

Mathematics

Module name		Mathematics				
Module level		1 st year of Bachelor program				
Abbreviation, if applicable		-				
Sub-heading, if applicable		-				
Courses included in the module, if applicable		MA 1102 Mathematics 1B MA 1202 Mathematics 2B				
Semester/term		1 st and 2 nd semesters				
Module coordinator(s)		Drs. Warsoma Djohan, M.S.				
Lecturer(s)		Drs. Warsoma Djohan, M.S.				
Language		Indonesian				
Classification within the Curriculum		Compulsory courses for Bachelor Program in Biology				
Teaching format/ class hours per week during the semester		Lecture (Face to face lecture): 3 hours x 16 weeks per semester Tutorial: 2 hours x 16 weeks per semester				
Workload	Total Workload	296hours; 2 courses x 3 CU				
		Face to face teaching	Structured activities	Independent study	Exam	Total
	Lecture	96	32	96	8	232
	Tutorial	-	64	-	-	64
	Total					296
Credit points		<i>Mathematics 1B (3 CU) & Mathematics 2B (3 CU)</i>				
Requirements		-				
Content	<p>Mathematics 1B</p> <ul style="list-style-type: none"> • Calculus primarily for students in the biological or life sciences • Focuses on modeling life sciences processes. We attempt to motivate and illustrate a great deal of the mathematics in the course with biological problems. • Introduction to the notion of a limit • Derivatives and integrals • Ideas, techniques, and applications of calculus to the life sciences • The interpretation of the derivative as a rate of change, and model growth and declines of populations <p>Mathematics 2B</p> <ul style="list-style-type: none"> • Material on modeling biological systems with differential equations, dynamical systems • A brief introduction to the matrix and its application in the study of age-structure population • Taylor approximations • Multivariable calculus • Differential equations that model such phenomena as competition, predator/prey interaction, and epidemics 					

Learning goals/ competencies	<p><i>After completion of this module students are expected to be able to:</i></p> <p>Knowledge</p> <ul style="list-style-type: none"> • Define the derivative and the integral • Explain the fundamental theorem of calculus which gives the relation between the derivative and the integral • Express an appreciation on the interaction between mathematics and other fields that they will learn in their study programs • Basic technical ability on the appropriate concepts, formulae, methods, and thinking <p>Skills</p> <ul style="list-style-type: none"> • Demonstrate a systematic, logical, and critical thinking; creative in solving problems related to concepts in Mathematics 1B and 2B • Produce their works and their thinking orally and in written papers. <p>Competence</p> <ul style="list-style-type: none"> • Demonstrate readiness to learn other courses that need calculus for life sciences as the prerequisite. 	
Study/exam achievements	<ul style="list-style-type: none"> • <i>Midterm exam 1</i> • <i>Midterm exam 2</i> • <i>Final exam</i> • <i>Quizzes</i> • <i>Assignments</i> 	
Forms of media	<i>Classical teaching tools:</i>	<i>white board/ chalk and talk, power point</i>
	<i>Integrated teaching tools:</i>	-
	<i>Digital teaching tools:</i>	-
	<i>Problem based teaching tools:</i>	-
Literature	<ol style="list-style-type: none"> 1. Marvin L. Bittinger, Neal Brand, and John Quintanilla. 2005. <i>Calculus for the Life Sciences</i>. Pearson. 2. Claudia Neuhauser. 2004. <i>Calculus for Biology and Medicine</i>, International Edition. Prentice Hall. 3. George B. Thomas, Maurice D. Weir, Joel Hass, <i>Thomas'</i>. 2010. <i>Calculus</i>, 12th edition. Pearson. 4. Dale Purcell, Edwin J. Purcell, Steven E. Rigdon. 2007. <i>Calculus</i>, 9th Edition. Pearson Prentice Hall. 	