, power stations, and other related processes. They have knowledge of unit operation, measurement, and control engineering; they develop software skills and know how to design equipment and reactors They also have a basic knowledge of problems related to internal combustion engines and understand internal combustion engine methods and applications. They had the ability to deal with risks such as pollution, identify and assess risks in the workplace, and estimate damage and risks as a result of the explosion.

Outcome 1

Understanding of allied knowledge

Graduates will be able to demonstrate broad knowledge of refinery processing, petrochemicals, crude oil, natural gas processing, and other related processes

Outcome 2

Oral and Written Communication

Graduates will be able to formally communicate the results of FET investigations using both oral and written communication skills.

Outcome 3

technical and cognitive skills

Graduates will be able to solve various practical engineering problems related FET (diffusion, distillation, gas absorption column, extraction, types of heat transfer, fins, heat exchangers, evaporation and condensation, ….)

Outcome 4

Critical thinking and analytical skills

Graduates will be able to identify emerging problems and attempt to solve them using logical and critical thinking methods using modeling, design, and prediction.

Outcome 5

Appropriate research tools and techniques

Graduates will be able to use software such as AspenPlus and HYSYS to design and simulate industrial plants and equipment for fuel and power production such as reactors, distillation columns, packed columns, heat exchangers, absorbers, etc.

Outcome 6

The skill of dealing with different types of energy sources

The ability to deal with the different types of sustainable energy sources such as solar energy, biogas, wind energy, geothermal energy, and, energy storage.

Outcome 7

Group/team leadership

Graduates will be able self-motivated, cooperates effectively with other professionals in different disciplines, backgrounds and interests to solve problems, works lucidly in confusing situations under pressure and demonstrates knowledge of and commitment following safety procedure for self and others.

Outcome 8

Own professional development

Graduates will be able to take his own decisions, planning and problem solving, and stay updated professionally.

5. Academic Staff

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6. Credits, Grading and GPA

Credits

Shatt Al-Arab University College is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 30 hrs student workload, including structured and unstructured workload.

Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

GRADING SCHEME

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب - قيد المعالجة	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

Number Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Calculation of the Cumulative Grade Point Average (CGPA)

1. The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

   CGPA of a 4-year B.Sc. degree:

   CGPA = [(1st ^{m}odule score x ECTS) + (2nd ^{m}odule score x ECTS) + ……] / 240

7. Curriculum/Modules

Level-1 / Semester-1

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
SAUCFETE101	Analytical Chemistry	116	59	7.00	C	
SAUCFETE102	Mathematic 1	73	102	7.00	B	
SAUCFETE103	Engineering Drawing	59	66	5.00	B	
SAUCFETE104	Computer Utilization 1	59	16	3.00	S	
SAUCFETE105	English 1	45	5	2.00	S	
SAUCFETE106	workshops	90	60	6.00	S	

Level-1 / Semester-2

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
SAUCFETE107	Principles of Chemical Engineering	73	102	7.00	C	
SAUCFETE108	Engineering Mechanics	73	77	6.00	B	
SAUCFETE109	Mathematic 2	73	77	6.00	B	Mathematic 1
SAUCFETE110	Human Rights and democaracy	45	5	2.00	S	
SAUCFETE111	Organic Chemistry	116	59	7.00	C	
SAUCFETE112	Arabic	45	5	2.00	S	

Level-2 / Semester-3

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
SAUCFETE201	Mass Balance and energy balance	74	101	7.00	C	Principles of Chemical Engineering
SAUCFETE202	Thermodynamics 1	74	76	6.00	C	
SAUCFETE203	Physical Chemistry	102	48	6.00	C	
SAUCFETE204	Mathematic 3	59	66	5.00	B	Mathematic 2
SAUCFETE205	Computer Utilization 2	59	41	4.00	S	Computer Utilization 1
SAUCFETE206	English 2	45	5	2.00	C	

Level-2 / Semester-4

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
SAUCFETE207	Thermodynamics 2	74	76	6.00	C	Thermodynamics 1
SAUCFETE208	Oil Refining	102	73	7.00	C	
SAUCFETE209	Properties of Engineering Materials	73	27	4.00	B	
SAUCFETE210	Engineering Statistics	45	55	4.00	B	
SAUCFETE211	Environmental Pollution and Industrial Safety	45	55	4.00	S	
SAUCFETE212	Fluid Mechanics	87	38	5.00	C	

Level-3 / Semester-5

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
SAUCFETE301	Heat Transfer 1	74	76	6.00	C	
SAUCFETE302	Energy Resources	74	51	5.00	C	
SAUCFETE303	Internal Combustion Engines	74	76	6.00	C	
SAUCFETE304	Engineering analysis	59	66	5.00	S	
SAUCFETE305	Mass Transfer 1	74	76	6.00	C	
SAUCFETE306	English 3	45	5	2.00	S	

Level-3 / Semester-6

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
SAUCFETE307	Mass Transfer 2	74	76	6.00	C	Mass Transfer 1
SAUCFETE308	Reactor Design 1	60	65	5.00	C	
SAUCFETE309	Power Plant Engineering	73	52	5.00	C	
SAUCFETE310	Gas Technology	59	66	5.00	C	
SAUCFETE311	Numerical Methods	45	30	3.00	B	
SAUCFETE312	Heat Transfer 2	74	76	6.00	C	Heat Transfer 1

Level-4 / Semester-7

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
SAUCFETE401	Industrial Unit Operations	101	74	7.00	C	
SAUCFETE402	Design of Industrial Equipment 1	46	104	6.00	C	
SAUCFETE403	Reactor Design 2	60	65	5.00	C	Reactor Design 1
SAUCFETE404	Sustainable Energy	73	52	5.00	S	
SAUCFETE405	English 4	45	5	2.00	S	
SAUCFETE406	Project (1)	101	24	5.00	C	

Level-4 / Semester-8

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
SAUCFETE407	Design of Industrial Equipment 2	59	91	6.00	C	Design of Industrial Equipment 1
SAUCFETE408	Professional Ethics	45	30	3.00	C	
SAUCFETE409	Measurement and Control Engineering	101	49	6.00	C	
SAUCFETE410	Corrosion	73	52	5.00	C	
SAUCFETE411	Modeling and Simulations	73	52	5.00	B	
SAUCFETE412	Project (2)	101	24	5.00	C	

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