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	Baghdad University / Al Khwarizmi College of engineering
2. University Department/Centre	Biochemical Engineering Department
3. Course title/code	Mass Transfer/505BCMT
4. Programme(s) to which itcontributes	University Requirement
5. Modes of Attendance offered	Full time
6. Semester/Year	Semester
7. Number of hours tuition (total)	4 hours (3 theoretical / 1 tutorial)
8. Date of production/revision of this specification	10-10-2018
9. Aims of the Course	
Separation of products (gases, liquids, solids), Recovery and purification using equipment operation on mass transfer bases and primary estimation of equipment sizing.	

10· Learning Outcomes, Teaching , Learning and Assessment Methods

A- Knowledge and Understanding

A1. Demonstrate the knowledge and understanding of the fundamental concepts, principles and theories underpinning Biochemical Engineering with core knowledge in: engineering analysis, fluid mechanics, thermodynamics; mass & heat transfer; biochemical reactions; materials; process control; safety, health & environment;

A2. operate small and pilot-scale equipment and use it to acquire essential data;

A3. understand process design and use integrated approaches to solve complex, often open-ended process design problems;

A4. demonstrate achievement of a specialised knowledge, particularly via project work, of process engineering which is founded on the chemical, biological and physical sciences.A4.

A5.

A6 .

B. Subject-specific skills

B1. Generate ideas, proposals and solutions or arguments independently and/or collaboratively in response to set scenarios and/or self initiated activity;

B2. Evaluate whether design solutions integrate social, legal, engineering and technical requirements;

B3. Identify appropriate design and governance problems and formulate clear objectives using analytical data and I&CT software as appropriate;

B.4 Develop design briefs with clarity graphically and/or in written specifications

Teaching and Learning Methods

- Lectures - backed up by handouts provided as hard copy
- Tutorials and classes - problem based learning in small groups – with college tutor in early years and with course lecturer or teaching assistant in late specialist options – using tutorial problem sheets issued by the Department. Analytical skills developed. Student centred as far as possible.

- Practicals: Structured practicals to introduce students to test equipment, experimental techniques, provide illustration of theoretical ideas. Assessed throughout the year.

Assessment methods

- Quizzes to assess the ability to solve the problems of the end chapter and formula sheets
- Final exam to assess the overall understanding of the course.

C. Thinking Skills

C1. Evaluate the concepts, values and debates which inform study and practice in Biochemical engineering;

C2. Employ appropriate problem solution skills, as appropriate, in the processes of analysis, synthesis, evaluation and summarization of ideas and information and the proposal of solutions;

C3. Use software packages in the analysis, modelling and simulation, and design of engineering systems.

C4. Analyse problems, think creatively to develop practical solutions and evaluate alternatives

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

D1. Work in groups in laboratories and in final year design project in order to meet shared objectives.

D2. Prepare and present arguments and illustrative materials in a variety of formats.

D3. Demonstrate literacy and information sourcing and retrieval skills.

D4.Use problem solving strategies to develop innovative solutions..

11. Course Structure					
Week	Hours	ILOs	Unit/Module or TopicTitle	Teaching Method	Assessment Method
1	4	Design/simulate the operation offlash distillation	Flash distillation	Lecture & Tutorial	
2	4	Design/simulate the operation of continuous beds for specified fluid flow rates	Continuous Distillation	Lecture & Tutorial	
3	4	Design/simulate the operation of continuous beds for specified fluid flow rates	Multi-components distillation, Reflux ratio	Lecture & Tutorial	
4	4	Design/simulate the operation ofmulti-feed distillation	Multi-feed distillation	Lecture & Tutorial	
5	4	Design/simulate the operation ofbatch distillation	Batch distillation	Lecture & Tutorial	Quizzes, Class work, Month's exams & Terminal Exam
6	4	Design/simulate the operation ofazotropic distillation	Azotropic distillation,	Lecture & Tutorial	
7	4	Design/simulate the operation ofmembrane distillation	Membrane distillation	Lecture & Tutorial	
8	4	Student will understand the mechanism of adsorption	Adsorption	Lecture & Tutorial	
9	4	Student will understand the mechanism of adsorption	Adsorption Equipments	Lecture & Tutorial	
10	4	Student will understand the mechanism of crystallization	Crystallization	Lecture & Tutorial	
11	4	Student will understand the mechanism of crystallization	Crystallizers	Lecture & Tutorial	Quizzes, Class work, Month's exams & Terminal Exam
12	4	Operation of Humidification will be clearly understood	Humidification, Humidity-Enthalpy chart	Lecture & Tutorial	
13	4	Operation of cooling tower will	cooling tower	Lecture &	

		be clearly understood		Tutorial	
14	4	Designing drier for rapid drying of heat-labile proteins.	Drying	Lecture & Tutorial	
15	4	Designing Evaporator for single and multi-effect evaporator	Evaporation	Lecture & Tutorial	

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1- Separation Process Principles, Chemical and Biochemical Operations, by J. D. Seader, Ernest J. Henley, and D. Keith Roper, 2011. 2- Mass Transfer Operation by Robert E. Treybal, 1980. 3- Chemical Engineering volumes 1 and 2, by Coulson and Richardson, 2005. 4- Bioseparation Downstream Processing for Biotechnology, Belter, Cussler, and Hu, 1988.
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures , internship, field studies)	

13. Admissions	
Pre-requisites	The student must be studied the principles of chemical and biochemical Eng., Engineering analysis, and thermodynamics.
Minimum number of students	10
Maximum number of students	30