Ninevah University

جامعة نينوى

First Cycle – Bachelor's degree (B.Sc.) – Systems and Control Engineering

بكالوريوس علوم - هندسة النظم والسيطرة

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1. Mission & Vision Statement

Vision Statement

Our mission is to provide education and to perform research in systems and control, at an internationally recognized high level. In research we aim at contributing to fundamental aspects of dynamical systems and control as well as at advancing innovative and high-tech applications, in combination with relevant industrial and academic partners. In teaching we aim at creating a scientific climate where students can flourish to become independent and highly-skilled engineers and scientists. We use our own laboratory to validate our fundamental research and to teach students to work individually and in teams on projects. Our organization is structured to maximize synergy within the department and to support the development of leadership of our scientists in their respective fields.

Mission Statement

Control theory is a quickly developing science. The complexity in design and operation of controlled systems increases tremendously. This requires a computational system theory for synthesis and real-time implementation that enables the integration of model-based control with system identification for multivariable and large-scale systems. Three important trends are the development of large-scale systems, model-based methods, and intelligent control.

- Complex large-scale systems will consist of numerous interacting networked subsystems, where hybrid and stochastic aspects will be addressed, as well as coordination within and across all levels of distributed and multi-level control frameworks.
- Model-based systems will be highly dependent on the on-line availability of goal-oriented, dynamic models that are adaptive to changing circumstances in both the system and its environment. The complexity of the models and the model-based systems is increasing rapidly.

Future control systems will be able to effectively learn from experience, actively acquire knowledge about the process controlled, optimize their performance and realize a high-degree of autonomous behavior where necessary.

Furthermore, as control becomes an integral part in the design of new systems, there is an enormous need for the development of new tools, methods and theories.

2. Program Specification

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

The BSc-SCE (Bachelor of Engineering in System and Control Engineering) programme provides students with a comprehensive education in the field of system and control engineering. The programme combines theoretical knowledge with practical skills, enabling students to design, analyze, and optimize complex control systems used in various industries.

The emphasis of the programme is on the application of engineering principles to control and automation systems. Students will gain a strong foundation in mathematics, physics, and computer science, which are essential for understanding and modeling dynamic systems. The curriculum covers core topics such as control theory, signal processing, robotics, and system design.

Throughout the four levels of the programme, students will engage in hands-on laboratory work, practical projects, and industrial placements to gain practical experience and apply their knowledge in real-world settings. The programme fosters a research-led approach, exposing students to the latest developments in the field and encouraging critical thinking and problem-solving skills.

At Level 1, students will be introduced to the fundamental principles of system and control engineering, including mathematics and programming. At Levels 2, 3, and 4, students will deepen their understanding of advanced control systems, digital signal processing, optimization techniques, and modeling and simulation. They will also have the opportunity to specialize in areas such as robotics, industrial automation, or process control through a range of elective modules.

The programme emphasizes the importance of teamwork, effective communication, and ethical considerations in engineering practice. Students will develop strong analytical, technical, and practical skills, allowing them to contribute to the design, development, and operation of complex control systems in industry.

The BSc-SCE programme aims to produce competent and innovative system and control engineers who can meet the challenges of a rapidly evolving technological landscape. Graduates will be well-prepared for a wide range of career opportunities in industries such as manufacturing, automation, robotics, energy, and aerospace, or pursue further studies at the postgraduate level.

3. Program Goals

1. To provide students with the basics of knowledge in the disciplines of control engineering.
2. To prepare qualified and proportionate engineers with the responsibility that awaits them in the field of work.
3. Develop communication skills and teamwork with others.
4. Prepare students for successful work in the field of control engineering and thus contribute to community service.

4. Student Learning Outcomes

The major goal of the Control Systems course is to develop a specific technical expertise in the analysis and design of Feedback Control Systems. Understanding the ability to recognize and analysis feedback control mechanisms and design feedback control systems is the key learning outcomes; the principle of feedback is a universal principle behind many processes and devices encountered in Electrical/Computer Engineering as well as physics, chemical, and mechanical engineering, biology, etc.

By the end of the course, students will be able to describe feedback control systems in mathematical terms of different equations, transfer functions and state-space models, if the time helped us, and will be able to analyze whether a given control system is stable or not and what needs to be done to make it stable (analysis), how this can should be done (synthesis) and how your solution will affect the system performance (evaluation).

After completing the course, students should have confidence in solving any problems in the area of control systems within the scope set by the lecturer. mastering control systems design tools such as MATLAB and Simulink are one of the practical outcomes to mention. Students will demonstrate their achievements in the course by attempting and solving homework exercises, and completing labs and the design project, if it will be assigned.

Outcome 1

Students will become the automation and control engineers with good basic knowledge, both in theory and in experiments.

Outcome 2

Students master the methodology for conducting research, have critical thinking and creativity; have ability of self-learning and studying automatic control at graduate level.

Outcome 3

Students are able to design, implement, operate the control systems; manage, consult, and provide technical support on automatic control products and projects.

Outcome 4

Students have ability to work independently as well as together in groups in high pressure environment; ability to develop and integrate in high quality job market; ability to use English efficiently to work in international enterprises and organizations.

Outcome 5

Students are trained to be automation and control engineers with good specialized knowledge as well as good health and professional ethics.

Outcome 6

Critical Thinking

Graduates will be able to use critical-thinking and problem-solving skills to develop a research project and/or paper.

5. Academic Staff

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6. Credits, Grading and GPA

Credits

Ninevah University 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 25 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

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs.

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NVEE206	Mathematics I	58	88	6	B	-
NVEE215	DC Circuits Analysis	88	83	7	B	-
NVEE219	Physics of Semiconductors	74	73	6	B	-
NVEES301	Computer Science and Programming	74	23	4	C	-
NVEESC302	Engineering Mechanics (Statics)	58	63	5	C	-
NV12	Democracy and Human Rights	16	18	2	S	-

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs.

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NVEE207	Mathematics II	58	92	6	B	NVEE206
NVEE216	AC Circuits Analysis	88	62	6	B	NVEE215
NVEESC303	Engineering Mechanics (Dynamics)	58	67	5	C	NVEESC302
NVEESC304	Computer Programming	74	76	6	C	NVEESC301
NVEE223	Digital Design	74	76	6	B	-
NV13	The crimes of the defunct Baath Party	16	9	1	S	-

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs.

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NVEE20811	Engineering Analysis I	44	81	5	B	NVEE207
NVEE210	Signals and Systems	74	76	6	B	NVEE207
NVEESC305	Control I	60	65	5	C	NVEE207
NVEESC306	Matlab Programming	60	65	5	C	NVEESC301
NVEESC307	Analog Electronics I	74	51	5	C	NVEE216
NV11	English	30	70	4	S	

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs.

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NVEE209	Engineering Analysis II	44	81	5	B	NVEE208
NVEESC309	Control II	60	65	5	C	NVEESC305
NVEESC310	Analog Electronics II	74	51	5	C	NVEESC307
NVEESC311	Measurement and Sensors	74	51	5	C	NVEESC307
NVEESC312	DC Machines	60	65	5	C	NVEE216
NVEE201	Engineering Drawing	58	67	5	B	NVEE208

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs.

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NVEESC313	System Modelling	44	81	5	C	NVEESC303, NVEESC309
NVEE214	Digital Control	74	51	5	B	NVEESC309
NVEE204	Digital Signal Processing I	74	51	5	B	NVEE210
NVEESC314	PLC I	74	51	5	C	
NVEESC315	Control Systems Design	88	62	6	C	NVEESC309
NVEE202	Industrial Management and Ethics	30	70	4	B	

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs.

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NVEE205	Digital Signal Processing II	74	51	5	B	NVEE204
NVEESC316	Industrial Networks	74	51	5	C	
NVEESC317	PLC II	60	65	5	C	NVEESC314
NVEESC318	Power Electronics	74	51	5	C	NVEESC310
NVEESC319	AC Machines	60	65	5	C	NVEESE312
NVEESC320	Microprocessors	60	65	5	C	

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs.

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NVEESC321	Robotics I	74	51	5	C	NVEESC303, NVEE209
NVEESC322	Optimal Control	88	37	5	C	NVEESC319
NVEESC323	Soft Computing	58	67	5	S	
NVEESC324	Process Control	88	37	5	C	NVEESC315
NVEESC325	Industrial Automation	44	81	5	C	NVEESC311
NVEESC308	Advanced Control Systems	60	65	5	C	NVEESC313

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs.

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NVEESC326	Robotics II	74	76	6	C	NVEESC321
NVEESC327	Adaptive Control	88	62	6	C	NVEESC313
NVEESC328	Computer Control Systems	58	92	6	C	NVEESC324
NVEESC329	Embedded Systems	74	76	6	C	NVEESC320
NVEESC330	Project II	72	78	6	C	

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