O/C

MGM INSTITUTE OF HEALTH SCIENCES

Accredited by NAAC with 'A' Grade

(Deemed University u/s 3 of UGC Act, 1956)

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CHOICE BASED CREDIT SYSTEM (CBCS)

(With effect from 2019-20 Batches)

(For Sem I & Sem II)

Curriculum for M.Sc Medical Biochemistry

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(Deemed University u/s 3 of UGC Act, 1956)
Kamothe, Navi Mumbai- 410 209

Approved as per BOM –57/2019, [Resolution No. 3.2.1.6.i], Dated 26/04/2019

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MGM INSTITUTE OF HEALTH SCIENCES, NAVI MUMBAI

LEARNING OUTCOME BASED CURRICULAM FRAMEWORK

M.Sc Medical Biochemistry Course

Undergoing 3 years M.Sc Medical Biochemistry students should be able to garner

Knowledge of Biomolecules

- Biochemicals & their importance

- The various metabolic pathways

- Consequences of deficiency or excess of various biomolecules

- Abnormalities possible & their causes in metabolic pathways.

-Genetic / Molecular Biology in detail

- Disease processes & associated changes in various parameters

Skills

- To be able to interpret medical reports
- To be able to distinguish if an error in reporting
- To be able to troubleshoot in case of crisis in lab

Analytical & Diagnostic

- How to use knowledge gained to be associated with the clinical case.
- To be able to give advice on further diagnostic workup of a case.
- To help predict clinical outcome / line of management.
- To be able to think of newer ways or methods of analyzing biomolecules.
- To be able to have a researcher's mindset.

Annexure – G – IIIb

ACADEMIC SYLLABUSFOR SEMESTER-II

Name of the Programme	**M. SC MEDICAL _eg. Medical Biochemistry_____**
Course Code	_____
Name of the Course	**Part2 ( )_____**

CourseObjective (Teaching Objectives)	To create keen interest in the molecular & genetic aspect of the existence & viability of a human body
Course Outcomes (earning Objectives)	The student should be able to develop curiosity & the ability to seek answers. They should be able to get an exposure to the teaching research & diagnostic fields, so that they are able to take an informed decision for their career ahead.

Unit No.	Theory Topics	Hours allotted No. of hrs
1.	Module 7	8
	Carbohydrate Metabolism- Digestion of carbohydrates, Glucose transporters, Glycolysis, Rapaport-Leubering cycle, Citric acid cycle/ Kreb's cycle/ tricarboxylic acid (TCA) cycle, Pentose phosphate pathway (PPP), Glycogenesis, Glycogenolysis, Glucogenesis, Uronic acid pathway, Metabolism of galactose, Metabolism of fructose, Minor pathways of Carbohydrate Metabolism, regulation of blood glucose levels, Diabetes mellitus, Glucose Tolerance Test (GTT)	
2.	Module 8	6
	Lipid Metabolism- Digestion of lipids, Fatty acid oxidation, Biosynthesis of Fatty acids, Metabolism in the adipose tissue, Metabolism of ketone bodies, Metabolism of cholesterol, Fatty liver, Atherosclerosis	
3.	Module 9	9
	Protein Metabolism – Digestion & absorption, General pathways of amino acid catabolism (Transamination, Deamination, Decarboxylation, Transdeamination), Ammonia Metabolism (Urea cycle, Glutamine formation), Metabolism of Glycine, Aromatic amino acids, Sulphur containing amino acids, Glutamic acid	

Unit No.	Theory Topics	Hours allotted No. of hrs
4	Module 10	8
a) b) c)	Nucleic acid Metabolism- Overview of the pathway of de novo synthesis of purine nucleotides (starting material & end products only- AMP & GMP), Salvage pathway for purine bases & nucleotides. Lesch-Nyhan syndrome (cause & biochemical basis of clinical features). Overview of the pathway of degradation of purines to form uric acid, including role of the xanthine oxidase. Hyperuricemia & gout (causes, clinical features, principles of treatment, including mechanisim of action of allopurinol & probenecid). Overview of pathway of de novo synthesis of prrimidine nucleotides, showing only starting material, rate-limiting enzyme & end products. Hb Metabolism- Heme synthesis, Heme degradation, Porphyria, Important physiological & pathological causes of jaundice in the newborn. Genetic code- Characteristics (universal, umambiguous, degenerate, without punctuation[continous/commaless]). Basis of degeneracy of the genetic code (wobble hypothesis). Protein Biosynthesis- Prokaryotic & Eukaryotic Replication, Transcription, Translation(Initiation, elongation, Termination, Inhibitors of protein biosynthesis) in brief.	
5	Module 11	8
a) b) c)	Detoxification- Definition & examples, Biochemical importance of the two phases of xenobiotic metabolism. The cytochrome P450 enzyme system. Water & Electrolyte balance- Distribution of water in various body compartments. Intra-extracellular fluid composition (sodium & potassium), Blood volume & osmolality, Hormonal regulation of water balance & its disorders. Acid & Base balance- Definition of acid, Base & buffer. Normal pH of body fluid & importance of maintaining normal pH, Sources of hydrogen ions in the body, Simple acid base disorders, Mechanisms of regulation of pH	
6	Module 12	6
	Organ function test- LFT, RFT, TFT, PFT, GFT	
	Total	**45**

Unit No.	Tutorial Topics	Hours allotted No. of---hrs
1	Carbohydrate Metabolism	**2**
2	Lipid Metabolism	**2**
3	Protein Metabolism	**2**
4	Nucleic acid Metabolism	**1**
5	Hb Metabolism	**2**
6	Protein Biosynthesis	**1**
7	Detoxification	**1**
8	Water & Electrolyte balance	**1**
9	Acid & Base balance	**1**
10	Organ function test- LFT, RFT, TFT, PFT, GFT	**2**
	Total	**15**

Unit No.	Practical Topics	Hours allotted No. of---hrs
1	Estimation of Blood Sugar	**2**
2	Estimation of Blood Urea	**2**
3	Estimation of Serum Creatinine	**2**
4	Estimation of Urine Creatinine	**2**
5	Estimation of Total protein, a lbumin & A/ G ratio	**2**
6	Estimation of Total Serum Bilirubin	**2**
7	Estimation of Serum Cholesterol	**2**
8	Estimation of Serum Uric acid	**2**
9	Estimation of Serum Electrolytes	**2**
10	Estimation of Serum S.G.O.T.	**2**
11	Estimation of Serum S.G.P.T.	**2**
12	Estimation of Serum Alkaline Phosphatse	**2**
13	Estimation of Serum Amylase	**2**
14	Revision	**4**
	Total	**30**

Annexure – G – IIIa

ACADEMIC SYLLABUSFOR SEMESTER-I

Name of the Programme	**M. SC MEDICAL _eg. Medical Biochemistry_____**
Course Code	_____
Name of the Course	**Part1 ( )_____**

CourseObjective (Teaching Objectives)	To create keen interest in the molecular & genetic aspect of the existence & viability of a human body
Course Outcomes (earning Objectives)	The student should be able to develop curiosity & the ability to seek answers. They should be able to get an exposure to the teaching research & diagnostic fields, so that they are able to take an informed decision for their career ahead.

Unit No.	Theory Topics	Hours allotted No. of hrs
1.	Module 1	4
	Cell Biology- Biophysical principles of Basic Sciences, Structure & function of different cell organelles, Separation of cell organelles, Markers for cell organelles, Structure & function of cell membrane, Cytoskeleton elements, Transport mechanism, Ion channels, Artificial membrane (liposome & its application)	
2.	Module 2	10
a)	Chemistry of Carbohydrate- Definition, Physiological functions, Classification, Monosaccharide, Disaccharide, Polysaccharides, Properties of Carbohydrates, Epimers, Isomers, Mutarotation	
b)	Chemistry of Lipids- Definition, Physiological functions, Classification of lipids, fatty acids, Essential fatty acids , Simple lipids , Compound Lipids, Derived Lipids	
3.	Module 3	10
a)	Chemistry of Protein- Amino acids & their Classification, various ways of Classification of protein, Structure of protein, Properties of proteins, Isoelectric pH, Denaturation, Biologically important peptides	
b)	Chemistry of Nucleic acids- Nucleosides, Nucleotides, Purine & Pyrimidine bases, Types & structure of DNA, Types & structure of RNA	

Unit No.	Theory Topics	Hours allotted No. of hrs
4.	Module 4	5
	Enzyme- Definition , Nomenclature & Classification- Systematic & recommended nomenclature, IUBMB Classification of enzymes only (names, definition, general reaction catalyzed and one example for each class). Properties of enzymes- Mechanism of action of an enzyme with regard to its effect on activation energy of a reaction. Concept of active sites in enzymes, Lock & key & induced fit models of enzyme- substrate binding, Specificity of enzymes- reaction & substrate specificity-definition & an example for each, Cofactors- metals & coenzymes (definition, examples of coenzymes) & examples of enzymes that require them . Factors that influence enzyme activity- Effect of pH (concept of optimal pH with examples). Effect of temperature (concept of optimal temperature). Overview of concept of effect of substrate concentration (Michaelis- Mention equation(no derivation required), basic concept of K_m & V_{max}). Effects of enzyme & product concentration Inhibition of enzymes- Types of enzyme inhibition – competitive, non- competitive, suicide inhibition, Examples of commonly used drugs that act by competitive inhibition of enzymes. Regulation of enzyme activity – Overview of mechanisms involved in regulating the activity of enzymes, Allosteric activation & inhibition .Covalent modification- (phosphorylation & de phosphorylation) Induction & repression , Concept of feed back inhibition. Isoenzymes , Therapeutic & diagnostic uses of enzymes	
5.	Module 5	15
a)	Vitamins- Sources , RDA, Functions & deficiency manifestation of Fat soluble vitamins(A, D, E, K), Water soluble vitamins (B complex & Vitamin C)	
b)	Biological Oxidation- Role of ATP, The respiratory chain & oxidative phosphorylation, Role of brown fat (non-shivering thermogenesis & role of uncoupling protein / thennogenin).	

Unit No.	Theory Topics	Hours allotted No. of hrs
c)	Minerals- Sources, Functions & deficiency manifestation of Calcium, Phosphorus, Iron, Copper, Zinc, Magnesium, Maganese, Iodine, Sodium, Potassium, Fluoride, Selenium	
6.	Module 6	8
a)	Hb Chemistry- Structure & functions of Hb, Physiological Hb , Abnormal Hb, Hb derivatives	
b)	Hormone- Classification of hormones: Group 1 & Group 2 hormones	
c)	Signal Transduction – Mechanism of intracellular signaling of hormones, G protein coupled receptors. Second messengers in hormone action: cAMP, cGMP, Ca2+ & phosphatidyl inositol. Hoemone receptors as gene-specific transcription factors	
	Total	**45 hrs**

Unit No.	Tutorial Topics	Hours allotted No. of---hrs
1	Cell Biology	**1**
2	Chemistry of Carbohydrate	**1**
3	Chemistry of Lipids	**1**
4	Chemistry of Protein	**2**
5	Chemistry of Nucleic acids	**1**
6	Enzyme	**1**
7	Factors that influence enzyme activity	**1**
8	Inhibition of enzymes	**1**
9	Vitamins	**2**
10	Biological Oxidation	**1**
11	Minerals	**1**
12	Hb Chemistry	**1**
13	Hormone	**1**
	Total	**15 hrs**

Unit No	Practical Topics	Hours allotted No. of hrs
1	Test for Monosaccharides	**2**
2	Test for Disaccharides	**2**
3	Test for Polysaccharides & Osazone formation	**2**
4	Colour reaction of Proteins	**2**
5	Precipitation reaction of Proteins	**2**
6	Urine : Physical Characteristics & normal constituents	**2**
7	Urine report : Physical Characteristics & abnormal constituents	**4**
8	Chemistry of Bile	**2**
9	Tests for Vitamin A & Vitamin C	**4**
10	Estimation of Serum Calcium	**2**
11	Estimation of Serum Phosphorus (inorganic)	**2**
12	Revision Practicals	**4**
	Total	**30 hrs**

Reference Books:

1. Textbook of Medical Biochemistry (As per the revised curriculum of MCI, 2019), Dr. S K Gupta .
2. Textbook of Biochemistry for Medical Students(As per revised MCI curriculum), D M Vasudevan, Sreekumari S, Kannan Vaidyanathan .
3. Textbook of Medical Biochemistry, M.N. Chatterjee, Rama Shinde.
4. Textbook of Biochemistry, Debajyoti Das

MGM INSTITUTE OF HEALTH SCIENCES M. Sc. Medical Students Syllabus for Research Methodology and Biostatistics		
	No. of Hours	
I. Research Methodology:	Theory	Practical
Scientific Methods of Research : Definition of Research, Assumptions, Operations and Aims of Scientific Research. Research Process, Significance and Criteria of Good Research , Research Methods versus Methodology, Different Steps in Writing Report, Technique of Interpretation, Precaution in interpretation, Significance of Report Writing, Layout of the Research Report	5	—
Research Designs: Prospective, retrospective, Observational Studies: Descriptive, explanatory, and exploratory, Experimental Studies: Pre-test design, post-test design, Follow-up or longitudinal design, Cohort Studies, Case Control Studies, Cross sectional studies, Intervention studies, Panel Studies.	5	—
Sampling Designs : Census and Sample Survey, Implications of a Sample Design, Steps in Sampling Design Criteria of Selecting a Sampling Procedure, Characteristics of a Good Sample Design, Different Types of Sample Designs (Probability sampling and non probability sampling), How to Select a Random Sample?, Systematic sampling, Stratified sampling, Cluster sampling, Area sampling, Multi-stage sampling, Sampling with probability proportional to size, Sequential sampling.	4	0
Measurement in research: Measurement Scales, Sources of Error in Measurement, Tests of Sound Measurement, Technique of Developing Measurement Tools, Scaling Meaning of Scaling, Scale Classification Bases, Important Scaling Techniques, Scale Construction Techniques, Possible sources of error in measurement, Tests of sound measurement	5	5
Methods of Data Collection: Types of data, Collection of Primary Data, Observation Method, Interview Method, Collection of Primary Data	3	0
Ethics and Ethical practice in research and plagiarism	1	
Sampling Fundamentals : Need and importance for Sampling, Central Limit Theorem, Sampling Theory, Concept of Standard Error, Estimation, Estimating the Population Mean Estimating Population Proportion, Sample Size and its Determination, Determination of Sample Size through the Approach Based on Precision Rate and Confidence Level.	5	2
II. Biostatistics		

Data Presentation : Types of numerical data: Nominal, Ordinal, Ranked, Discrete and continuous. Tables: Frequency distributions, Relative frequency, Graph: Bar charts, Histograms, Frequency polygons, one way scatter plots, Box plots, two way scatter plots, line graphs	3	3
Measures of Central Tendency and Dispersion : Mean, Median, Mode Range, Inter quartile range, variance and Standard Deviation, Coefficient of variation, grouped mean and grouped standard deviation (including merits and demerits).	3	3
Testing of Hypotheses: Definition, Basic Concepts, Procedure for Hypothesis Testing, Normal distribution, data transformationImportant Parametric Tests, Hypothesis Testing of Means, Hypothesis Testing for Differences between Means, Hypothesis Testing for Comparing Two Related Samples, Hypothesis Testing of Proportions, Hypothesis Testing for Difference between Proportions, Testing the Equality of Variances of Two Normal Populations.	6	6
Chi-square Test: Chi-square as a Non-parametric Test, Conditions for the Application Chi-square test, Steps Involved in Applying Chi-square Test, Alternative Formula, Yates' Correction, and Coefficient by Contingency.	2	2
Measures of Relationship: Need and meaning, Correlation and Simple Regression Analysis	2	2
Analysis of Variance and Covariance: Analysis of Variance (ANOVA):Concept and technique of ANOVA, One-way ANOVA, Two-way ANOVA, ANOVA in Latin-Square Design Analysis of Co-variance (ANOCOVA), ANOCOVA Technique.	4	4
Nonparametric or Distribution-free Tests: Important Nonparametric or Distribution-free Test Sign test, Wilcoxon signed-Rank Test, Wilcoxon Rank Sum Test: Mann-Whitney U test Kruskal Walli's test, Friedman's test, and Spearman Correlation test.	3	3
Vital Health Statistics: Measurement of Population: rate, crude rate, specific rate, *Measurement of fertility***:** specific fertility rate, Total fertility rate, *Reproduction rate,* Gross Reproduction Rate, Net Reproduction Rate, Measures related to mortality: Crude Death Rate (CDR) , Age-specific death Rate, Infant and child mortality rate, Measures related to morbidity.	4	3
Computer Application Use of Computer in data analysis and research, Use of Software and Statistical package.	0	2
Total hours	55	35

Name of the Degree: M.Sc. Medical Biochemistry

AIMS OF THE PROGRAM

To create keen interest in the molecular & genetic aspect of the existence & viability of a human body
The student should be able to develop curiosity & the ability to seek answers. They should be able to get an exposure to the teaching research & diagnostic fields, so that they are able to take an informed decision for their career ahead.

Duration of Study: The duration of the study for M.Sc. Medical Biochemistry will be of six semesters spread over three years.

Program pattern- Commencement of Semester

- First Semester: August
- Second Semester: February
- Third Semester: August
- Fourth Semester: February
- Fifth Semester: August
- Sixth Semester: February

Eligibility Criteria: As a minimum criterion of eligibility, aspiring candidates are needed to have attained a B.Sc. in any discipline of Life Sciences, Biosciences, Bachelor's degree in any of Physics, Biological Sciences, M.B.B.S, BDS, BAMS, BHMS, B.Pharm.,B.Tech (Biotechnology), Bachelor's Degree in Agricultural, Veterinary and Fishery Sciences, or equivalent examination with a minimum aggregate score of 50%.

For any query visit the website: www.mgmuhs.com

CURRICULUM FOR M. Sc. Medical Biochemistry

I st YEAR

Semester I							
	Syllabus Ref. No.	**Subject**	**Credits**	**Teaching hours**	**Marks**		
	Theory				**Internal Assessment**	**Semester Exam**	**Total**
	MB101T	**Medical Anatomy**	**4**	**4**	**20**	**60**	**80**
	MB102T	**Medical Physiology**	**4**	**4**	**20**	**60**	**80**
	MB103T	**Medical Biochemistry**	**4**	**4**	**20**	**60**	**80**
	MB104T	**Medical Pharmacology**	**4**	**4**	**20**	**60**	**80**
	MB105T	**Medical Microbiology**	**4**	**4**	**20**	**60**	**80**
	Practical						
	MB101P	**Medical Anatomy**	**1**	**2**	**20**	**50**	**70**
	MB102P	**Medical Physiology**	**1**	**2**	**20**	**50**	**70**
	MB103P	**Medical Biochemistry**	**1**	**2**	**20**	**50**	**70**
	MB104P	**Medical Pharmacology**	**1**	**2**	**20**	**50**	**70**
	MB105P	**Medical Microbiology**	**1**	**2**	**20**	**50**	**70**
	Total		**25**	**30**	**200**	**550**	**750**

Semester II

	Syllabus Ref. No.	Subject	Credits	Teaching hours	Marks		
	Theory				**Internal Assessment**	**Semester Exam**	**Total**
	MB201T	**Medical Anatomy**	**4**	**4**	**20**	**60**	**80**
	MB202T	**Medical Physiology**	**4**	**4**	**20**	**60**	**80**
	MB203T	**Medical Biochemistry**	**4**	**4**	**20**	**60**	**80**
	MB204T	**Medical Pharmacology**	**4**	**4**	**20**	**60**	**80**
	MB205T	**Medical Microbiology**	**4**	**4**	**20**	**60**	**80**
	MB206T	**Research Methodology & Biostatistics (Core Course)**	**4**	**4**	**20**	**60**	**80**
	Practical						
	MB201P	**Medical Anatomy**	**1**	**2**	**20**	**50**	**70**
	MB202P	**Medical Physiology**	**1**	**2**	**20**	**50**	**70**
	MB203P	**Medical Biochemistry**	**1**	**2**	**20**	**50**	**70**
	MB204P	**Medical Pharmacology**	**1**	**2**	**20**	**50**	**70**
	MB205P	**Medical Microbiology**	**1**	**2**	**20**	**50**	**70**
	MB206P	**Research Methodology & Biostatistics (Core Course)**	**1**	**2**	**20**	**50**	**70**
	Total		**30**	**36**	**240**	**660**	**900**

2ND YEAR

Semester III							
	Syllabus Ref. No.	**Subject**	**Credits**	**Teaching hours**	**Marks**		
	Theory				**Internal Assessment**	**Semester Exam**	**Total**
	MB301T	Instrumentation	4	4	20	60	80
		Core Elective course**					
	MB302CET	Molecular Biology					
	MB303CET	Clinical Nutrition	4	4	Internal Exam 80 Marks		
	MB304	Clinical Postings	6	18	50		50
	MB305	Dissertation/Project Proposal*	5	10	50	-	50
	MB306	Seminar	2	2	50		50
	Practical						
	MB301P	Separation Techniques	2	4	20	50	70
	MB302CEP	Core Elective practical Molecular Biology	1	2	Internal Exam 70 Marks		
	MB303CEP	Nanobiotechnology					
		Total	24	44	190	110	300

Semester IV							
	Syllabus Ref. No.	**Subject**	**Credits**	**Teaching hours**	**Marks**		
	Theory				**Internal Assessment**	**Semester Exam**	**Total**
	MB401T	Metabolism in disease conditions & principles of nutrition	4	4	20	60	80
		General elective **	4	4			
	MB402GE	Bioethics, Biosafety, IPR & Technology Transfer	Internal Exam of 80 Marks				
	MB403GE	Disaster Management and Mitigation Resources					
	MB403GE	Human rights					
	MB404	Clinical Postings	7	21	50		50
	MB405	Dissertation / Project*	5	10	50		50
	MB406	Seminar	2	2	50		50
	Practical						
	MB401P	Standardisation & Estimation of various biomolecules. Isolation of biomolecules from sources	2	4	20	50	70
		Total	24	45	190	110	300

IIIrd YEAR

Semester V							
	Syllabus Ref. No.	**Subject**	**Credits**	**Teaching hours**	**Marks**		
	Theory				**Internal Assessment**	**Semester Exam**	**Total**
	MB501T	Applied Biochemistry & Laboratory Medicine	4	4	20	60	80
	MB502	Clinical Postings	6	18	50		50
	MB503	Dissertation / Project*	12	24	50		50
	Practical						
	MB501P	Organ Function Tests -Estimation of MDA, Catalase, SOD, Vitamin A, C, E, HbA1C -Lipid Profile - Cardiac Profile -ELISA & RIA	1	2	20	50	70
		Total	23	46	140	110	250

Semester VI							
	Syllabus Ref. No.	**Subject**	**Credits**	**Teaching hours**	**Marks**		
	Theory				**Internal Assessment**	**Semester Exam**	**Total**
	MB601T	Molecular Biology, Bioinformatics & Recent Advances	4	4	20	60	80
	MB602	Clinical Postings	6	18	50		50
	MB603	Dissertation / Project*	12	24		100	100
	Practical						
	MB601P	Practical for Molecular Biology	2	4	20	50	70
		Total	24	50	90	210	300

*(a) ***Dissertation / Project* Course** commences in II nd Semester.

Students should undergo ICMR Online Course of Research Methodology before submitting the protocol for their Dissertation. (Ist / II nd Semester)

Allotment of Guide	II nd Semester (On or Before 30 April)
Submission of Protocol for Scientific and Ethical Committee Approval	III rd Semester (On or Before 14 th Aug)
Scientific and Ethical Approval	III rd Semester (On or Before 14 th October)
Commencement of Research Work	III rd Semester 15th October
Submission of Thesis	VI th Semester 31 st March

(Elective): Any one subject is to be chosen from the subjects offered (Subjects offered may change from time to time depending on the availability of expertise)

**Elective courses may or may not have practical and/or field work.

Annexure G - IV

Outline of course curriculum

MSc-Medical Courses (2019-20 batch)

Semester -I

		Hrs/week					Hrs/semester				Exam Marks		
Code No.	Core subjects	Lecture/week	Tutorial/week	Practical hrs/week	Total Hrs /week	Total Credits/week	Lecture/ semester	Tutorial/ semester	Practical/ semester	Total hours	IA	semester Exam	Total marks
Theory													
	Anatomy	3	1		4	4	45	15		60	20	60	80
	Physiology	3	1		4	4	45	15		60	20	60	80
	Biochemistry	3	1		4	4	45	15		60	20	60	80
	Pharmacology	3	1		4	4	45	15		60	20	60	80
	Microbiology	3	1		4	4	45	15		60	20	60	80
Practical													
	Anatomy			2	2	1			30	30	20	50	70
	Physiology			2	2	1			30	30	20	50	70
	Biochemistry			2	2	1			30	30	20	50	70
	Pharmacology			2	2	1			30	30	20	50	70
	Microbiology			2	2	1			30	30	20	50	70
	Total					25				450			750

Total Marks for IA	
Theory	Practical
30	30

Theory Internal Assement	
Theory	15
Seminar	5
Total	20

Practical Internal Assement	
Practical	15
Journal	5
Total	20

Annexure G - V

Outline of course curriculum
MSc-Medical Courses (2019-20 batch)
Semester -II

		Hrs/week					Hrs/semester				Exam Marks		
Code No.	Core subjects	Lecture/ week	Tutorial/ week	Practical hrs/week	Total Hrs /week	Total Credits/ week	Lecture/ semester	Tutorial/ semester	Practical/ semester	Total hours	IA	semester Exam	Total marks
Theory													
	Anatomy	3	1		4	4	45	15		60	20	60	80
	Physiology	3	1		4	4	45	15		60	20	60	80
	Biochemistry	3	1		4	4	45	15		60	20	60	80
	Pharmacology	3	1		4	4	45	15		60	20	60	80
	Microbiology	3	1		4	4	45	15		60	20	60	80
	Research Methodology & Biostatistics	4			4	4	60			60	20	60	80
Practical													
	Anatomy			2	2	1			30	30	20	50	70
	Physiology			2	2	1			30	30	20	50	70
	Biochemistry			2	2	1			30	30	20	50	70
	Pharmacology			2	2	1			30	30	20	50	70
	Microbiology			2	2	1			30	30	20	50	70
	Research Methodology & Biostatistics			2	2	1			30	30	20	50	70
	Total					30				540			900

Total Marks for IA	
Theory	Practical
30	30

Theory Internal Assement	
Theory	15
Seminar	5
Total	20

Practical Internal Assement	
Practical	15
Journal	5
Total	20

Assessment Pattern for MSc Medical Courses (2019 Onwards)

1. LETTER GRADES AND GRADE POINTS:

MGMIHS has adopted the UGC recommended system of awarding grades and CGPA under Choice Based Credit Semester System for MSc Medical courses.

1. MGMIHS would be following the absolute grading system, where the marks are compounded to grades based on pre-determined class intervals.
2. The UGC recommended 10-point grading system with the following letter grades will be followed:

Table 1: Grades and Grade Points

Letter Grade	**Grade Point**
O (Outstanding)	10
A+ (Excellent)	9
A (Very Good)	8
B (Good)	7
C (Above Average)	6
F (Fail)/ RA (Reappear)	0
Ab (Absent)	0
Not Completed (NC)	0
RC (<50% in attendance or in Internal Assessment)	

a. A student obtaining Grade RA shall be considered failed and will be required to reappear in the examination.

b. Candidates with NC grading are those detained in a course (s); while RC indicate student not fulfilling the minimum criteria for academic progress or less than 50%in attendance or less than 50% in internal assessments (IA). Registrations of such students for the respective courses shall be treated as cancelled. If the course is a core course, the candidate has to re-register and repeat the course when it is offered next time.

c. CBCS Grading System - Marks Equivalence Table

Table 2: Grades and Grade Points

Letter Grade	**Grade Point**	**% of Marks**
O (Outstanding)	10	86-100
A+ (Excellent)	9	70-85
A (Very Good)	8	60 -69
B (Good)	7	55 -59
C (Above Average) – **Pass both for UG and PGs**	6	50- 54
F (Fail))/ RA (Reappear)	0	Less than 50
Ab (Absent)	0	-
NC- not completed	0	-
RC- Repeat the Course	0	0

Table 3: Cumulative Grades and Grade Points

Letter Grade	**Grade Point**	**CGPA**
O (Outstanding)	10	9.01 - 10.00
A+ (Excellent)	9	8.01 – 9.00
A (Very Good)	8	7.01 – 8.00
B (Good)	7	6.00 - 7.00
C (Above Average)	6	5.01 - 6.00

d. Assessment of a Course: Evaluation for a course shall be done on a continuous basis. Uniform procedure will be adopted under the CBCS to conduct continuous internal assessments (IA), followed by one end-semester university examination (ES) for each course.

e. Courses in programs wherein Theory and Lab are assessed jointly, the minimum passing head has to be 50% Grade each for theory and practical's separately. RA grade in any one of the components will amount to reappearing in both components. i.e. theory and practical.

2. Eligibility to appear for the end-semester examinations for a course includes:

2.1 Candidates having ≥ 75% attendance and obtaining the minimum 35% in internal assessments in each course to qualify for appearing in the end-semester university examinations.

2.2 The students desirous of appearing for university examination shall submit the application form duly filled along with the prescribed examination fee.

2.3 Incomplete application forms or application forms submitted without prescribed fee or application form submitted after due date will be rejected and student shall not be allowed to appear for examination.

3. Passing Heads

3.1 The minimum passing head shall be 50% in both Theory and practicals separately including the internal assessment.

3.2 Elective subjects – the minimum prescribed marks for a pass in elective subject should be 50%. The marks obtained in an elective subjects should be communicated to the university before the commencement of the university examination. (From IIIrdSem Onwards)

4 Detention:

A student not meeting any of the above criteria may be detained (NC) in that particular course for the semester. In the subsequent semester, such a candidate improve in all, including attendance and/or IA minimum to become eligible for the next end-semester examination.

5 The maximum duration for completing the course will be 6 years (minimum duration of course x 2) i.e. (3x2) =6 years for PG Courses, failing which his/her registration will be cancelled. Full fees of entire course of three years may be liable to be paid by the students.

6 Carry over benefit:

6.1 A candidate who fails in any two main subjects of previous semester shall be permitted to carry over those subjects to the next semester.

6.2 A candidate shall not be allowed to appear in the final semester examination unless the candidate has cleared all the previous semester examinations.

7 Grace Marks for PG Courses:

No grace marks will be awarded for PG Exams.

8. University End-Semester Examination

8.1 There will be one final university examination at the end of every semester.

8.2 A candidate must have minimum 75% attendance (Irrespective of the type of absence) in theory and practical in each subject to be eligible for appearing the University examination.

8.3 The Dean shall send to the university a certificate of completion of required attendance and other requirements of the applicant as prescribed by the university, two weeks before the date of commencement of the written examination.

8.4 A candidate shall be eligible to sit for the examination only, if she / he has secured minimum 35% in internal assessment of that subject. The internal examinations will be conducted at college/ department level.

8.5 Notwithstanding – anything in any examination, a deficiency of attendance at lectures or practical maximum to the extent of 10% - may be condoned by the Dean.

8.6 If a candidate fails either in theory or in practical, he/ she have to re-appear for both.

8.7 There shall be no provision of re- evaluation of answer sheets. Candidates may

apply to the university following due procedure for recounting of theory marks in the

Presence of the subject experts.

8.8 Internal assessments shall be submitted by the Head of the Department to the university

through the Dean MGMMC at least two weeks before commencement of University theory examination.

8.9 Supplementary examination: There shall be no supplementary examination

8.10 Re-Verification -There shall be provision of retotaling of the answer sheets, candidate shall be permitted to apply for recounting/retotaling of theory papers within 8 days from the date of declaration of results.

8.11 Scheme of University Exam Theory PG Program: General structure / patterns for setting up question papers for Theory / Practical courses, their evaluation weightages for PG programs are given in the following tables.

8.12 Theory Question Paper Pattern for Core Subjects in University Examinations

Under CBCS - 60Marks

Question Type	**No. of Questions**	**Questions to be Answered**	**Questions X Marks**	**Total Marks**
Brief Answer Questions	7	6	1X 10	60

General Instructions (Theory):

A. Time duration of each Theory Paper will be of Three (3) Hrs .
B. Total Marks of each Theory Paper will be 60 Marks

8. 13 Practical Question Paper Pattern For University Examinations Under CBCS - 50 Marks

Exercise	**Description**	**Marks**
Q No 1	Practical exercise – 1	1 x15=15 M
Q No 2	Station exercise	5x5M=25 M
Q No 3	VIVA	10 M
		Total = 50 M

General Instructions (Practical):

A. All the students have to remain present at the examination center 15 minutes before the scheduled time for examination.

B. Students have to carry with them certified journal, I-card or examination receipt, and other necessary requirements for examination.

C. Candidate should not leave the practical hall without the permission of examiner.

D. Use of calculator is allowed but the use of mobile phones is strictly prohibited.

E. The candidate has to leave the laboratory only after the submission of all the answer sheets of the exercises performed.

8.14 Internal examination pattern (Theory) : 30marks

Question type	No. of questions	Questions to be answered	Question X marks	Total marks
Brief Answer Questions	4	3	1X10	30

8.15 Breakup of theory IA calculation for 20 marks

Internal exam (Department -30 Marks)	15 marks
Seminar	5 marks
	Total = 20 M

8.16 Internal Examination Pattern (Practical): 30 Marks

Practical Exercise	10marks
Station Exercise	10 marks
Viva	10 marks
Total practical	30 Marks

8.17 Breakup of practical IA calculation:

Internal exam (Department -30 Marks)	15 marks
Journal	5 marks
	Total = 20 M

Internal Assessment marks should be submitted to the university by respective departments at least 15 days prior to onset of university examination.

9. Submission of Protocol of Dissertation: Students should undergo Online Course of Research Methodology (MCI- PG) before submitting the protocol for their Dissertation.

MGM Institute of Health Sciences, Navi Mumbai

MGM MEDICAL COLLEGE

Academic Year 2019 – 2020

Academic Calendar For M.Sc. (3 Years) Medical Courses

(Anatomy, Physiology, Biochemistry, Pharmacology, Microbiology)

SCHEDULE OF ACTIVITY	DATES
Commencement of First Semester	01.08.2019
Receipt of completed Eligibility forms at MGMIHS from Respective college without late fees Receipt of completed Eligibility forms at MGMIHS from Respective college with late fees (Only for new admission)	On or before 30.10.2019 On or before 30.11.2019
Commencement of Internal Exam	3rd Week of November 2019
Winter Vacation for Staff	16.10.2019 to 15.11.2019
Notification of First Semester University Examination	As per MGMIHS
Commencement of First Semester University Examination	1 Week of January 2020
Conclusion of respective semesters	Last week of January 2020
Declaration of final Result	As per MGMIHS
Commencement of Second Semester	1st Week of February 2020
Commencement of Internal Examination	3rd Week of April 2010
Allotment of Guide for Dissertation	On or Before 30 th April 2020
Notification of Second Semester University Examination	As per MGMIHS
Summer Vacation for staff	01.05.2020 to 10.06.2020
Commencement of Second Semester University Examination	1 Week of July 2020
Conclusion of Second Semester	15 July 2020
Declaration of final Result	As per MGMIHS
Commencement of Next Academic Session	16.07.2020

MGM Institute of Health Sciences, Navi Mumbai

MGM MEDICAL COLLEGE

Academic Year 2019 – 2020

Academic Calendar For M.Sc. (3 Years) Medical Courses

(Anatomy, Physiology, Biochemistry, Pharmacology, Microbiology

SCHEDULE OF ACTIVITY	DATES
Commencement of Third Semester	16.07.2020
Submission of Protocol for Scientific and Ethical Approval	14.08.2020
Commencement of Internal Exam	3rd Week of November 2020
Winter Vacation for Staff	16.10.2020 to 15.11.2020
Notification of First and Third Semester University Examination	As per MGMIHS
Commencement of Third Semester University Examination	1 Week of January 2021
Conclusion of respective semesters	15 January 2021
Declaration of final Result	As per MGMIHS
Commencement of Fourth Semester	3rd week of January 2021
Commencement of Internal Examination	2nd Week of April 2021
Notification of Fourth Semester University Examination	As per MGMIHS
Summer Vacation for staff	01.05.2021 to 10.06.2021
Commencement of Fourth Semester University Examination	3rd Week of June 2021
Conclusion of Respective Semesters	30 June 2021
Declaration of final Result	As per MGMIHS
Commencement of Next Academic Section	1.07.2021

MGM Institute of Health Sciences, Navi Mumbai

MGM MEDICAL COLLEGE

Academic Year 2019 – 2020

Academic Calendar For M.Sc. (3 Years) Medical Courses

(Anatomy, Physiology, Biochemistry, Pharmacology, Microbiology

SCHEDULE OF ACTIVITY	DATES
Commencement of Fifth Semester	1.07.2021
Commencement of Internal Exam	3rd Week of November 2021
Winter Vacation for Staff	16.10.2021 to 15.11.2021
Notification of First, Third and Fifth Semester University Examination	As per MGMIHS
Commencement of Fifth Semester University Examination	First Week of December 2021
Conclusion of Fifth semester	Second Week of December 2021
Declaration of final Result	As per MGMIHS
Commencement of Sixth Semester	16 December 2021
Submission of Dissertation	31 March 2022
Commencement of Internal Examination	2nd Week of April 2022
Notification of Fourth Semester University Examination	As per MGMIHS
Summer Vacation for staff	01.05.2022 to 10.06.2022
Commencement of Sixth Semester University Examination	1st June 2022
Conclusion of Respective Semesters	30 June 2022
Declaration of final Result	As per MGMIHS