



University of Karachi

Department of Mathematics

2014 Session

Pre-requisite: MATH 510

MATH 609: Biomathematics I (2+1)

Activity	Dates	Class and Activity Schedule
Introduction day	M* January 16; E* February 03	Fri Th M 1030h–1210h; E 1800h-1940h
Teaching	January 17 – May 23	Thu Lab M 1420h–1600h; E 1800h-1940h
Concept-Paper Presentation	March 06	Thu M 1420h-1600h; E 1800h-1940h
Research-Proposal Presentation	March 20	Thu M 1000h-1230h; E 1530h-1800h
Obesity-Profile Presentation	April 17	Thu M 1420h-1600h; E 1800h-1940h
Growth-&-Obesity-Profile Presentation	May 08	Thu M 1420h-1600h; E 1800h-1940h
Semester Examinations	June 03-20	Venue: Room No. 009, Mathematics
Summer Holidays	June 23-30	Office Hours: Mon-Wed 1530h–1630h

Course Supervisor: Professor Dr. Syed Arif Kamal; Telephone: + 92 21 9926 1300-6 ext. 2380
PhD (Mathematical Neuroscience); MA (Johns Hopkins, USA); MS (Indiana, USA)
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Faculty Office: Room No.006, Department of Mathematics, University of Karachi
Directions: <http://www.ngds-ku.org/kamal/contact.htm#Directions>
Handout Address: http://ngds-ku.org/M609-10/MATH609_14.pdf
Course Material: <http://anthromath.uok.edu.pk>; <http://ngds.uok.edu.pk>
Tutorial: Mrs. Samira Sahar Jamil (Faculty Office: Room No. 115)
Laboratory: Ms. Urooj (Faculty Office: Room No. 235)

Course Objectives

To give the students a sound background in the techniques & the methods of biomathematics so that they can apply these ideas to improve health of self and family, work closely with doctors and allied-health professionals and enter graduate programs in anthromathematics

Higher Education and Job Opportunities

MS/MPhil/PhD from Karachi University, LUMS, Urdu University, the Aga Khan University and DUHS; jobs in health-care sector, R&D organizations, colleges and universities. This course would be a plus point for job in schools and hospitals, because the students get hands-on training in anthropometry.

Course Outline

Section A: Introduction to biomathematics, significance, future directions and scope

Section B: Mathematics of physical examination, ethics of physical examination (thoroughness, conflict-of-interest, privacy, confidentiality and comfort, Hippoc-

ratio oath), ethical considerations in research involving human subjects, clinical-trial registration

Section C: Measurement of height, weight and MUAC, teaching opportunities offered by these measurements, obese and wasted individuals, tall and stunted individuals, BMI and its universal classification

Section D: Obesity profiles of adults, models of child growth, correlation models, ICP model, KFA model and KJK model with concepts of optimal mass and estimated-adult BMI introduced

Section E: Eating disorders: anorexia nervosa, bulimia nervosa, over-nutrition, under-nutrition and energy-channelization and their role in maintaining optimal weight-for-height, diet, exercise and lifestyle adjustment as key factors in optimal-weight management

Section F: Vitamin-D deficiency in children and its significance in diet-based interventions to maintain optimal weight and gain height, helpful hints for gaining height



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Marks Breakdown

<i>Evaluation Parameter</i>	<i>Marks</i>	<i>Self-Obesity-Profile Computation</i>	<i>Marks</i>
Terminal	80	Height Measurement	0.5
Concept Paper	05	Mass Measurement	0.5
Research Proposal	05	Obesity Profile ^{\$}	4.0
Self-Obesity-Profile	05	Growth-and-Obesity Profile [#]	5.0
Growth-and-Obesity Profile	05		

Total **100**

^{\$} $P(h)$, $P(\mu)$, BMI, STATUS(μ), (1 mark each), measurement of height (0.5 mark) and mass (0.5 mark)

[#] $P(h)$, $P(\mu)$, BMI, Estimated-Adult BMI, $\Delta h' = h - h_{\text{army-cut-off}}$, $\Delta h = h - h_{\text{MP}}$,

$\Delta m = m - m_{\text{opt}}$, STATUS(h), STATUS(μ), suggestions for optimal-mass management (0.5 mark each)

Biomathematics Projects 2010:

<http://www.ngds-ku.org/M609-10/Projects2010.pdf>

Biomathematics Projects 2011:

<http://www.ngds-ku.org/M609-10/Projects2011.pdf>

Past Papers: <http://www.ngds-ku.org/kamal/past.htm#Biomathematics>

Timeline

All activities are scheduled on Thursdays in Room No. 009, Mathematics, during **M1420h-1600h; E 1800h-1940h**, except that of **Thursday, March 20**, which is to be held in Room No. 007, Mathematics, during **M 1000h-1230h; E 1530h-1800h**

<i>Year</i>	<i>Month</i>	<i>Day</i>	<i>Task (to be accomplished)</i>
2014	February	06	Preparation of research proposal (guidelines given)
		13	Tentative submission of topic of research proposal
		20	Finalization of topic of research proposal
		27	Submission of Concept Paper
	March	06	<i>Concept-Paper Presentation (Oral Session)</i>
		13	Submission of Research Proposal
		20	<i>Research-Proposal Presentation (Poster Session)</i>
		27	Practice session
	April	03	Data collection
		17	<i>Obesity-Profile Presentation</i>
	May	08	<i>Growth-and-Obesity-Profile Presentation</i>



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Course Plan

Date	THEORY: Fri M 1030h-1210h; E 1800-1940h	Date	LABORATORY: Thu M 1420h-1600h; E 1800-1940h
JANUARY			
17	Introduction to biomathematics	23	Introduction to laboratory techniques
24	Future directions and scope of biomathematics	30	No Laboratory (Convocation)
31	Mathematics of physical examination		
FEBRUARY			
		06	Preparation of research proposal
07	Research ethics	13	Measurement of height
14	Hippocratic oath	20	Measurement of mass
21	BMI and its classification, stunting and tallness	27	Measurement of MUAC
28	Models of child growth (correlation, ICP)		
MARCH			
		06	Concept-Paper Presentation (Oral Session)
07	KFA and KJK models	13	Accuracy, precision and reproducibility
14	Obesity and wastedness, adult obesity profiles	20	Research-Proposal Presentation (Poster Session)
21	Growth-and-obesity profiles of children	27	Practice session
28	Estimated-adult-BMI computation		(measurement of height and mass of a classmate)
APRIL			
		03	Data collection
04	Optimal-mass management	10	Tutorial (Obesity Profile)
11	Eating disorders	17	Obesity-Profile Presentation (Lab Exam)
18	Under- & over-nutrition	24	Tutorial (Growth-and-Obesity Profile)
25	Energy-channelization problem		
MAY			
		01	No Laboratory (Labor-Day Holiday)
02	Measures to gain height	08	Growth-and-Obesity Profile Presentation
09	Vitamin-D deficiency	15	Revision
16	Revision	22	Past-Paper Solution
23	Exam-Taking Strategy		