Specification for Biochemistry (D)
2025/2026

1) Basic information:

Course title	**Biochemistry (D)**						
Course code	**BMB-226**						
Department offering the course	**Biochemistry and Molecular Biology**						
Number of credit hours	**Theoretical**	**1**	**Practical**	**1 (2)**	**Total**	**2 (3)**	
Course Type	**Obligatory**						
Academic level	**2nd Level**						
Semester	**spring Semester**						
Academic program	**Bachelor of Veterinary medicine (BVM)**						
Faculty	**Veterinary medicine**						
University	**Benha University**						
Name of course coordinator	**Prof. dr. / Samy Ali Hussein Aziza**						
Specification Approval Date	**Faculty council/ 27-8-2025**						
Course Specification Approval	**Department council**						

2) Course overview:

- **Course contents written in the program bylaw:**

Molecular biology and protein metabolism.

3) Course Learning Outcomes CLOs

	(NARS) outcomes		Course outcomes	
	Code	**Text**	**Code**	**Text**
Knowledge and understanding	**2.4**	Physiological and biochemical bases of different organ functions, metabolic processes and homeostasis	**a1**	Identify the basic knowledge about digestion and absorption of proteins.
			a2	Define the basic knowledge about deamination and urea cycle and ammonia metabolism.
			a3	Gain the basic

				information about metabolism of individual amino acids.
			a4	State the basics of nucleoproteins metabolism
Intellectual skills	**4.2**	Assess and criticize, at the fundamental level, how data are derived	**b1**	Distinguish between anabolism and catabolism of urea and ammonia.
			b2	Distinguish between anabolism and catabolism of individual amino acids
			b3	Judge the metabolic disorders of amino acids metabolism
			b4	Determinate the different metabolic disorders of nucleoproteins metabolism.
Professional and practical skills	**3.4**	Perform clinical examination of diseased cases and collect relevant samples..	**c1**	Ability to collect and analyze urine samples.
			c2	Ability to prepare different kits or chemicals, reagents needed in the experimental work.
			c3	Perform various chemical experiments to distinguish urine components.
			c4	Identify pathological constituents of urine.
	D			
	5.2	Function in a	**d1**	Communicate

General and transferable skills		multidisciplinary team.		effectively with lab collage during biochemistry lab session
	5.4	Organize and control tasks and resources.	**d2**	Manipulate and organize tasks
	5.5	Search for new information and technology as well as adopting life–long self-learning.	**d3**	Search for new information and technology
	5.6	Utilize computer and internet skills.	**d4**	Utilize computer and internet skills

4) Teaching and learning methods:

Lectures	√	**Discussion & seminar**	√	**Practical**	√
Presentation & movies	√	**Problem solving**	√	**Brain storming**	√
Others					

Course Schedule:

Number of the weeks	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of Learning Hours			
			Theoretical teaching (lectures/discussion groups)	Training (Practical/Clinical/ .....)	Self-learning (Tasks/ Assignments/ Projects)	Other
W1	**Digestion and absorption of protein Blood nitrogen balance**	**2 (3)**	**1**	**1(2)**		0
W2	**Deamination of amino acids**	**2 (3)**	**1**	**1(2)**		0

	Ammonia metabolism					
W3	**Urea metabolism**	**2 (3)**	**1**	**1(2)**	Formative quiz	0
W4	**Metabolism of Glycine**	**2 (3)**	**1**	**1(2)**		0
W5	**Metabolism of Phenylalanine**	**2 (3)**	**1**	**1(2)**		0
W6	**Metabolism of Tryptophan, Glutamic**	**2 (3)**	**1**	**1(2)**	Formative quiz	0
W7	**Semester work including 1hr exam**	**----------**				
W8	**Metabolism of aspartic and histidine**	**2 (3)**	**1**	**1(2)**		0
W9	**Metabolism of sulfur containing amino acids**	**2 (3)**	**1**	**1(2)**		0
W10	**Metabolism of branched amino acids**	**2 (3)**	**1**	**1(2)**	Formative quiz	0
W11	**Metabolism of Serine, alanine**	**2 (3)**	**1**	**1(2)**		0
W12	**Metabolism of Purines and disorders (1)**	**2 (3)**	**1**	**1(2)**		0
W13	**Metabolism of Purines and disorders (2)**	**2 (3)**	**1**	**1(2)**		0
W14	**Metabolism of Pyrimidines and disorders**	**2 (3)**	**1**	**1(2)**	Formative quiz	0
W15	**Practical Exam**	**----------**				

5) Methods of students' assessment:

a- Assessment methods (summative and formative)

1. Formative assessment: including (weekly quizzes, homework assignments and surveys).
2. Summative assessment including (quizzes, class activities, 1hr exam, practical exam, oral exams and final written exams).

b- Assessment schedule and weight

Assessment method	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
Semester work 1hr exam	7th week	10	10%
Formative assessment	Throughout the semester	--------	----------
Practical exam	15th week	30	30%
oral exam	End of semester	10	10%
Written exam	End of semester	50	50%
Assignments / Project /Portfolio/ Logbook	--------	-------	-------
Field training	--------	----------	-------
Other (Mention)	-------	--------	-------

Total	100	100%

6) Learning resources and supportive facilities:

Teaching and learning methods	**Main reference**	**Student Handbook:** Clinical Biochemistry (III), Edited by Staff members. **Student practical Clinical book (III)**, Edit by Staff members
	Essential books (text books)	**A) Lippincott Illustrated Reviews: Biochemistry** (Lippincott Illustrated Reviews Series) 7th Edition. By Denise Ferrier. **B) Harper's Illustrated Biochemistry, 32nd Edition.** Peter J. Kennelly, Kathleen M. Botham, Owen P. McGuinness, Victor W. Rodwell, P. Anthony Weil. **C) Medical Biochemistry:** An Essential Textbook, 2021 , Panini (author) **D) Textbook of Biochemistry with Clinical Correlations,** Devlin Hardback, Thomas M. Devlin **E) Clinical Biochemistry and Metabolic Medicine:** 8th Edition, By Martin Crook.
	Recommended books	**A)** Bakry, M.A. (2005): Review of Medical Biochemistry. 3rd ed. **B)** Khalifa, A. (2017): Biochemistry for Medical Students. Fac. Of Med., Ain Shams Univ. **C)** Salah, E. (2003): Medical Biochemistry. 2nd. Ed. Fac. of Med., Ain Shams Univ.
	Periodicals, Web sites, . . . etc	▪ Journal of Biochemistry. ▪ American Journal of Biochemical Association. ▪ American Journal of Veterinary research. ▪ https://byjus.com/ ▪ https://www.ekb.eg/ar/home
	Learning platform	▪ Thinqi
		Devices ▪ Spectrophotometer ▪ Microscope ▪ Centrifuge ▪ Water Distillator

Facilities required for teaching and learning	**Devices & instruments**	▪ Water Bath ▪ Incubator ▪ Magnetic stirrer ▪ Vortex mixer **Instruments:** ▪ Automatic Pipette ▪ Digital balance ▪ Bottles ▪ Flasks ▪ Cylinders ▪ Beakers ▪ Test Tubes ▪ Eppendorf's Tubes ▪ Burners
	Additional instruments	Data show White board

Matrices:

A- Content and ILOs matrix:

Topic	A) Knowledge and understanding	B) Intellectual skills	C) Professional and practical skills	D) General and transferable skills
Digestion and absorption of protein Blood nitrogen balance	a1	b1	c1, c2	d1, d2, d3
Deamination of amino acids Ammonia metabolism	a1	b1	c1, c2, c3, c4	d1, d2, d3
Urea metabolism	a1	b1	c1, c2, c3, c4	d1, d2, d3,d4
Metabolism of Glycine	a2, a3	b2, b3	c1, c2	d1, d2, d3
Metabolism of Phenylalanine	a2, a3	b2, b3	c1, c2	d1, d2, d3
Metabolism of Tryptophan, Glutamic	a2, a3	b2, b3	c1, c2	d1, d2, d3,d4
Metabolism of aspartic and histidine	a2, a3	b2, b3	c3, c4	d1, d2, d3
Metabolism of sulfur	a2, a3	b2, b3	c3, c4	d1, d2, d3

containing amino acids				
Metabolism of branched amino acids	a2, a3	b2, b3	c3, c4	d1, d2, d3,d4
Metabolism of Serine, alanine	a2, a3	b2, b3	c1, c2	d1, d2, d3,d4
Metabolism of Purines and disorders (1)	a4	b4	c1, c2	d1, d2, d3
Metabolism of Purines and disorders (2)	a4	b4	c1, c2	d1, d2, d3
Metabolism of Pyrimidines and disorders	a4	b4	c1, c2	d1, d2, d3

B- Teaching and learning methods and ILOs matrix:

ILOs		**Teaching and Learning method**					
		L	**P&M**	**D&S**	**P**	**Ps**	**Bs**
Knowledge and understanding	**a1**	√	√	√	√	√	√
	a2	√	√	√	√	√	√
	a3	√	√	√	√	√	√
	a4	√	√	√	√	√	√
Intellectual skills	**b1**	√		√			
	b2	√		√			
	b3	√		√			
	b4	√		√			
Professional and practical skills	**c1**				√		√
	c2				√		√
	c3				√		√
	c4				√		√
General skills	**d1**					√	√
	d2					√	√
	d3					√	√
	d4					√	√

L : Lecture, **P&M:** Presentations & Movies**, D&S:** Discussions & Seminars **P:** Practical **Ps:** Problem solving, **Bs:** Brain storming

C- Assessment methods and ILOs matrix:

ILOs		Assessment Method				
		formative	semester1hr exam	Oral	Practical	Written
Knowledge and understanding	a1	√	√	√		√
	a2	√	√	√		√
	a3	√	√	√		√
	a4	√	√	√		√
Intellectual skills	b1	√	√	√		√
	b2	√	√	√		√
	b3	√	√	√		√
	b4	√	√	√		√
Professional and practical skills	c1				√	
	c2				√	
	c3				√	
	c4				√	
General skills	d1	√		√		
	d2	√		√		
	d3	√		√		
	d4	√		√		

- **Course coordinator:**

Prof. Dr. Samy Ali Hussein Aziza

- **Head of Biochemistry Department:**

Prof. Dr. Afaf Desoky Abd El-Magid

- **Program Coordinator:**

Prof. Dr. Mahmoud Abed Abou Elroos