



# DIPLOMA IN MEDICAL LABORATORY TECHNOLOGY

# FACULTY OF HEALTH SCIENCES

# UNIVERSITI SULTAN ZAINAL ABIDIN





#### STUDENT HANDBOOK MEDICAL LABORATORY TECHNOLOGY PROGRAMME FACULTY OF HEALTH SCIENCES UNIVERSITI SULTAN ZAINAL ABIDIN

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### 1. GENERAL INFORMATION OF UniSZA

### 1.1 Brief history of UniSZA establishment

Universiti Sultan Zainal Abidin (UniSZA) (previously known as Universiti Darul Iman- UDM) is located in Terengganu, East Coast Peninsula Malaysia an oil producing state with beautiful beaches and vast diversities of flora and faunas. On 26<sup>th</sup> March 2005, UniSZA is founded when Prime Minister Dato' Seri Abdullah Ahmad Badawi announced the formation of university. On 1<sup>st</sup> January 2006, the UniSZA's first Vice Chancellor, Dato' Professor Dr. Alias B. Daud was appointed. The university now operates under the motto "Knowledge for the Benefit of Humanity'. UniSZA aims to shape talented leaders who both knowledgeable and cultured with an international outlook.

UniSZA currently operates two campuses, namely Kota Campus and Gong Badak Campus. In the coming years, a third campus- Besut Campus begin its operation at Tembila. UniSZA Gong Badak Campus focuses on teaching and research in Islamic knowledge together with conventional studies. Kota Campus offer programmes in Medical while Besut Campus will specialized in agricultural fields such as biotechnology and other related courses. UniSZA aspires to be a world class institution of higher learning that produces and shapes talented leaders in various fields who are knowledgeable, refined, noble and an appropriate of diversity to benefit humankind.

### 1.2 Vision of UniSZA

Contemporary Integrated Islamic University (CIIU).

### 1.3 Mission of UniSZA

To produce holistic individuals with Naseem values through educational excellence and high impact research towards empowering society.



### 2. GENERAL INFORMATION OF THE FACULTY

### 2.1 Background history of its development

**Faculty of Health Sciences** officially began its operation on 1<sup>st</sup> September 2014. The faculty aims to produce more scholar in professional field like health sciences in Terengganu and country as well. By producing high quality graduates in these critical areas, UniSZA realize its visions to emerge as a higher learning institution with international standards capable of delivering leaders, processing highly-polished thinking infused with excellent level of knowledge and embedded with strong cultural as well as ethical principles.

### 2.2 General concept and scope of learning at FSK UniSZA

The curriculum of the health sciences in UniSZA is based on the University's motto of "Knowledge for the benefit of humanity". It will be based on the basic studies of human body and its dynamic interaction with the environment. Curriculum's contents hinges on strong scientific foundation, Islamic value, modern technology and understanding of art. The curriculum stipulates course hours, practical hours, seminars, and tutorials. The knowledge, skills and attitudes in the intended learning objectives are evaluated formatively and summatively throughout the health sciences course.

### 2.3 Vision of FSK

To become a centre of academic excellence producing holistic health professionals.

### 2.4 Mission of FSK

Producing refined and proficient health sciences graduates in line with community needs through academic and research excellence.

### 2.5 Faculty management

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### 3. THE EDUCATIONAL PROGRAMME

### 3.1 Medical laboratory technology programme

Diploma in Medical Laboratory Technology was established to train graduates who will begin their career in Medical Laboratory Technology. As stated in the objectives of conducting the course, the faculty design the course in order to produce graduates who are competent in the field of medical laboratory technology by leveraging the knowledge and skills of the latest technology.

In line with this, the faculty has identified a number of specific employment sectors that could be met by graduates from the Diploma in Medical Laboratory Technology. The selection of medical laboratory sector is based on the need of trained workers and labor deficit in this sector which is expected to last into 2010 (Reference : "The outlook for stocks and Manpower Requirements Members of Allied Health Sciences", Training Division Ministry of Health Malaysia, January 10, 2005). As such, the faculty justify this course offerings based on the needs and projections for skilled workers in the health sector, particularly in the field of laboratory medicine.

### 3.2 Programme objectives

- To produce graduates who can provide quality services by applying knowledge, skills, medical ethics and concern.
- To produce graduates who are able to communicate effectively with the community and colleagues.
- To produce graduates who are involved as a member of the health team who are competent in the chosen discipline.
- To produce graduates who are interested and committed to the research and continuing education for career and personal development.

### 3.3 Duration of the programme

Duration of the course of this program is 3 years where each year consists of two semesters. Each semester consists of 14 weeks of learning. The minimum period for the completion of this program is 6 semesters, while the maximum period allowed is 10 semesters.

### 3.4 Career opportunities

Employment opportunities that can be pursued by graduates in Medical Laboratory Technology are:

- 1. Laboratory Medicine at government and private hospitals
- 2. Medical laboratory technologist at public or private
- 3. Research assistant
- 4. Assistant scientific officer

### 3.5 Opportunities in furthering study

Students can continue their studies at a higher level such as, bachelors, masters and doctorate programs in the following areas:

- Biomedical
- Medical
- Microbiology
- Medical Laboratory Technology
- Dietetics and Nutrition
- Biotechnology
- Genetics
- Biology

#### 3.6 Admission requirement

The entry requirement is SPM or equivalent approved by the Senate of Universiti Sultan Zainal Abidin. Qualification according to the University's general and special requirements for the program are as follows:

#### GENERAL REQUIREMENT OF THE UNIVERSITY

Pass Certificate of Education or its equivalent with at least five (5) credits including Bahasa Melayu.

#### TYPICAL REQUIREMENT OF THE PROGRAMME

1. Obtained at least Grade C in the following subjects during SPM:

- Biology
- > Chemistry
- Mathematics
- > English

#### AND

2. Not physically handicapped

### 3.7 **Programme Learning Outcomes (PLO)**

At the end of the program, graduates will be able to:

1. demonstrate fundamental knowledge in medical sciences;

2. perform medical laboratory procedures, validate and refer findings competently;

3. assist in advanced medical laboratory procedures;

4. perform quality control procedures competently;

5. identify technical errors, perform basic troubleshooting and related problem-solving procedures;

6. assist in the management of the laboratory;

7. practice according to bio-safety and chemical safety requirements and regulations;

8. demonstrate sensitivities and responsibilities towards the community, culture, religion and environment;

9. adhere to the legal, ethical principles and the professional code of conduct in medical laboratory sciences;

10. communicate effectively in verbal and written forms with patients, their family /caregiver, peers, healthcare professionals and the stakeholders at large;

11. demonstrate leadership, interpersonal and social skills;

12. collaborate with other healthcare professionals;

13. formulate solutions based on critical and lateral thinking;

14. participate in research related to medical laboratory sciences and health sciences; and

15. demonstrate ICT, entrepreneurial and lifelong learning skills in their practice.

### 3.8 Structure of the curriculum

To qualify a student is awarded a Diploma in Medical Laboratory Technology from Universiti Sultan Zainal Abidin, students must successfully complete the program with at least 102 credit hours to graduate study within 3 years (6 semesters) or more. There are two main courses, University Courses and Core Courses.

Candidates must achieve a pass standard of all courses offered to enable them to obtain a Diploma in Medical Laboratory Technology or at least C in each subject. All subjects were included with theoretical, practical and tutorials that will courage the students to get early exposure before moving to working environment.

University Course Course Programme (Core Courses) TOTAL 17 credit hours <u>85 credit hours</u> <u>102 credit hours</u>

# 3.8.1 University subject (17 Credit hours)

NO	CODE	COURSE SUBJECT	CREDIT HOURS	SEMESTER	GROUP
1.	PBD 10102	English I	2	1	No option
2.	MPU 23022	Morals and Ethics I	2	2	Non-Muslims Student
3.	MPU 23062	Social Etiquette and Personal Appearance	2	3	Non-Muslims Student
4.	MPU 23042	Comparative Religion I	2	1	Non-Muslims Student
5.	Refer a foreign language courses offered	Foreign Language (PBD)	2	2	Foreign language course
6.	MPU 23012	Faith and Morals	2	2	Muslims Student
7.	PBD 10202	English II	2	2	No option
8.	MPU 21022	Penghayatan Etika dan Peradaban	2	1	No option
9.	Refer to curriculum courses offered	Co-curriculum	3	***	Co- curriculum course
10.	MPU 23052	Al-Quran and Recitation	2	4	Muslims Student
11.	MPU 23032	Fiqh of Worship	2	2	Muslims Student

# 3.8.2 Course subject (85 Credit hours)

HOURSHOURS1.DBL 10903Human Anatomy31No option2.DBL 11003Diagnostic Laboratory Science31No option3.DBL 10303Basic Biochemistry31No option4.DBL 10402Immunology21No option5.DBL 11103Basic Pathology31No option6.DBL 11403Basic Histopathology Technique32No option7.DBL 10502Cell Biology and Genetics22No option8.DBL 11203Human Physiology32No option9.DBL 11303Blood Transfusion I32No option10.DBL 20103Haematology I33No option11.DBL 21002Blood Transfusion II23No option12.DBL 21002Blood Transfusion II23No option13.DBL 21303Chemical Pathology I33No option14.DBL 21402Special Technique in Histopathology34No option15.DBL 21503Medical Parasitology and Entomology34No option16.DBL 21703Haematology II34No option17.DBL 21503Chemical Pathology II34No option18.DBL 21503Chemical Pathology II34No option19.DBL 21703Haematology II34	NO.	CODE	COURSE SUBJECT	CREDIT	SEMESTER	GROUP
1.       DBL 10903       Human Anatomy       3       1       No option         2.       DBL 11003       Diagnostic Laboratory       3       1       No option         3.       DBL 10303       Basic Biochemistry       3       1       No option         4.       DBL 10402       Immunology       2       1       No option         5.       DBL 11103       Basic Pathology       3       1       No option         6.       DBL 11403       Basic Pathology       3       2       No option         7.       DBL 10502       Cell Biology and Genetics       2       2       No option         8.       DBL 11203       Human Physiology       3       2       No option         9.       DBL 11303       Blood Transfusion I       3       2       No option         10.       DBL 20103       Haematology I       3       3       No option         11.       DBL 21002       Blood Transfusion II       2       3       No option         12.       DBL 21002       Blood Transfusion II       2       3       No option         13.       DBL 21402       Special Technique in Histopathology       3       3       No option      <				HOURS		
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12.DBL 21002Blood Transfusion II23No option13.DBL 21303Chemical Pathology I33No option14.DBL 21402Special Technique in Histopathology23No option15.DBL 21503Medical Parasitology and Entomology33No option16.DBL 21803Chemical Pathology II34No option17.DBL 20703Haematology II34No option18.DBL 21603Cytology & Cytopathology34No option19.DBL 21703Diagnostic Microbiology34No option20.DBL 21103Research and Biostatistics34No option21.DBL 21103Research and Biostatistics34No option22.DBL 30112Industrial Training I125No option23DBL 30202Diagnostic Studies I25No option24DBL 30402Diagnostic Studies II26No option	11.	DBL 21203	Basic Microbiology	3	3	No option
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14.DBL 21402Special Technique in Histopathology23No option15.DBL 21503Medical Parasitology and Entomology333No option16.DBL 21803Chemical Pathology II34No option17.DBL 20703Haematology II34No option18.DBL 21603Cytology & Cytopathology34No option19.DBL 21703Diagnostic Microbiology34No option20.DBL 21903Health Informatics34No option21.DBL 21103Research and Biostatistics34No option22.DBL 30112Industrial Training I125No option23DBL 30202Diagnostic Studies I25No option24DBL 30310Industrial Training II106No option25DBL 30402Diagnostic Studies II26No option	13.	DBL 21303	Chemical Pathology I	3	3	No option
HistopathologyNo option15.DBL 21503Medical Parasitology and Entomology33No option16.DBL 21803Chemical Pathology II34No option17.DBL 20703Haematology II34No option18.DBL 21603Cytology & Cytopathology34No option19.DBL 21703Diagnostic Microbiology34No option20.DBL 21903Health Informatics34No option21.DBL 21103Research and Biostatistics34No option22.DBL 30112Industrial Training I125No option23DBL 30202Diagnostic Studies I25No option24DBL 30310Industrial Training II106No option25DBL 30402Diagnostic Studies II26No option	14.	DBL 21402	Special Technique in	2	3	No option
15.DBL 21503Medical Parasitology and Entomology33No option16.DBL 21803Chemical Pathology II34No option17.DBL 20703Haematology II34No option18.DBL 21603Cytology & Cytopathology34No option19.DBL 21703Diagnostic Microbiology34No option20.DBL 21903Health Informatics34No option21.DBL 21103Research and Biostatistics34No option22.DBL 30112Industrial Training I125No option23DBL 30202Diagnostic Studies I25No option24DBL 30310Industrial Training II106No option25DBL 30402Diagnostic Studies II26No option			Histopathology			
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16.DBL 21803Chemical Pathology II34No option17.DBL 20703Haematology II34No option18.DBL 21603Cytology & Cytopathology34No option19.DBL 21703Diagnostic Microbiology34No option20.DBL 21903Health Informatics34No option21.DBL 21103Research and Biostatistics34No option22.DBL 30112Industrial Training I125No option23DBL 30202Diagnostic Studies I25No option24DBL 30310Industrial Training II106No option25DBL 30402Diagnostic Studies II26No option			Entomology			
17.DBL 20703Haematology II34No option18.DBL 21603Cytology & Cytopathology34No option19.DBL 21703Diagnostic Microbiology34No option20.DBL 21903Health Informatics34No option21.DBL 21103Research and Biostatistics34No option22.DBL 30112Industrial Training I125No option23DBL 30202Diagnostic Studies I25No option24DBL 30310Industrial Training II106No option25DBL 30402Diagnostic Studies II26No option	16.	DBL 21803	Chemical Pathology II	3	4	No option
18.DBL 21603Cytology & Cytopathology34No option19.DBL 21703Diagnostic Microbiology34No option20.DBL 21903Health Informatics34No option21.DBL 21103Research and Biostatistics34No option22.DBL 30112Industrial Training I125No option23DBL 30202Diagnostic Studies I25No option24DBL 30310Industrial Training II106No option25DBL 30402Diagnostic Studies II26No option	17.	DBL 20703	Haematology II	3	4	No option
19.DBL 21703Diagnostic Microbiology34No option20.DBL 21903Health Informatics34No option21.DBL 21103Research and Biostatistics34No option22.DBL 30112Industrial Training I125No option23DBL 30202Diagnostic Studies I25No option24DBL 30310Industrial Training II106No option25DBL 30402Diagnostic Studies II26No option	18.	DBL 21603	Cytology & Cytopathology	3	4	No option
20.DBL 21903Health Informatics34No option21.DBL 21103Research and Biostatistics34No option22.DBL 30112Industrial Training I125No option23DBL 30202Diagnostic Studies I25No option24DBL 30310Industrial Training II106No option25DBL 30402Diagnostic Studies II26No option	19.	DBL 21703	Diagnostic Microbiology	3	4	No option
21.DBL 21103Research and Biostatistics34No option22.DBL 30112Industrial Training I125No option23DBL 30202Diagnostic Studies I25No option24DBL 30310Industrial Training II106No option25DBL 30402Diagnostic Studies II26No option	20.	DBL 21903	Health Informatics	3	4	No option
22.DBL 30112Industrial Training I125No option23DBL 30202Diagnostic Studies I25No option24DBL 30310Industrial Training II106No option25DBL 30402Diagnostic Studies II26No option	21.	DBL 21103	Research and Biostatistics	3	4	No option
23DBL 30202Diagnostic Studies I25No option24DBL 30310Industrial Training II106No option25DBL 30402Diagnostic Studies II26No option	22.	DBL 30112	Industrial Training I	12	5	No option
24DBL 30310Industrial Training II106No option25DBL 30402Diagnostic Studies II26No option	23	DBL 30202	Diagnostic Studies I	2	5	No option
25   DBL 30402   Diagnostic Studies II   2   6   No option	24	DBL 30310	Industrial Training II	10	6	No option
	25	DBL 30402	Diagnostic Studies II	2	6	No option

### 3.8.3 Structure of the curriculum by semester

- 1. First year
- a) First semester

CATEGORY	CODE	COURSE SUBJECT	CREDIT HOURS
	MPU21022	Penghayatan Etika Dan Peradaban	2
	MPU23032	Fiqh Ibadah (Muslim)	2
	MPU23042	Perbandingan Agama I (Non Muslim)	
	PBD10102	English I	2
	PBD ****2	Bahasa Asing	2
	MPU23052	Tajwid Al-Quran	2
COURSES	MPU23062	Etiket Sosial & Penampilan Diri (Non Muslim)	
	MPU23012	Akidah & Akhlak (Muslim)	2
	MPU23012	Akidah & Akhlak (Muslim)	2
	MPU23022	Moral Dan Etika I (Non Muslim)	2
	PBD10202	English li	
	*** ****3	Kokurikulum	3
		Total	17

#### b) Second semester

CATEGORY KOD KURSUS NAMA KURSUS		JAM KREDIT	
	DBL10903	Human Anatomy	3
	DBL11003	Diagnostic Laboratory Science	3
	DBL10303	Basic Biochemistry	3
CORE	DBL10402	Immunology	2
COURSES	DBL21203	Basic Microbiology	3
	DBL11303	Blood Transfusion I	3
	DBL10502	Cell Biology and Genetics	2
		JUMLAH KREDIT	19

### 2. Second year

### a) Third semester

CATEGORY	CODE	COURSE SUBJECT	CREDIT HOURS
	DBL11203	Human Physiology	3
	DBL11403	Basic Histopathology Technique	3
	DBL20103	Hematology I	3
CORE COURSES	DBL21703	Diagnostic Microbiology	3
	DBL21303	Chemical Pathology I	3
	DBL21503	Medical Parasitology and Entomology	3
	DBL21002	Blood Transfusion II	2
		Total	20

#### b) Fourth semester

CATEGORY	CODE	COURSE SUBJECT	CREDIT HOURS
	DBL21402	Special Technique in Histopathology	2
	DBL20703	Hematology II	3
	DBL21603	Cytopathology Cytology and	3
CORE COURSES	DBL11103	Pathology Basic	3
	DBL21803	Chemical Pathology II	3
	DBL21103	Biostatistic Research and	3
	DBL21903	Health Informatics	3
		Total	20



3. Third year

#### a) Fifth semester

CATEGORY	CODE	COURSE SUBJECT	CREDIT HOURS
	DBL 30112	Industrial Training I	12
CORE COURSES	DBL 30202	Diagnostic Studies I	2
		Total	14

### b) Sixth semester

CATEGORY	CODE	COURSE SUBJECT	CREDIT HOURS
	DBL 30310	Industrial Training II	10
CORE COURSES	DBL 30402	Diagnostic Studies II	2
		Total	12



### 4. EVALUATION SYSTEM

To test the understanding of the subject being taught, a system of ongoing evaluation during the study session and also at the end of the study were applied. System evaluation is based on the system found in the Academic Regulations for Undergraduate Universiti Sultan Zainal Abidin.

The assessment of a course depends on the objectives and course content. The ratio of contribution assessment methodology in the final grade will be determined by the faculty with the following conditions:

- a. Continuous Assessment 40%
- b. Final Exam 60%.
- c. The course of a practical or project is assessed 100%.

#### 4.1 First semester and other semester

- Students with CGPA> = 2.00 is considered a pass and allowed to proceed to the next semester.
- Students with 1.7 = <CGPA <2.0 is considered a conditional pass and placed under probation status. Students may be allowed to continue their studies and must have a CGPA of 2.0 and above. If they fail, they will be dismissed.
- Students with CGPA <1.7 is considered failed and will be terminated (GB).

#### 4.2 Evaluation to get the diploma

A student must meet all the following requirements to be eligible to be awarded the diploma with honors:

- a. Achieve a minimum cumulative grade point average of 2.00.
- b. Meet the number of credit hours as prescribed by the program.
- c. Complete Industrial Training



### 4.3 Grading Process

Mark	Grade	Score	Performance
80 - 100	А	4.00	Eventert
75 – 79	A-	3.67	Excellent
70 - 74	B+	3.33	Cood
65 - 69	В	3.00	Good
60 - 64	B-	2.67	
55 – 59	C+	2.33	Medium
50 – 54	С	2.00	
47 – 49	C-	1.67	
44 – 46	D+	1.33	Foiled
40 – 43	D	1.00	Failed
39 below	F	0.00	

\* For more information, please refer to the Academic Regulations for Undergraduate Universiti Sultan Zainal Abidin

### 4.4 Industrial Training

The training is mandatory training of the student in selected hospitals for 2 semesters in Year 3 study to gain experience by practicing what they have learned at the University. Upon completion of the industrial training students should be able to:

- Complete laboratory tests accurately.
- Formulation of a laboratory test where more critical and less critical.
- Relate between theory and practice in laboratory tests as well as the confidentiality of test results in hospital

Industrial Training Assessment is based on:

Continuous assessment and evaluation by preseptor logbook	50%
Final Exam	40%
Written coursework	5%
Rating academic supervisor	5%



### 5. **REFERENCE BOOKS**

Cours	se code	Course subject	Credit hours	
DBL	.10903	Human Anatomy	3	
•	Main References:			
1.	1.Gerard J. Tortora Anatomy and Physio	and Bryan H. Derrickso logy, 9th Edition. John Wile	n. (2013). Essentials of y & Sons, Inc.	
2.	2.Kenneth S. Saladir & Function, 7th editic	n (2015). Anatomy & Physi n. McGraw-Hill Internationa	ology: The Unity of Form al Inc.	
Cours	se code	Course subject	Credit hours	
DBL	.11003 Diagr	nostic Laboratory Science	3	
•	Main references supp	porting the course (the lates	st 5 years)	
1.	Mary Louise Turgeo The Basics and Rout	n,. Linne & Ringsrud's Clir ine Techniques, 7th edition	nical Laboratory Science: . Elsivier Mosby., 2015.	
•	Additional references	supporting the course:		
1.	Robert R. Harr. Me Davis Company, Phil	dical Laboratory Science adelphia, 2013	review, 4th Edition. F.A	
2.	Monica Cheesbrou Countries, Volume 1	gh., Medical Laboratory and Volume 2, 2 <sup>nd</sup> Edition.,	Manual for Tropical 2009. ELBS	
3.	Catherine W. Johns Essential Laboratory Clinical. Second Edit	son, Daniel L. Timmons, Mathematics: Concepts ion, Waveland Press, Inc.	Pamela E. Hall., 2010, and Applications for the	
Cours	se code	Course subject	Credit hours	
DBL	.10303	Basic Biochemistry	3	
<ul> <li>Main references supporting the course (the latest 5 years)</li> <li>Campbell, M.K. and Farrell, S.O. (2015). <i>Biochemistry</i>. (8<sup>th</sup> Edition). Brooks/Cole, Cengage Learning.</li> </ul>				
<ul> <li>Additional references supporting the course</li> <li>Champe, P.C., Harvey, R.A., Ferrier, D.R. (2013), <i>Lippincott's Illustrated Reviews: Biochemistry, International Students Edition (Lippincott's Illustrated Reviews Series).</i> 6<sup>th</sup> ed.: Lippincott Williams and Wilkins.</li> <li>Voet, D.J., Voet, J.G. &amp; Pratt, C.W. (2012). <i>Principles of Biochemistry.</i> (4<sup>th</sup></li> </ul>				
			22	

3.	Edition). Johr Thomas, M <i>correlations</i> .	n Wiley & Sons. .D. (2011). <i>Text book of Biocl</i> (7 <sup>th</sup> Edition). John Wiley & Sons.	hemistry with Clinical
Cours	se code	Course subject	Credit hours
DBL	10502	Cell Biology and Genetics	2
1.	Lewis, R. 20 McGraw Hill.	05. Human Genetics: Concepts an New York, USA.	d applications. 6th Ed.
2.	Karp, G. 200 Ed. John Wil	4. Cell and Molecular Biology: Conce ey & Sons. USA.	ept and Experiment. 4th
3.	Hartwell L.H R. C. 2004. ( York, USA.	, Hood L., Goldberg M.L.,Reynolds Genetics: from genes to genomes. 2n	A.N., Silver I.M., Veres d Ed. McGraw Hill. New
4.	Karp. G. 201	0, Cell Biology. 6th Ed. John Wiley &	Sons. USA.
Cours	se code	Course subject	Credit hours
DBL	10402	Immunology	2
• Addi 1.	tional referen Male, D., B	ces supporting the course rostoff, J. & Roth, DB. (2013). Im	munology. (8 <sup>th</sup> edition).
2.	Doan, T., M Illustrated R Philadelphia.	elvoid, R. Viselli, S. &Waltenbaugh, eviews: Immunology. (2 <sup>nd</sup> edition).	C. (2013). Lippincott's Wolters Kluwer Health,
3.	Jeffry, K. (20 Philadelphia.	012). Immunology and Microbiology	.(2 <sup>nd</sup> edition). Elsevier,
4.	Todd, I. &Sp Wiley-Blackv	vickett, G. (2010). Lecture Notes Im vell, New Jersey.	nmunology. (6 <sup>th</sup> edition).
Cours	se code	Course subject	Credit hours
DBL	11103	Basic Pathology	3
• Mair 1. L E	n Reference: .ee Ellen Cop Edition,St Lou	stead & Jacquelyn L Banasik (2013). is.Elsevier	Pathophysiology, 5th

<ul> <li>Additional references</li> </ul>	supporting the course	
1. Lippimcott Williams Edition, Philadelphi	& Wilkins (2013). Pathophysiolog a: Wolters Kluwer Health	y made incredibly easy!, 5th
2. Strayer, David S, R Foundations of Med	ubin, Raphael (2012). Rubin's Pat licine, Philadelphia: Lippincort Will	hology: Clinicopathologic iams & Wilkins
3. Sinhasan SP (2012	). Pathology Review, Hyderabad:	Paras Medical Publisher
4. Story, Lachel (2012 & Bartlett	2). Pathophysiology: a practical ap	proach, Sudbury, Mass: Jones
Course code	Course subject	Credit hours
DBL21203	Basic Microbiology	3
Main Reference		
1. Carroll K.C., Butel Medical Microbiolog	I J, and Morse S. 2016. <i>Jawei</i> gy ( <i>Lange)</i> . 27th edition. McGraw I	tz <i>Melnick &amp; Adelbergs</i> Hill Education.
Additional reference	es supporting the course	
1. Murray P.R., Rose edition. Elsevier.	enthal K.S., and Pfaller. 2016. Me	edical microbiology. 18th
2. Tille, P.M, 2014. Elsevier Health Sc	Bailey & Scott's diagnostic mic iences.	crobiology. 13rd edition.
	Course oubject	•
Course code	Course subject	Credit hours
DBL20103	Hematology I	Credit hours
<ul> <li>DBL20103</li> <li>Main references:</li> <li>Hoffbrand, A.V. &amp; Wiley-Blackwell.</li> </ul>	Hematology I Moss, P.A.H. (2015). Essential H	3 aematology. 7th Edition.
<ul> <li>DBL20103</li> <li>Main references:</li> <li>1. Hoffbrand, A.V. &amp; Wiley-Blackwell.</li> <li>Additional references</li> </ul>	Hematology I Moss, P.A.H. (2015). Essential H ces::	3 aematology. 7th Edition.
<ul> <li>Course code DBL20103</li> <li>Main references:</li> <li>Hoffbrand, A.V. &amp; Wiley-Blackwell.</li> <li>Additional referen</li> <li>Anderson, S.C. &amp; 2nd edition. Wolter</li> </ul>	Hematology I Moss, P.A.H. (2015). Essential H ces:: Poulsen, K.B. (2013). Anderson's rs Kluwer Health/Lippincott William	Credit hours         3         aematology. 7th Edition.         s Atlas of Haematology.         s & Wilkins.
<ul> <li>Course code</li> <li>DBL20103</li> <li>Main references:</li> <li>Hoffbrand, A.V. &amp; Wiley-Blackwell.</li> <li>Additional referen</li> <li>Additional referen</li> <li>Anderson, S.C. &amp; 2nd edition. Wolter</li> <li>Bain, B.J., Bates, Lewis Practical Ha</li> </ul>	Hematology I Moss, P.A.H. (2015). Essential H ces:: Poulsen, K.B. (2013). Anderson's rs Kluwer Health/Lippincott William I., Laffan, M.A. & Mitchell-Lewis ematology. Elsevier Health Science	3 aematology. 7th Edition. Atlas of Haematology. S & Wilkins. S, S. (2011). Dacie and Ses UK.
<ul> <li>Course code DBL20103</li> <li>Main references:</li> <li>Hoffbrand, A.V. &amp; Wiley-Blackwell.</li> <li>Additional referen</li> <li>Anderson, S.C. &amp; 2nd edition. Wolter</li> <li>Bain, B.J., Bates, Lewis Practical Ha</li> <li>Bernadette F. Rod Fifth Edition. Elsev</li> </ul>	Hematology I Moss, P.A.H. (2015). Essential H ces:: Poulsen, K.B. (2013). Anderson's rs Kluwer Health/Lippincott William I., Laffan, M.A. & Mitchell-Lewis ematology. Elsevier Health Scienc ak& Jacqueline H. Carr. (2017). C ier.	3 aematology. 7th Edition. Atlas of Haematology. As & Wilkins. S, S. (2011). Dacie and Ses UK. Iinical Hematology Atlas.
<ul> <li>Course code</li> <li>DBL20103</li> <li>Main references: <ol> <li>Hoffbrand, A.V. &amp;</li> <li>Wiley-Blackwell.</li> <li>Additional referen</li> <li>Additional referen</li> <li>Anderson, S.C. &amp;</li> <li>2nd edition. Wolter</li> </ol> </li> <li>Bain, B.J., Bates, Lewis Practical Ha</li> <li>Bernadette F. Rod Fifth Edition. Elsev</li> <li>5. Elaine, M. Keo Rodak's Hematolo Elsevier.</li> </ul>	Hematology I Moss, P.A.H. (2015). Essential H ces:: Poulsen, K.B. (2013). Anderson's rs Kluwer Health/Lippincott William I., Laffan, M.A. & Mitchell-Lewis ematology. Elsevier Health Science ak& Jacqueline H. Carr. (2017). C rier. ohane, Larry J. Smith & Jeaning ogy: Clinical Principles and App	3 Jaematology. 7th Edition. Atlas of Haematology. As & Wilkins. S, S. (2011). Dacie and Ses UK. Jinical Hematology Atlas. e, M. Walenga. (2017). Jications, 5e5th Edition.
<ul> <li>Course code</li> <li>DBL20103</li> <li>Main references: <ol> <li>Hoffbrand, A.V. &amp; Wiley-Blackwell.</li> <li>Additional references:</li> <li>Anderson, S.C. &amp; 2nd edition. Wolter</li> </ol> </li> <li>Bain, B.J., Bates, Lewis Practical Ha</li> <li>Bernadette F. Rod Fifth Edition. Elsevier</li> <li>5. Elaine, M. Kee Rodak's Hematolog Elsevier.</li> </ul>	Hematology I Moss, P.A.H. (2015). Essential H ces:: Poulsen, K.B. (2013). Anderson's 's Kluwer Health/Lippincott William I., Laffan, M.A. & Mitchell-Lewis ematology. Elsevier Health Scienc ak& Jacqueline H. Carr. (2017). C ier. ohane, Larry J. Smith & Jeaning ogy: Clinical Principles and App	3         aematology. 7th Edition.         s Atlas of Haematology.         s & Wilkins.         s, S. (2011). Dacie and         ces UK.         linical Hematology Atlas.         e, M. Walenga. (2017).         lications, 5e5th Edition.

Main reference	ces supporting the course (the latest 5 yea	ars)
1. Bishop Micha Clinical Chem	ael, Duben-Von Lauten Janet, Fody Edw histry: Principles, Procedures and Correla	ard,7th Edition 2013. tions.
References s	upporting the course:	
1. Additional re	Kaplan LA, Pesce AJ (Eds). Clinical	chemistry:5th Edition
2010 Theory 2. Anderson, S Applications.	Revised Edition 2007. The Mac-Graw	istry: Concepts and Hill Companies Inc.
United State 3. Burtis, CA. A 7th edition 20	of America. nd Ashwood, E.R. Tietz Fundamentals 15. W. B. Saunders Company.	of Clinical Chemistry.
Course code	Course subject	Credit hours
DBL11403	Basic Histopathology Technique	3
<ul> <li>Main reference</li> <li>Bancroft. J. D.</li> <li>Elsevier Health</li> </ul>	e 2013. Theory and Practice of Histologica Science	l Techniques.
<ul> <li>Additional ref.</li> <li>Mescher. A. 20 13<sup>th</sup>edition.Lan</li> <li>Carson F.L. &amp;ł</li> </ul>	erences: 013. Junquira's Basic Histology: Text and Ige. McGraw Hill Medical publication. Hadik C. 2014. Histotechnology: A Self	Atlas.
<ul> <li>Additional ref.</li> <li>Mescher. A. 20 13<sup>th</sup>edition.Lan</li> <li>Carson F.L. &amp;</li> <li>Course code</li> </ul>	erences: 013. Junquira's Basic Histology: Text and lge. McGraw Hill Medical publication. Hadik C. 2014. Histotechnology: A Self Course subject	Atlas. Credit hours
<ul> <li>Additional ref</li> <li>Mescher. A. 20 13<sup>th</sup>edition.Lan</li> <li>Carson F.L. &amp;</li> <li>Course code</li> <li>DBL21503</li> </ul>	erences: 013. Junquira's Basic Histology: Text and lge. McGraw Hill Medical publication. <u>Hadik C. 2014. Histotechnology: A Self</u> <b>Course subject</b> Medical Parasitology and Entomology	Atlas. Credit hours 3
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3. Tille, P.M, 2014. B Elsevier Health Science	ailey & Scott's diagnostic micr s.	obiology. 13rd edition.
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DBL20703	Hematology II	3
<ul> <li>Main references sup</li> <li>Hoffbrand, A.V. &amp; N John Wiley &amp; Sons.</li> </ul>	porting the course: loss, P.A.H. (2015). Essential Ha	ematology. 7th Edition.
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DBL21803	Chemical Pathology II	3
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1 Bishon Michael Duk	pen-Von Lauten Janet, Fody Edw	vard, Clinical Chemistry:
Principles, Procedure	es and correlations	
<ul> <li>Additional references</li> </ul>	s supporting the course:	
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<ul> <li>Additional references</li> <li>Additional references</li> <li>Kaplan LA, Pesce Correlation.</li> <li>Anderson, SC and Applications. 2003. America.</li> </ul>	s supporting the course: AJ (Eds). Clinical chemistry: d Cockayne, S. Clinical Che The Mac-Graw Hill Companies	Theory, Analysis and mistry: Concepts and s Inc. United State of
<ul> <li>Additional references</li> <li>Additional references</li> <li>Kaplan LA, Pesce Correlation.</li> <li>Anderson, SC and Applications. 2003. America.</li> <li>Burtis, CA. And As 2001. W. B. Saunde</li> </ul>	s supporting the course: AJ (Eds). Clinical chemistry: d Cockayne, S. Clinical Che The Mac-Graw Hill Companies hwood, E.R. Tietz Fundamentals rs Company.	Theory, Analysis and mistry: Concepts and s Inc. United State of s of Clinical Chemistry.

DBL21402	Special Technique in Histopathology	2
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DBL21603	Cytology and Cytopathology	3
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2. Pranab Dev (2 diagnosis diffice Publishers	015). Fine needle aspiration cytolo ulties 2nd Edition, New Delhi: Jayr	gy: interpretation and bee Brothers Medical
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DBL11303	Blood Transfusion I	3
Main references s	supporting the course (the latest 5 year	s)
1. Harmening D.M Ed., F.A. Davis	I., Modern Blood Banking and Trans Company, 2012.	fusion Practices, 6th
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<ol> <li>Kathy D. Blaney Banking and Tra 2. Walker R.H A</li> </ol>	v and Paula R. Howard. Basic & Appl ansfusion Practices. Mosby. 3rd edition ABB Technical Manual. American	ied Concepts of Blood n 2013 Association of Blood
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Course code	Course subject	Credit hours
DBL11203	Human Physiology	3
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Course code	Course subject	Credit hours
DBL21002	Blood Transfusion II	2
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DBL21103	Research and Biostatistic	2
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- 4. Wager, K.A., Lee, F.W., Glaser, J.P (2009). Health care information systems: A practical approach for health care management. 2nd Ed. John Wiley & Sons. San Fransisco.
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DBL 30112	Industrial Training I	12

- Main references supporting the course (the latest 5 years)
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- 2. Anthony Mescher. Junquira's Basic Histology: Text and Atlas. 2013. 13<sup>th</sup> edition.Lange. Mc Graw Hill Medical publication.
- 3. Richard Mac Demay. Art & Science of Cytopathology. 2011. 2<sup>nd</sup> edition. Americn Society for Clinical Pathology.
- 4. Voet, D.J., Voet, J.G. & Pratt, C.W. (2012). *Principles of Biochemistry*. 4th edition. John Wiley & Sons.
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DBL 30202	Diagnostic Studies I	2

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. Panduan Menulis 2015/2016.	Proposal Diploma Teknologi Makm	al Perubatan HES1022,
<ol> <li>Panduan Menulis Perubatan, Fakult</li> </ol>	Tesis Projek Elektif HES2032, Dip i Sains Kesihatan, 2015/2016	loma Teknologi Makmal
<ul> <li>Additional reference</li> </ul>	es supporting the course	
<ol> <li>Academic Report Majid et al., Pears 4. Basic &amp; Clinica Trapp, McGraw-H</li> </ol>	Writing. From Research to Present son Prentice Hall; 2nd Edition, 2009 I Biostatistics, Beth Dawson, Robert Iill Medical; 4th Edition, 2004.	ation. Norazman Abdul t G. Trapp & Robert
Course code	Course subject	Credit hours
DBL 30310	Industrial Training II	10
<ul> <li>Main references su</li> </ul>	pporting the course (the latest 5 years	ars)
1. Denise M. Harm Third Edition 201	ening. Laboratory Management, Pr 2.	inciples and Processes,
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<ol> <li>Richard Mac De Americn Society</li> </ol>	emay. Art & Science of Cytopatho for Clinical Pathology.	logy. 2011. 2 <sup>nd</sup> edition.
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DBL 30402	Diagnostic Studies II	2
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NOTE 31