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.

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.

7. Number of hours tuition (total)	45 Hours for each course
8. Date of production/revision of this specification	2021

9. Aims of the Course

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

1. To provide foundation of knowledge of biomaterial science principles
2. to introduce the materials used in biomedical applications, in particular those used in joint replacement of the lower limb.
3. to introduce the fundamental concepts behind the design, function and application of state-of-the-art biomaterials, that is, materials that are designed based on a molecular understanding of their interactions with biological systems.

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.

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First course					
1	3		Introduction to biomaterial		
2	3		Structure of solid		
3	3		Theoretical Density Metals & Imperfections in crystalline structures		
4	3		Types of materials Metals		Quiz (1)
5	3		Metallic Implant Materials		
6	3		Corrosion part (1)		
7	3		Corrosion part (2)		Quiz (2)
8	3		Phase diagram (Building)		
9	3		Polymer (Types)		
10	3		Polymer (determine Molecular weight)		
11	3		Polymerization		
12	3		Physical states of polymers		
13	3		Polymeric Implant Materials		
14	3		Ceramics material		
15	3		Mid exam		
Second course					
16	3		Mechanical properties (Stress & Strain)		
17	3		Mechanical properties (Tensile Properties)		
18	3		Mechanical properties (True stress & strain)		
19	3		Quiz (1)		
20	3		Failure		
21	3		Design Using Fracture Mechanics		
22	3		Failure (Fatigue)		
23	3		Calculating damage with Miner’s Rule		
24	3		Quiz (2)		
25	3		Failure (Stress cycle parameters & Performance of Biomaterials)		
26	3		Electrical properties & Thermal Properties		
27	3		Optical properties		
28	3		Viscoelasticity (1)		

29	3		Viscoelasticity (2)		
30	3		Mid exam		

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	**1.** Introduction to Biomaterial. (J. Park) **2**. Biomaterials Science and Engineering by J. Park **3**. Biomaterials Science: An Introduction to Materials in Medicine by Buddy Ratner, Frederick J. Schoen.
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	BME 445
Minimum number of students	20
Maximum number of students	30