# TEMPLATE FOR COURSE SPECIFICATION

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW |

**COURSE SPECIFICATION**

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| 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. |

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| 1. Teaching Institution | Al-Nahrain University |
| 2. University Department/Centre | College Of Science |
| 3. Course title/code |  |
| 4. Modes of Attendance offered | In-person and e-learning |
| 5. Semester/Year | First/2022-2023 |
| 6. Number of hours tuition (total) | 30 |
| 7. Date of production/revision of this specification | 26/10/2022 |
| 8. Aims of the Course | |
| 1- Familiarization with the bioenergy molecule in the living system (ATP) with some facts and relationships necessary for the biochemical reactions called (metabolism). | |
| 2- The study of the metabolism of the first and most important biomolecule, carbohydrates; Their biochemical reactions show that they degrade (catabolize) it to invest in energy production, and metabolize it using this energy. And then the paths built | |
| 3- A study of fat metabolism in both catabolism and construction and energy calculation in ATP | |
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| 9· Learning Outcomes, Teaching ,Learning and Assessment Methode |
| A- Cognitive goals . A1- Understand the term metabolism  A2- Understand the principle of converting the energy resulting from the oxidation of foodstuffs into chemical energy that can be invested in the body of the living organism to accomplish its activities  A3- Understand the principles of destruction and construction of vital compounds (carbohydrates and fats in this chapter)  A4- Understanding the process of generating chemical energy from the destruction of vital compounds (carbohydrates and fats) and investing them to build these molecules again - according to the needs of the organism - |
| B. The skills goals special to the course.  B1 - The ability to identify energy molecules within biochemical reactions  B2 - The ability to carry out building and demolition reactions for any biological molecule within most of the family of carbohydrates and fats  B3 - The ability to calculate the output and energy needs of the biochemical building and demolition reactions |
| Teaching and Learning Methods |
| The teaching methods used are  1- Download the full class lectures on the Google Classroom app  2- Explanation in class using POWR POINT SLIDES  3- The lecture included some educational videos  The method of learning used is  1- Dividing the students into groups and igniting the spirit of competition among them by presenting topics within the curriculum to be discussed within each group, as well as spreading the spirit of the team  2- Interactive education by asking questions and receiving several answers and comparing them with each other to reach the correct answer |
| Assessment methods |
| Personal interaction of each student in the lecture  2- By dividing the students into groups and assigning them to answer an enriching question  3- Assigning students to prepare homework for enriching questions  4- Daily and monthly exams |
| C. Affective and value goals  C1- Building an effective and positive relationship between the teacher and the student  C2 - Develop the students' ability to link what they have learned to the daily life reality in order to spread scientific culture.  C 3- To benefit from what they have learned in self-development, and thus the development of the environment and the environment in which they live |

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| D. General and rehabilitative transferred skills(other skills relevant to employability and personal development).  D1- Linking the subject and what they study to the expected problems in the field of work in this specialty (medical or nutritional laboratory analyzes)  D2 - The ability to employ the studied information in the dissemination of a healthy and reliable scientific culture with regard to this science (biochemistry). |

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| 10. Course Structure | | | | | |
| Week | Hours | ILOs | Unit/Module or Topic Title | Teaching Method | Assessment Method |
| 1 | 2 | Understand the course description and the course information | Introduction to metabolism and bioenergy | interactive lecture | Discussion |
| 2 | 2 | Understanding the term metabolism, biochemical energy, metabolic pathways | Concepts about metabolism | Interactive with slides and a video tutorial | discussion and homework |
| 3 | 2 | Understanding Bioenergy Compounds ATP, ADP, CREATININ-P, …ETC | Energetic compounds and biochemical energy | Interactive using slides | Daily discussion and exam |
| 4 | 2 | Extracting the energy quotient of carbohydrates and fats. Understand the glycolytic pathway strategy | Bioenergy quotient and input for carbohydrate metabolism. Glycolysis pathway strategy | Interactive using slides | Discussion, daily exam and homework |
| 5 | 2 | Detailed understanding of glycolytic pathway interactions | glycolytic pathway | Interactive using slides | Discussion, daily exam and homework |
| 6 | 2 | Continuation of the previous lecture | Continuation of the previous lecture | Interactive using slides | Discussion, daily exam and homework |
| 7 | 2 | Student evaluation of the above | monthly exam |  |  |
| 8 | 2 | Understand the fate of glycolysis product and how other sugars are involved in the glycolysis pathway | Fate of pyruvate and entry of other sugars into the pathway | Interactive using slides | Discussion, daily exam and homework |
| 9 | 2 | Understand how the reactions of the Krebs cycle interact with the products of the glycolysis pathway | Krebs cycle | Interactive using slides | Discussion, daily exam and homework |
| 10 | 2 | Understand how glucose is produced from non-sugar molecules | Gluconeogenesis | Interactive using slides | Discussion, daily exam and homework |
| 11 | 2 | Continuation of the previous lecture | Continuation of the previous lecture | Interactive using slides | Discussion, daily exam and homework |
| 12 | 2 | Understand the pentose sugar production pathway | The pentose phosohate pathway | Interactive using slides | Discussion, daily exam and homework |
| 13 | 2 |  | second exam |  | and homework |
| 14 | 2 | Understanding the pathway of fat breakdown and transporting it through the human body and calculating the energy generated from it | Fat catabolism pathway | Interactive using slides | Discussion, daily exam and homework |
| 15 | 2 | Understanding the fat building pathway | Fat building pathway | Interactive using slides | Discussion, daily exam and homework |

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| 11. Infrastructure | | | |
| 1. Books Required reading: | | Biochemistry 4th Edition by [Christopher Mathews](https://www.amazon.com/s/ref=dp_byline_sr_book_1?ie=UTF8&field-author=Christopher+Mathews&text=Christopher+Mathews&sort=relevancerank&search-alias=books) (Author), [Kensal van Holde](https://www.amazon.com/s/ref=dp_byline_sr_book_2?ie=UTF8&field-author=Kensal+van+Holde&text=Kensal+van+Holde&sort=relevancerank&search-alias=books) (Author), [Dean Appling](https://www.amazon.com/s/ref=dp_byline_sr_book_3?ie=UTF8&field-author=Dean+Appling&text=Dean+Appling&sort=relevancerank&search-alias=books) (Author) | |
| 2. Main references (sources) | | Lehninger Principles of Biochemistry 4th Edition by [David L. Nelson](https://www.amazon.com/David-L-Nelson/e/B001H6MD2Y/ref=dp_byline_cont_book_1)  (Author), [Michael M. Cox](https://www.amazon.com/Michael-M-Cox/e/B001H6KJQQ/ref=dp_byline_cont_book_2) | |
| A- Recommended books and references (scientific journals, reports…). | | Biochemistry. Jeremy M. Berg, John L. Tymoczko, Lubert– International Edition | |
| B-Electronic references, Internet sites… | | https://www.pearson.com/en-gb/highered-students.html | |
| 12. The development of the curriculum plan | | |
| Adoption of the official modern editions of the above references. Creating a practical aspect that can be applied in the laboratory | | |
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