

FACULTY OF LIFE SCIENCES

Syllabus for

**Bachelor of Science (Honours) (Medical Laboratory
Technology)**

Semester: V-VI

**(Under Credit Based Continuous Evaluation Grading
System)**

(Session: 2026-27)



Kanya Maha Vidyalaya, Jalandhar (Autonomous)

The Heritage Institution

KANYA MAHAVIDYALAYA, JALANDHAR (AUTONOMOUS)
SCHEME AND CURRICULUM OF EXAMINATIONS OF FOUR-YEAR DEGREE
PROGRAMME
Session-2026-27

Bachelor of Science (Honours) (Medical Laboratory Technology) (Semester -V)											
Course Code	Course Title	Course Type	Total Credits (L-T-P)	Credit Hours			Total Marks	Marks			Exam Time in Hrs
				L	T	P		L	P	CA	
BMLL-5481	Haematology-IV	DSC	3-0-0	3	-	-	100	70	-	30	3
BMLP-5481	Haematology-IV Lab	DSC	0-0-2	-	-	4	50	-	35	15	3
BMLL-5482	Pathology-III	DSC	3-0-0	3	-	-	100	70	-	30	3
BMLP-5482	Pathology- III Lab	DSC	0-0-2	-	-	4	50	-	35	15	3
BMLL-5483	Clinical Biochemistry-III	DSC	3-0-0	3	-	-	100	70	-	30	3
BMLP-5483	Clinical Biochemistry-III Lab	DSC	0-0-2	-	-	4	50	-	35	15	3
BMLL-5484	Parasitology	DSC	3-0-0	3	-	-	100	70	-	30	3
BMLP-5484	Parasitology Lab	DSC	0-0-1	-	-	2	50	-	35	15	3
BMLL-5485	Immunology-II	MDC-II	3-0-0	3	-	-	100	70	-	30	3
BMLP-5485	Immunology-II Lab	MDC-II	0-0-1	-	-	2	50	-	35	15	3
CCFC-5522	Internship	CCFR	0-0-2	-	-	4	50	-	35	15	1
VACJ-5551	*Job Readiness	VAAC	2-0-0	2	-	-	50	35	-	15	1
Total Credits			27								

*Credits of these papers will not be added in SGPA/CGPA and only grades will be provided.

DSC- Discipline Specific Course

MDC- Multi Disciplinary Course

CCFR- Co-curricular Field Work and Report Writing

VAAC- Value Added Audit Course

KANYA MAHAVIDYALAYA, JALANDHAR (AUTONOMOUS)
SCHEME AND CURRICULUM OF EXAMINATIONS OF FOUR-YEAR DEGREE
PROGRAMME
(Session: 2026-27)

Bachelor of Science (Honours) (Medical Laboratory Technology) (Semester -VI)											
Cours e Code	Course Title	Cour se Type	Total Credit s (L-T- P)	Credit Hours			Total Mark s	Marks			Exa m Tim e in Hrs
				L	T	P		L	P	CA	
BMLI-6480	‡‡Training in Diagnostic Lab/ Internship	SEC	0-0-20	-	-	40	500	-	500	-	-
VACH-6401	Human Rights and Constitutional Duties	VAC	2-0-0	2	-	-	50	35	-	15	1
Total Credits			22								

SEC- Skill Enhancement Course

VAC- Value Added Course

‡‡A report on the basis of the training/internship will be submitted by the students and shall be evaluated by a committee of three members.

Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–V
(Session: 2026-27)
Course Title: Hematology-IV
Course Code: BMLL- 5481
(THEORY)

Course Outcome

After passing this course the student will be able to:

CO1: Learn about Blood groups and their inheritance.

CO2: Know about blood donors, acceptors and blood rejection.

CO3: Understand human circulatory system.

CO4: Learn about Human heart and its working.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–V
(Session: 2026-27)
Course Title: Hematology-IV
Course Code: BMLL- 5481
(THEORY)

Time: 3 Hours

Total Marks: 100

Credits: 3-0-0

Theory: 70

CA: 30

Instructions for paper setter:

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions of section A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section. Each question carries 14 marks.

Unit-I

Human blood group system, Inheritance of blood group system-indirect anti-globulin

(Coomb's test), direct anti- globulin (Coomb's test).

Unit –II

Criteria of blood donation, Blood rejection, Blood donors and acceptors, protocols for blood donation, checking of blood sample of donar.

Unit –III

Circulatory system- open and closed, basic parts of a human circulatory system, veins, arteries, capillaries.

Unit –IV

Structure of heart, Supply of blood in the body- working of heart, Blood pressure.

Books Recommended

1. Godkar, PB and Godkar, DP (2008) Text Book of Medical Laboratory Technology, 2nd edition Bhalani Publishing House, Mumbai, India.
2. Martin R. Howard & Peter J Hamilton (2013) Text Book of Hematology, 4th edition, Churchill Livingstone

Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–V
(Session: 2026-27)
Course Title: Hematology-IV Lab
Course Code: BMLP- 5481
(PRACTICAL)

Course Outcome

After passing this course the student will be able to:

CO1: Gain knowledge about centrifuge.

CO2: Know about determination of ESR by different methods.

CO3: Understand various erythrocyte indices and reticulocyte count.

CO4: Learn about Blood group determination.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–V
(Session: 2026-27)
Course Title: Hematology-IV Lab
Course Code: BMLP- 5481
(PRACTICAL)

Time: 3 Hours

Total Marks: 50

Credits: 0-0-2

Practical: 35

CA: 15

1. Study of centrifuge
2. Determination of ESR by Wintrob's method
3. Determination of ESR by Westergren's method
4. Determination of PCV by Wintrob's method
5. Erythrocyte Indices-MCV, MCH, MCHC
6. Reticulocyte count
7. Determination of blood group

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–V
(Session: 2026-27)
Course Title: Pathology-III
Course Code: BMLL- 5482
(THEORY)

Course Outcome

After passing this course the student will be able to:

CO1: Understand various diseases of nervous system.

CO2: Learn about diseases of sense organs.

CO3: Know about endocrine disorders.

CO4: Gain knowledge about cytopathology.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–V
(Session: 2026-27)
Course Title: Pathology-III
Course Code: BMLL- 5482
(THEORY)

Time: 3 Hours

Total Marks: 100

Credits: 3-0-0

Theory: 70

CA: 30

Instructions for paper setter:

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions of section A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section. Each question carries 14 marks.

Unit-I

Nervous System: - Neuronal damage- Cerebral Oedema, ICP, Cerebral Infarction, Head injury- ageing and dementia, Alzheimer's disease, dementia, infections, Parkinson's Disease; Hydrocephalus.

Unit-II

Sense Organs:-Ear:- Otitis,tumours and tumours-like lesions of ear. Eye: congenital lesions- retinopathy of prematurity, retinitis pigmentosa. Inflammatory conditions. Vascular lesions- diabetic retinopathy, hypertensive retinopathy, retinal infarcts. Cataract.

Unit-III

Endocrine System: -Pituitary: - Hyper & Hypo secretions, Thyroid gland (overactivity and underactivity): - Goiter, Tumours of Thyroid. Adrenal: - Cushing Syndrome, Addison Disease Pancreas: - Diabetes, Multiple endocrine neoplasia (MEN) syndromes.

Unit-IV

Cytopathology: -Collection and processing of cytological specimen. Exfoliative Cytology, Cervical-cytology & Aspiration cytology (FNAC): principals, indications role of cyto-technician.

Books Recommended:

1. Godkar, PB and Godkar, DP (2008) Text Book of Medical Laboratory Technology, 2nd edition Bhalani Publishing House, Mumbai, India.
2. Muir's Textbook of Pathology (2014) edited by C. Simon Herrington. CRC press USA
3. Text book of Pathology (2004) by V Krishna. Orient Longman Pvt. Ltd, India.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–V
(Session: 2026-27)
Course Title: Pathology-III Lab
Course Code: BMLP- 5482
(PRACTICAL)

Course Outcome

After passing this course the student will be able to:

- CO1: Know about squamous cell from cheek cells.
- CO2: Gain knowledge about organs of Nervous system.
- CO3: Understand various organs of Endocrine system.
- CO4: Learn about sense organs.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–V
(Session: 2026-27)
Course Title: Pathology-III Lab
Course Code: BMLP- 5482
(PRACTICAL)

Time: 3 Hours

Total Marks: 50

Credits: 0-0-2

Practical: 35

CA: 15

1. To study squamous cell from cheek cells.
2. To study stained slide preparation from organs of Nervous system.
3. To study stained slide preparation from organs of Endocrine system.
4. To study the stained slide preparation from sense organs.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–V
(Session: 2026-27)
Course Title: Clinical Biochemistry-III
Course Code: BMLL- 5483
(THEORY)

Course Outcome

After passing this course the student will be able to:

CO1: Understand about Clinical Enzymology.

CO2: Gain knowledge about various Biomarkers.

CO3: Know about various liver function tests.

CO4: Learn about gastric function tests.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–V
(Session: 2026-27)
Course Title: Clinical Biochemistry-III
Course Code: BMLL- 5483
(THEORY)

Time: 3 Hours

Total Marks: 100

Credits: 3-0-0

Theory: 70

CA: 30

Instructions for paper setter:

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions of section A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section. Each question carries 14 marks.

Unit-I

Clinical Enzymology: Enzymes, cofactors, coenzymes and prosthetic group, apoenzyme and holoenzyme, enzyme nomenclature & classification, intracellular and extracellular levels of enzymes in normal and diseased individuals, isoenzymes (LDH, CK, AP), *in vitro* enzyme assays, Enzymes as therapeutic and diagnostic agents, immobilized enzymes.

Unit-II

Biomarkers: Definition and classification, Markers of Cardiac disease: Creatine kinase, Cardiac troponins, Lactate dehydrogenase. Markers of Liver disease: Aspartate aminotransferase, Alanine amino transferase, Alkaline phosphatase, Nucleotide phosphatase, Gamma glutamyl transferase. Other biomarkers: Acid phosphatase, Cholinesterase, Glucose-6-phosphate dehydrogenase, Amylase, Lipase, Aldolase, Enolase.

Unit-III

Liver Function Tests: Jaundice, prehepatic, hepatic and post hepatic jaundice, Tests for liver function, Serum bilirubin (direct and indirect), Bile acids and bile salts, Tests based on the metabolic capacity of the liver, Test based on synthetic function, Serum enzymes as markers of hepatobiliary diseases.

Unit-IV

Gastric Function Tests: Gastric function, Hydrochloric acid secretion, Assessment of free and total acidity, Pancreatic function tests.

Books Recommended

1. Vasudevan D, Sreeekumari S and Vaidyanathan K (2016) Textbook of Biochemistry for Medical Students.8th Edition. Jaypee Brothers Medical Publishers (P) Ltd.
2. Godkar PB and Godkar DP (2014) Textbook of Medical Laboratory Technology (Vol 1 and 2) by P.B. Godkar. Bhalani Publishing House.
3. Chaterjea MN and Shinde R (2012) Text book of Medical Biochemistry. 8th Edition.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–V
(Session: 2026-27)
Course Title: Clinical Biochemistry-III Lab
Course Code: BMLP- 5483
(PRACTICAL)

Course Outcome

After passing this course the student will be able to:

CO1: Learn about serum enzymes.

CO2: Know about glucose estimation.

CO3: Understand determination of conjugated and unconjugated bilirubin.

CO4: Learn about serum SGOT and SGPT.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–V
(Session: 2026-27)
Course Title: Clinical Biochemistry-III Lab
Course Code: BMLP- 5483
(PRACTICAL)

Time: 3 Hours

Total Marks: 50

Credits: 0-0-2

Practical: 35

CA: 15

1. Determination of serum lactate dehydrogenase
2. Determination of serum alkaline phosphatase
3. Determination of serum acid phosphatase
4. Glucose estimation using a glucometer
5. Determination of conjugated bilirubin
6. Determination of unconjugated bilirubin
7. Determination of serum SGOT
8. Determination of serum SGPT

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–V
(Session: 2026-27)
Course Title: Parasitology
Course Code: BMLL- 5484
(THEORY)

Course Outcome

After passing this course the student will be able to:

CO1: Understand parasitism and parasitic adaptations.

CO2: Learn about life history, pathogenesis and control of parasitic protozoans.

CO3: Know about life history, pathogenesis and control of parasitic helminthes.

CO4: Gain knowledge about vector biology.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–V
(Session: 2026-27)
Course Title: Parasitology
Course Code: BMLL- 5484
(THEORY)

Time: 3 Hours

Total Marks: 100

Credits: 3-0-0

Theory: 70

CA: 30

Instructions for paper setter:

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions of section A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section. Each question carries 14 marks.

Unit-I

Parasitism:

Types of Parasitism, Hosts and their types, Inter-Animal Associations, Parasitic Adaptations

Unit-II

Life history, pathogenesis and control of Parasitic Protozoans:

Entamoeba histolytica, *Trypanosoma gambiense*, *Leishmania donovani*, *Plasmodium* sp.

Unit-III

Life history, pathogenesis and control of Parasitic Helminths:

Taenia solium, *Schistosoma haematobium*, *Ancylostoma duodenale*, *Wuchereria bancrofti*

Unit-IV

Vector Biology:

Transmission of Diseases by vectors, Types of Vectors, Mosquitoes as vectors, Mites and ticks as vectors, Tse-tse flies as vectors, House fly as vectors

Books Recommended:

1. Chatterjee, K.D. (1977). Parasitology , Chatterjee Medical Publishers, Calcutta, India.
2. Rej, S.K. and Roy, R. (2013). Simplified course on Parasitology and

Immunology, New Central.

3. Roberts, L. S. and Janovy, J. (2009). Foundation of Parasitology, 8th edition, McGraw Hill Book Agency(P) Ltd, London. Higher Education, Boston

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–V
(Session: 2026-27)
Course Title: Parasitology Lab
Course Code: BMLP- 5484
(PRACTICAL)

Course Outcome

After passing this course the student will be able to:

- CO1: Learn about different type of microscopes.
- CO2: Know about preparation of thin and thick blood film for parasite examination.
- CO3: Understand various stains used to study protozoans.
- CO4: Learn about different kind of blood cells in humans.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–V
(Session: 2026-27)
Course Title: Parasitology Lab
Course Code: BMLP- 5484
(PRACTICAL)

Time: 3 Hours

Total Marks: 50

Credits: 0-0-1

Practical: 35

CA: 15

1. Different types of Microscopes used in parasitic studies.
2. Permanent slides of Parasites.
3. Examination of Blood for parasites
 - a. Preparation of thick blood film
 - b. Preparation of thin blood film
4. Staining blood films for the study of Protozoa.
 - a. Romanowsky stain
 - b. Leishman's stain
 - c. Giemsa stain
5. Examination of stool for parasites
6. Identification of different kinds of blood cells in humans

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–V
(Session: 2026-27)
Course Title: Immunology-II
Course Code: BMLL- 5485
(THEORY)

Course Outcome

After passing this course the student will be able to:

- CO1: Learn about immunological memory and its significance, autoimmunity and experimental approaches.
- CO2: Understand about MHC class I and II molecules and structure of T- cell antigen receptors.
- CO3: Know about Complement system and Cytokines.
- CO4: Gain knowledge about Humoral and cell mediated immune response.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–V
(Session: 2026-27)
Course Title: Immunology-II
Course Code: BMLL- 5485
(THEORY)

Time: 3 Hours

Total Marks: 100

Credits: 3-0-0

Theory: 70

CA: 30

Instructions for paper setter:

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions of section A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section. Each question carries 14 marks.

Unit-I

Immunological memory and its significance: Mechanisms of memory formation; Long- term immunity and memory cells; Specificity and recognition of self and non-self; Self- tolerance mechanisms. **Autoimmunity:** Causes and types of autoimmune diseases; Diagnostic approaches and treatments; Terminology and approaches to the study of immune system. **Experimental approaches:** Flowcytometry, ELISA, Western blotting.

Unit-II

MHC class I and class II molecules: Structure–Alpha and beta chains, peptide-binding grooves; Function – Antigen presentation to T-cells. **Structure of T-cell antigen receptors:** TCR composition–Alpha-beta and gamma-delta TCRs; Antigen recognition and signalling.

Unit-III

Complement system: Components and pathways (classical, alternative, lectin); Functions- Opsonization, lysis, inflammation. **Cytokines:** Types and functions (interleukins, interferons, TNF, growth factors); Role in immune regulation and signalling.

Unit-IV

Humoral immune response: B-cell activation and differentiation; Antibody production and functions. **Cell mediated immune response:** T-cell activation and differentiation; Roles of CD4⁺ helper T-cells and CD8⁺ cytotoxic T-cells. **Immunity to infection:** Mechanisms, pathogenesis, and host immune response to - Bacterial infections; Viral infections; Fungal infections; Parasitic infections.

Books Recommended:

1. Abbas, A. K., Litchman, A.H. (2006-2007). Basic Immunology : Functions and Disorders of the Immune System, 2nd Ed. (updated edition), Philadelphia, Pennsylvania: W.B. Saunders Company Publishers.
2. Benjamini, E., Coico, R. and Sunshine, G. (2009). Immunology: A Short Course, 6th Ed., New York, Wiley-Blackwell.
3. Roitt, I. M., Delves, P. Seamus M. and Burton D. (2006). Essential Immunology, 11th Ed., Wiley- Blackwell.
4. Roitt, I., Brostoff, J. and Male, D. (2001). Immunology, 7th Ed., Mosby
5. Kanfmann S.H.E., Sher, A., Ahmed, R. (2002). Immunology of Infections Diseases, ASM Press, Washington.
6. Goldsby, R. A., Kindt, T.J., Osborne, B.A. (2005). Kuby Immunology, 5th Ed., W.H. Freeman and Company, New York.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–V
(Session: 2026-27)
Course Title: Immunology-II Lab
Course Code: BMLP- 5485
(PRACTICAL)

Course Outcome

After passing this course the student will be able to:

- CO1: Gain knowledge about WBC isolation from blood.
- CO2: Learn about Viability test by dye exclusion method.
- CO3: Know about DNA isolation from blood cells.
- CO4: Understand about Dot Immuno Blot Assay.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–V
(Session: 2026-27)
Course Title: Immunology-II Lab
Course Code: BMLP- 5485
(PRACTICAL)

Time: 3 Hours

Total Marks: 50

Credits: 0-0-1

Practical: 35

CA: 15

1. Isolation of WBCs from blood
2. Viability test by dye exclusion method
3. DNA isolation from blood cells
4. Dot Immuno blot assay (DIBA)
5. Double immune diffusion test using specificant body and antigen.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Bachelor of Science (Honours) (Medical Laboratory Technology) Semester–VI
(Session: 2026-27)
Course Title: Internship
Course Code: BMLI- 6480

L-T-P: 0-0-2

Max. Marks: 50

Students shall undertake Community Engagement and Service/ field based learning through an internship of four weeks during the fifth semester after completion of classes or during the summer vacation at the end of the fourth semester.

The internship shall be carried out in one of the areas related to the courses of study. Students participating in NCC or NSS activities may submit a certificate of participation for a minimum duration of four weeks in lieu of the internship.

Every student shall submit an internship report in the prescribed format along with the original internship completion certificate and permission letter issued by the college to carry out the internship/ community outreach.

The viva voce examination shall be conducted on the basis of the final internship report submitted and the presentation by the student.