How to choose your entry-level Mathematics courses

Fall 2009

All SES majors have a mandatory portion of Mathematics courses. Many students from both SHSS and SES love Mathematics from High School and take additional Mathematics classes as electives.

However, there are many choices so that students and also advisors sometimes get confused. Moreover, the preferences on which courses to recommend from the point of view of particular majors may change from time to time. Since such changes have happened again in the course of the 2008/09 academic year, and the existing guide "How to choose Engineering and Science Mathematics Courses" posted at

http://math.jacobs-university.de/courses/

does not reflect all of them, here is a **summary for newcomers and advisors**.

Rule 1: Consult the **handbook** of your major, get input from more seasoned Jacobs students (but don't take it for granted), talk to your **academic advisor** (if (s)he is in doubt, ask the designated coordinator of your major).

Rule 2: All SES majors and the International Logistics (Management) major from SHSS have a recommended/mandatory entrance ESM1 class. Currently there are 3 different courses to choose from.

>   **120101 ESM1A (Single Variable Calculus)** is earmarked for most of the SES majors (exceptions are Mathematics, ACM, Physics, Chemistry, and all Life Sciences). A set of notes which allows you to judge the scope and level of the ESM1A of the last couple of years can be found at
>   http://www.faculty.jacobs-university.de/poswald/teaching/ESM1A/

>   **120111 ESM1B (Multivariate Calculus and ODE)** is recommended for Physics, ACM, and Mathematics (regular variant), but also appropriate for students from the ESS, Electrical Engineering, Computer Science, and for students of other majors who already have a good background in Calculus.

>   **120121 ESM1C (Calculus and Matrix Algebra)** is recommended for Bio/Life Science and Chemistry majors, and for students from SHSS taking Mathematics as part of their Other School Electives. Compared to ESM1A, this course allows a bit more room for refreshing pre-calculus material, the development of elementary skills during tutorial sessions, and contains a short introduction into linear algebra material.

For more details, read the posted syllabi and double-check with the instructor. In Fall 2009, the Instructors of Record are Prof. Penkov (ESM1A), Dr. Tumarkin (ESM1B), and Dr. Oktay (ESM1C).

The fall semester Mathematics courses can be complemented by the lab module **110111 NatSciLab Symbolic Software**, which offers an introduction to the software packages *Mathematica* and *LaTeX*. Any of the ESM1 courses may be followed in the spring semester by either **120102 ESM2A (Linear Algebra, Probability, Statistics)** or **120112 ESM2B (Linear Algebra, Probability, Fourier Analysis)** which are mandatory for many majors and can be complemented by the lab module **110112 NatSciLab Math Numerical Software,** introduction to the software package *Matlab*.

Rule 3: Students with university-level calculus courses on their record may apply for **transfer credits** or consider taking an **advanced placement (AP) exam** offered for ESM1B (Thursday Sept. 10, 7-9pm, Res. III Lecture Hall), and ESM1A/C (Monday, Sept. 7, 7-9 pm, Conrad Naber Lecture Hall). Compare Section 6 of the university policies posted at
http://www.jacobs-university.de/academics/policies/.
There is no separate AP exam for ESM1C, students may opt to attend the AP test for ESM1A instead.

Rule 4: Students who choose Mathematics courses as Electives, consider Mathematics as a possible second major, or have passed the AP exam and look for a challenging extra Mathematics course should consider

> **110101 General Mathematics and Computational Science I,** which covers topics from pure to applied and computational mathematics, introducing to mathematical reasoning as well as modeling (IoR Prof. Preusser).

Alternatively, attending the well-structured **100211 Analysis I** (IoR Prof. Oswald) **100221 Linear Algebra I** (IoR Prof. Penkov) offered for the Mathematics major be the right choice. Before choosing these courses, a consultation with the instructor is strongly recommended. Any of these courses can be continued into the Spring semester (and complemented by the mentioned lab modules).

There are also University Studies Courses related to some aspects of Mathematics, you have to check each semester if you find something to your taste!

If still in doubt, please consult with your advisor or the instructor of the respective course. Good luck!

The Mathematics Faculty