TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Baghdad / Alkhwarizmi College of Engineering
2. University Department/Centre	Biomedical Engineering Department
3. Course title/code	Artificial Organs 2
4. Programme(s) to which it contributes	B.Sc. Biomedical Engineering
5. Modes of Attendance offered	Full Time
6. Semester/Year	Second Course
7. Number of hours tuition (total)	45 Hours
8. Date of production/revision of this specification	2018
9. Aims of the Course	
By the end of this course, The students will be able to: 1. The replacement or augmentation of failing human organs with artificial devices and systems has been an important element in health care for several decades. 2. Concepts underlie the design and analysis of the devices as kidney dialysis to augment failing kidneys, artificial heart valves to replace failing human valves, cardiac pacemakers to reestablish normal cardiac rhythm, and heart assist devices to augment a weakened human heart.	

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Knowledge and Understanding

Graduates will be able to:

A1.√ A2.√ A3.√

B. Subject-specific skills

B1.√ B2.√ B3.√

Teaching and Learning Methods

Staff involved in the degree program utilize a wide range of teaching methods that they deem the most appropriate for a particular course. These include:

1. Lectures where the students write information presented to them via slide show, overhead or written by the lecturer؛
2. Lectures where the students have some printed notes/handouts and may annotate, or expand these during a spoken lecture.
3. Question and answer sessions during lectures or staff Office Hours.

Assessment methods

1. Written examinations (Summative assessment)؛
2. Oral presentations of individual and group work
3. Homework؛

C. Thinking Skills

C1.√ C2.√ C3.√ C4.√

Teaching and Learning Methods

1. External lectures from industry or clinicians;
2. Feedback given to students during tutorials;
3. Question and answer sessions during lectures or staff Office Hours

Assessment methods

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.√ D2.√

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First course					

1	3		Introduction to Artificial Organs 2		
2	3		Artificial Heart Valve		
3	3		Artificial Heart		
4	3		Ventricular Assist Device (VAD)		
5	3		Pump Types		
6	3		Select Artificial Heart Pump Types		
7	3		Mechanical Circulatory Support for Artificial Heart		
8	3		Magnetic Bearing and Hydrodynamic Bearing of VAD		
9	3		Artificial Liver		
10	3		Artificial Pancreas		
11	3		Artificial Lung		
12	3		Artificial Kidney		
13	3		Dialysis		
14	3		Artificial Eye		
15	3		Artificial Ear		

12. Infrastructure	
Required reading: · Core Texts · Course Materials · Other	1. Artificial Organs by Gerald E. Miller 2. Design of Artificial Human Joints & Organs by Subrata Pal 3. Artificial Organs by Nadey Hakim (Ed)
Special requirements (include for example workshops, periodicals, IT software, websites)	Check the new modern websites talking about the new modifications
Community-based facilities (include for example, guest Lectures , internship , field studies)	

13. Admissions	
Pre-requisites	
Minimum number of students	20
Maximum number of students	30

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Baghdad / Alkhwarizmi College of Engineering
2. University Department/Centre	Biomedical Engineering Department
3. Course title/code	Design control systems 2
4. Programme(s) to which it contributes	B.Sc. Biomedical Engineering
5. Modes of Attendance offered	Full Time
6. Semester/Year	Second Course
7. Number of hours tuition (total)	75 Hours
8. Date of production/revision of this specification	2018
9. Aims of the Course	
In this course, the students will learn how to use time and frequency response methods in designing control systems. First, we start with understanding the concept of Root-Locus method and then we move on and learn how to use this method in designing phase-lead, phase lag, Lead-lag compensators. We will then utilize the design procedures for tuning P, PD, PI, and PID controllers. At this point, we would cover a good chunk of material in time domain analysis. It's time to convey our learning journey to the frequency domain. To do so, we will analyze the control systems in the frequency domain using Bode diagrams, polar plot, Nyquist plot, and Nicholas plot. These graphical techniques are essential in analyzing the stability of the systems in the frequency domain as well as in designing the control systems. If we have enough time, we probably introduce the concept of state - space analysis in control systems.	

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A. Knowledge and Understanding

Graduates will be able to:

A1.√ A2.√ A3.√

B. Subject-specific skills

B1.√ B2.√ B3.√ B4.√

Teaching and Learning Methods

1. Lectures where the students write information presented to them via slide show, or written by the lecturer;
2. Lectures where the students have some printed notes/handouts and may annotate, or expand these during a spoken lecture;
3. Question and answer sessions during lectures or staff Office Hours;
4. Laboratory sessions.

Assessment methods

1. Written examinations (Summative assessment);
2. Oral presentations of individual and group work;
3. Homework;
4. Practical skills will be assessed through laboratory experiments, write-ups, coursework reports, project reports and presentations;
5. Presentation skills through group presentations and poster presentations.

C. Thinking Skills

C1.√ C2.√ C3.√ C4.√

Teaching and Learning Methods

1. External lectures from industry or clinicians;
2. Feedback given to students during tutorials;
3. Question and answer sessions during lectures or staff Office Hours;
4. Completion of web-based exercises or computer based laboratory sessions

Assessment methods

1. Individual written project report(s) of both individual and group projects;
2. Practical skills will be assessed through laboratory experiments, write-ups, coursework reports, project reports and presentations;
3. Presentation skills through group presentations and poster presentations.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.√ D2.√ D3.√

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method

First course					
1	5		Root – locus method (1)		
2	5		Root – locus method (2)		
3	5		Design via root-locus method (Phase lead - PD)		Quiz
4	5		Design via root-locus method (Phase Lag -PI)		
5	5		Design via root-locus method (lead - lag) - PID		Quiz
6	5		Frequency Response Analysis		
7	5		Bode Plot (1) and system characteristics		
8	5		Bode plot (2), System identification		
9	5		Polar and Nyquist plot		
10	5		Mid-term exam		Quiz
11	5		Design using Bode plot (1)		
12	5		Design using Bode plot (1)		Quiz
13	5		Introduction to control systems analysis in state space (system modeling in state space)		
14	5		Introduction to control systems analysis in state space (basic concepts of construability and observability)		
15	5		Review lecture		

12. Infrastructure	
Required reading: · Core Texts · Course Materials · Other	1. Modern Control Engineering, By: Katsuhiko Ogata. (5th ed.) 2. Control Systems Engineering, By: Norman S. Nise. (7th ed.) 3. Modern Control Systems, By: Richard C. Dorf and Robert H. Bishop.(12th ed.) 4. Feedback Control Systems, By John Van De Vegte (3rd ed.)
Special requirements (include for example workshops, periodicals, IT software, websites)	Check the new modern websites talking about the new modifications
Community-based facilities (include for example, guest Lectures , internship , field studies	

13. Admissions	
Pre-requisites	
Minimum number of students	20
Maximum number of students	30

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides rich foundation to learn and acquire English as a second language and use the language for academic purposes. The course prepare undergraduate students to use English language successfully in speaking, reading and writing

1. Teaching Institution	University of Baghdad / Alkhwarizmi College of Engineering
2. University Department/Centre	Biomedical Engineering Department
3. Course title/code	Electronics devices and application
4. Programme(s) to which it contributes	B.Sc. Biomedical Engineering
5. Modes of Attendance offered	Full Time
6. Semester/Year	Second Course
7. Number of hours tuition (total)	60 Hours
8. Date of production/revision of this specification	2018
9. Aims of the Course	

By the end of this course,
The students will be able to:

1. Know the theory and background Transistor Frequency Response.
2. Know the applications and operations of Feed Back Analysis
3. Negative Feed Back.
4. learn about the Feed Back Analysis, Positive Feed Back
5. Investigate the 555 Timer
6. Training on Practical Circuits, Timers, Drivers and Power Supplies

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A. Knowledge and Understanding

Graduates will be able to:

A1. √ A2. √ A3. √

B. Subject-specific skills

B1. √ B2. √ B3. √

Teaching and Learning Methods

1. Lectures where the students write information presented to them via slide show, overhead or written by the lecturer;
2. Lectures where the students have some printed notes/handouts and may annotate, or expand these during a spoken lecture;
3. Question and answer sessions during lectures or staff Office Hours;
4. Laboratory sessions.

Assessment methods

1. Written examinations (Summative assessment);
2. Oral presentations of individual and group work;
3. Homework;
4. Practical skills will be assessed through laboratory experiments, write-ups, coursework reports, project reports and presentations;
5. Presentation skills through group presentations and poster presentations.

C. Thinking Skills

C1. √ C2. √ C3. √ C4. √

Teaching and Learning Methods

1. External lectures from industry or clinicians;
2. Feedback given to students during tutorials;
3. Question and answer sessions during lectures or staff Office Hours;
4. Completion of web-based exercises or computer based laboratory sessions

Assessment methods

1. Individual written project report(s) of both individual and group projects;
2. Practical skills will be assessed through laboratory experiments, write-ups, coursework reports, project reports and presentations;
3. Presentation skills through group presentations and poster presentations

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. √ D2. √

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method

Second course					
1	4		Transistor Frequency Response (A) BJT Transistor		
2	4		Low Frequency Response High Frequency Response		
3	4		Transistor Frequency Response (B) FET Transistor		Quiz
4	4		Low Frequency Response High Frequency Response		
5	4		Feed Back Analysis (A) Negative Feed Back		Quiz
6	4		- Voltage Shunt, - Current Shunt - Voltage Series, - Current Series		
7	4		Negative Feed Back Approach in BJT Transistor		
8	4		Negative Feed Back Approach in FET Transistor		
9	4		Negative Feed Back Approach in OP-Amp		
10	4		Feed Back Analysis(B) Positive Feed Back (Non- Sinusoidal Oscillates)		Quiz
11	4		I) Transistors: - A stable, - Mon stable		
12	4		II) 555 Timer: - A stable, - Mon stable		Quiz
13	4		Practical Circuits: - Timers, - Drivers		
14	4		- Power Supplies		
15	4		Mid exam		

12. Infrastructure	
Required reading: · Core Texts · Course Materials · Other	1. Electronic Devices and Circuit Theory by Robert L. 2. Boylestad 3. Electronic devices and circuits by Jicob Milliman 4. ELECTRONIC DEVICES by Thomas L. Floyd
Special requirements (include for example workshops, periodicals, IT software, websites)	Check the new modern websites talking about the new modifications
Community-based facilities (include for example, guest Lectures , internship , field studies	

13. Admissions	
Pre-requisites	
Minimum number of students	20
Maximum number of students	30

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Baghdad / Alkhwarizmi College of Engineering
2. University Department/Centre	Biomedical Engineering Department
3. Course title/code	Medical Measurements Laboratory 2
4. Programme(s) to which it contributes	B.Sc. Biomedical Engineering
5. Modes of Attendance offered	Full Time
6. Semester/Year	Second Course
7. Number of hours tuition (total)	60 Hours
8. Date of production/revision of this specification	2018
9. Aims of the Course	
Students in the Course of Biomedical Measurements and Diagnostics learn the underlying science for developing new medical measurement and diagnostic techniques, then use these to conduct fundamental medical research as well as education and research on clinical applications.	

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A. Knowledge and Understanding

Graduates will be able to:

A1.It gives the introductory idea about human physiology system which is very important with respect to design consideration. With widespread use and requirements of medical instruments, this course gives knowledge of the principle of operation and design of biomedical instruments

B. Subject-specific skills

1- Measure biomedical signals and parameters such as ECG, EEG, EMG, blood pressure and temperature.

2- Know the applications and operation of BSP.

3- Write programs and virtual instruments in LabVIEW**.**

Teaching and Learning Methods

Lectures

Assessment methods

Written exams

C. Thinking Skills

C1. Strategic thinking skills.

C2. Translate complex ideas into clear concepts

Teaching and Learning Methods

Lectures

Assessment methods

Written assignment

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. The ability to work in multidisciplinary team.

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First course					
1	4		ECG and Pulse		
2	4		ECG and Pulse		
3	4		Blood pressure		

4	4		Blood pressure		
5	4		Heart sounds		
6	4		Heart sounds		
7	4		Exam		
8	4		Introduction to Arduino		
9	4		Arduino		
10	4		Arduino		
11	4		De Lorenzo Kit		
12	4		De Lorenzo Kit		
13	4		De Lorenzo Kit		
14	4		De Lorenzo Kit		
15	4		Exam		

12. Infrastructure	
Required reading: · Core Texts · Course Materials · Other	1. Medical Instrumentation Application and Design, 4th Edition, John G. Webster, February 2009. 2. Biopac students Lab – Laboratory manual
Special requirements (include for example workshops, periodicals, IT software, websites)	Check the new modern websites talking about the new modifications
Community-based facilities (include for example, guest Lectures , internship , field studies)	

13. Admissions	
Pre-requisites	
Minimum number of students	20
Maximum number of students	30

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Baghdad / Alkhwarizmi College of Engineering
2. University Department/Centre	Biomedical Engineering Department
3. Course title/code	Biomedical Instrumentation Design I 2
4. Programme(s) to which it contributes	B.Sc. Biomedical Engineering
5. Modes of Attendance offered	Full Time
6. Semester/Year	First Course
7. Number of hours tuition (total)	60 Hours
8. Date of production/revision of this specification	2018
9. Aims of the Course	

This course aims at providing the student with the necessary basic and advanced concepts for the followings:

1. Application design for ECG, EMG, EEG system.
2. Application of medical systems design ERG, hemodynamic and SPO2.
3. Application Design for Audiometry system.
4. Mini project design.

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Knowledge and Understanding

Graduates will be able to:

A1. Use their information and thoughtful of the appropriate modelling, scientific and computational tools that support medical instrumentation, to solve, in depth, analytical, design or theoretical problems in this field.

A2. Apply their data and understanding of physical and clinical laws, arithmetic analysis in order to model medical device and any other similar systems.

A3. Explain the role of Biomedical Engineers in medical instrumentation group of work and the constraints within which their clinical judgment will be exercised.

B. Subject-specific skills

B1. Discuss the principles of general block diagram for medical systems.

B2. Discuss the design requirements and specifications, the preliminary stages of designs and their modified action and work, via series of videos and figures.

B3. Use the preliminary understanding to build a virtual explanation for the desired and undesired plan of design.

B4. Discuss the ability to explain new modification and the new trend of clinical supportive works.

Teaching and Learning Methods

The teaching and learning of such important Couse include the followings:

1. Lectures by the instructor himself explaining the main and important points of design.
2. Free discussion of the brain storm presented at the lecture times and discuss the new and future trends.
3. Seminars presented by the student and discussed directly by the other student and instructor.
4. Discussions of important points and induced ideas through social media

Assessment methods

1. Seminar presented and discussed.
2. Site visited through group of students and under supervising of official medical company.
3. Home works and challenges of design thoughts.
4. Quizzes and exams.

C. Thinking Skills

C1. Apply appropriate analytical mathematics, scientific and engineering tools to the analysis of problems;

C2. Analyze and solve engineering problems;

C3. Design a medical device system, component or process to meet a need;

C4. Integrate knowledge and understanding of other scientific, mathematical, computational or engineering disciplines in order to support their engineering

Teaching and Learning Methods

1. Internal lectures from manufacturers or clinicians;
2. Feedback given to students during tutorials;
3. Question and answer sessions during lectures or staff Office Hours;
4. Guided reading of texts, journal articles etc., for individual and group projects

Assessment methods

1. Individual written report(s).
2. Group discussions of group work brainstorm case studies.
3. Practical skills will be assessed through troubleshoot technique.
4. Experimental, research and design skills will be assessed through laboratory experiments write-ups, coursework reports, project reports and presentations;
5. Presentation skills through group presentations and poster presentations.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Apply in depth problem solving and analytical thinking to a diverse range of problems;

D2. Use appropriate multi-disciplinary skills to solve medical device problems, combining the biological and engineering knowledge gained through the degree;

D3. Demonstrate numeracy and literacy in written reports, project work and examinations;

D4. Learn effectively for the purpose of continuing professional development and in a wider context throughout their career.

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First course					
1	4		Introduction to BMID 2		
2	4		EMG		
3	4		ECG 1		Quiz
4	4		ECG 2		
5	4		EEG		Quiz
6	4		ERG		

7	4		EGG		
8	4		Hemodynamic system		
9	4		Med – term exam		
10	4		Spo2		Quiz
11	4		Design Project 1		
12	4		Design Project 2		Quiz
13	4		Design Project 3		
14	4		Final Term Exam		
15	4		Review		

12. Infrastructure	
Required reading: · Core Texts · Course Materials · Other	1. Khandapur, "Medical Instrumentation", 2010. 2. J. G. Webster, "Encyclopedia of Medical Devices and Instrumentation", 2nd edition, John Wiley 2010. 3. J. D. Bronzino, "Biomedical Engineering Handbook, Medical Devices and Systems", 3rd edition, Taylor and Francis Group, 2006.
Special requirements (include for example workshops, periodicals, IT software, websites)	Check the new modern websites talking about the new modifications
Community-based facilities (include for example, guest Lectures , internship , field studies)	

13. Admissions	
Pre-requisites	
Minimum number of students	20
Maximum number of students	30

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Baghdad / Alkhwarizmi College of Engineering
2. University Department/Centre	Biomedical Engineering Department
3. Course title/code	Microcontroller & Microprocessor
4. Programme(s) to which it contributes	B.Sc. Biomedical Engineering
5. Modes of Attendance offered	Full Time
6. Semester/Year	Second Course
7. Number of hours tuition (total)	45 Hours
8. Date of production/revision of this specification	2018
9. Aims of the Course	
By the end of this course, the students will be able to: 1. Know the concept of the Microprocessor and the architecture of the simple type of Microprocessors (8086/8088). 2. Know how the Microprocessors communicate with the memory and Input/output ports. 3. Learn same simple programs in assembly language. 4. Know the applications of the Microcontroller such as Arduino.	

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A. Knowledge and Understanding

Graduates will be able to:

A1.√ A2.√ A3. √

B. Subject-specific skills

B1. √ B2.√ B3.√

Teaching and Learning Methods

1. Lectures where the students write information presented to them via slide show, overhead or written by the lecturer;
2. Lectures where the students have some printed notes/handouts and may annotate, or expand these during a spoken lecture;
3. Question and answer sessions during lectures or staff Office Hours;

Assessment methods

1. Written examinations (Summative assessment);
2. Oral presentations of individual and group work;
3. Homework
4. Practical skills will be assessed through laboratory experiments, write-ups, coursework reports, project reports and presentations;
5. Presentation skills through group presentations and poster presentations to improve their soft skills such as problem solving, team work, time management and presentation skills.

C. Thinking Skills

C1.√ C2.√ C3.√ C4.√

Teaching and Learning Methods

1. External lectures from industry or clinicians;
2. Feedback given to students during tutorials;
3. Question and answer sessions during lectures or staff Office Hours;
4. Completion of web-based exercises or computer based laboratory sessions;

Assessment methods

1. Individual written project report(s) of both individual and group projects;
2. Practical skills will be assessed through coursework reports, project reports and presentations;
3. Presentation skills through group presentations and poster presentations.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.√ D2.√ D3.√

11. Course Structure					
Week	**Hours**	**ILOs**	**Unit/Module or Topic Title**	**Teaching Method**	**Assessment Method**
First course					
1	3		introduction to Mocroprocessor 8086/8088		
2	3		Bus interfaces and registers.		
3	3		Addressing Mode I		Quiz
4	3		Addressing Mode II		
5	3		Operation Code (for data movement)		Quiz
6	3		The concept of the arithmetic and logic instructions with Simple programs		
7	3		8086/8088 hardwar specifications		
8	3		Seminar activity and group presentations		
9	3		8086/8088 Timming digram		
10	3		Memory interface – types of memory		Quiz
11	3		Input/Output ports		
12	3		Interfacing and Microcontroller		Quiz
13	3		Seminar		
14	3		The Architecture of the microcontroller (Arduino)		
15	3		Exam end term		

12. Infrastructure	
Required reading: · Core Texts · Course Materials · Other	The 8088 and 8086 Microprocessors: Programming, Interfacing, Software, Hardware, and Applications. Walter A. Triebel, Avtar Singh. Prentice Hall PTR, 2002 - Technology & Engineering
Special requirements (include for example workshops, periodicals, IT software, websites)	Check the new modern websites talking about the new modifications
Community-based facilities (include for example, guest Lectures , internship , field studies)	

13. Admissions	
Pre-requisites	
Minimum number of students	20
Maximum number of students	30

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Baghdad / Alkhwarizmi College of Engineering
2. University Department/Centre	Biomedical Engineering Department
3. Course title/code	Engineering Systems
4. Programme(s) to which it contributes	B.Sc. Biomedical Engineering
5. Modes of Attendance offered	Full Time
6. Semester/Year	Second Course
7. Number of hours tuition (total)	45 Hours
8. Date of production/revision of this specification	2018
9. Aims of the Course	
By the end of this course, the students will be able to understand the dynamic characteristic of many mechanisms that are used in different biomedical applications. Such applications are dentures, bone fixation, and exoskeleton. The student knowledge will be honed by writing technical reports and demonstrating oral presentations.	

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A. Knowledge and Understanding

Graduates will be able to:

A1. √ A2. √ A3. √

B. Subject-specific skills

B1. √ B2. √ B3. √

Teaching and Learning Methods

1. Lectures where the students write information presented to them via slide show, overhead or written by the lecturer;
2. Lectures where the students have some printed notes/handouts and may annotate, or expand these during a spoken lecture;
3. Question and answer sessions during lectures or staff Office Hours.
4. Laboratory sessions.

Assessment methods

1. Written examinations (Summative assessment);
2. Oral presentations of individual and group work;
3. Homework;
4. Practical skills will be assessed through laboratory experiments, write-ups, coursework reports, project reports and presentations;
5. Presentation skills through group presentations and poster presentations.

C. Thinking Skills C1. √ C2. √ C3. √ C3. √

Teaching and Learning Methods

1. External lectures from industry or clinicians;
2. Feedback given to students during tutorials;
3. Question and answer sessions during lectures or staff Office Hours;
4. Completion of web-based exercises or computer based laboratory sessions

Assessment methods

1. Individual written project report(s) of both individual and group projects;
2. Practical skills will be assessed through laboratory experiments, write-ups, coursework reports, project reports and presentations;
3. Presentation skills through group presentations and poster presentations

D. General and Transferable Skills (other skills relevant to employability and personal development). D1. √ D2. √

11. Course Structure

Week	hr	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
Second course					

1	3		Dynamic systems		
2	3		Relative and absolute velocity and acceleration		
3	3		Describe a mechanism of two and three bar chain, Solve the velocity and acceleration of points within a mechanism, Use mathematical and graphical methods		
4	3		Construct velocity and acceleration diagram, Inertia force, Define corioils, Solve problem involving sliding links, Application on human body system		
5	3		Fatigue failure due to variable stress, Variable stresses in machine parts, Completely Reversed or cyclic stresses, Fatigue and endurance limit		
6	3		Approximation of S-N curve of high cycle fatigue, Solve problem		
7	3		Applications of fatigue on human body system and on biomedical materials		
8	3		Creep failure due to constant stress and temperature, Introduction Creep strain – Time diagram, Parameter method, Stress relaxation, Solve problem		
9	3		Creep Applications on Biomedical materials and chemical system		
10	3		Mid-term Exam		
11	3		Screwed joints system, Screwed joints		
12	3		Application on dental implants		
13	3		Riveted joints system, Riveted joints (methods of riveting, Lab joints, Butt, joint)		
14	3		Application on bone joints		

12. Infrastructure

Required reading: · Core Texts · Course Materials · Other	1. Biomedical Signal Analysis: A Case-Study Approach, By: R. M. Rangayyan, 1st Edition. 2. Practical Biomedical Signal Analysis Using MATLAB (Series in Medical Physics and Biomedical Engineering), By: K. J. Blinowska (Author), J. Zygierewicz (Author) 3. Hwei P. HSU" Signals and System". (Shaum's outlines)
Special requirements (include for example workshops, periodicals, IT software, websites)	Check the new modern websites talking about the new modifications
Community-based facilities (include for example, guest Lectures , internship , field studies)	

13. Admissions

Pre-requisites	
Minimum number of students	20
Maximum number of students	30

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides rich foundation to learn and acquire English as a second language and use the language for academic purposes. The course prepare undergraduate students to use English language successfully in speaking, reading and writing

1. Teaching Institution	University of Baghdad / Alkhwarizmi College of Engineering
2. University Department/Centre	Biomedical Engineering Department
3. Course title/code	Bio-Computer Design Lab 2
4. Programme(s) to which it contributes	B.Sc. Biomedical Engineering
5. Modes of Attendance offered	Full Time
6. Semester/Year	First Course
7. Number of hours tuition (total)	45 Hours
8. Date of production/revision of this specification	2018
9. Aims of the Course	
By the end of this course the students will get the theory and application of: 1. Software Design and Validation, 2. Microprocessor, 3. Computer Architecture	

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A. Knowledge and Understanding

B. Subject-specific skills

Teaching and Learning Methods

1. Lectures where the students write information presented to them via slide show, overhead or written by the lecturer;
2. Lectures where the students have some printed notes/handouts and may annotate, or expand these during a spoken lecture;
3. Question and answer sessions during lectures or staff Office Hours;
4. Laboratory sessions.

Assessment methods

1. Written examinations (Summative assessment);
2. Oral presentations of individual and group work;
3. Homework;
4. Practical skills will be assessed through laboratory experiments, write-ups, coursework reports, project reports and presentations;
5. Presentation skills through group presentations and poster presentations.

C. Thinking Skills

Teaching and Learning Methods

1. External lectures from industry or clinicians;
2. Feedback given to students during tutorials;
3. Question and answer sessions during lectures or staff Office Hours;
4. Completion of web-based exercises or computer based laboratory sessions

Assessment methods

1. Individual written project report(s) of both individual and group projects;
2. Practical skills will be assessed through laboratory experiments, write-ups, coursework reports, project reports and presentations;
3. Presentation skills through group presentations and poster presentations.

D. General and Transferable Skills (other skills relevant to employability and personal development)

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First course					

1	3		Introduction to Embedded system		
2	3		Defining the Embedded system		
3	3		Embedded processor and Application Awareness		Quiz
4	3		Hardware and Software Co-Design Model		
5	3		Examples of failed Real time systems		Quiz
6	3		Real time Tasks Categories		
7	3		Controlling Timing in Software & What is Time?		
8	3		LIMITS OF CURRENT REAL-TIME SYSTEMS		
9	3		Basic concepts of real time systems		
10	3		Basic concepts of real time systems		Quiz
11	3		Introduction to User graphical interface		
12	3		GUI examples		Quiz
13	3		Introduction to networking		
14	3		OSI layers		
15	3		TCP/IP protocol		

12. Infrastructure	
Required reading: · Core Texts · Course Materials · Other	1- Hard Real Time Computing Systems; Predictable scheduling Algorithms and Applications, Giorgio C. Buttazzo, 3rd edition, Springer Science+Business Media, LLC 2011 2- Designing a Graphical User Interface, James Hunter Michigan State University, ECE 480 – Design Team 6, 5 April 201. 3- COMPUTER NETWORKS, ANDREW S. TANENBAUM, DAVID J. WETHERALL, fifth edition, PRENTICE HALL, 2011.
Special requirements (include for example workshops, periodicals, IT software, websites)	Participate in Classroom discussion in English and Google Class. Writing some formal samples in English and make a presentation in English as well
Community-based facilities (include for example, guest Lectures , internship , field studies)	

13. Admissions	
Pre-requisites	
Minimum number of students	20
Maximum number of students	30