

New Study Regulations For Biomedical Computing

Dear Students of Biomedical Computing,

As you might have heard, we plan to change the study regulations for BMC. Of course, you have started last fall and thus these new study regulations do not apply to you – *so far*. However, there is the possibility to switch to these new regulations and we will inform you as soon as possible what you will have to do in order to do so.

“Why should I switch to the new regulations?”

Well, the most obvious reason is that the new study regulations only have required and elective courses. *Required elective courses are no longer existent!* This has a huge impact; imagine that you have passed the exam in Basic Mathematical Methods for Imaging and Visualization for instance, but your grade was rather bad. According to the old regulations this grade counts for your final grade and there is no way to change it. According to the new regulations you are *able to replace* Basic Mathematical Methods with another module and thus you are still able to improve your final grade¹!

Another advantage of the new regulations is rather technical and it concerns the recognition of courses you might have attended during a possible stay abroad. Concisely put, it is now possible to recognize courses even, if the content of these courses does not *fully* match the content of a course at TUM. Indeed, this partial recognition is very useful, because it happens really often that there no exact match among the courses offered at TUM.

“How does it work in detail?”

The new regulations are designed in such a way that it is very easy to switch to the new regulations. In particular it is not necessary to attend courses which have not been considered by the old regulations.

On the following pages you will find two categories of courses (also called modules):

- **required modules:** These modules have to be taken! You have to attend the course, you have to pass the exam in these courses, and the grade you get will definitely have an impact on your final grade.
- **elective modules:** These modules are also divided into certain categories, such as *Mathematical Methods and Scientific Computing*. For every category there is a minimum amount of credits you have to earn. In the case of *Mathematical Methods and Scientific Computing* it is 8 ECTS credits for instance. This means that you can achieve the required amount of credits by passing the exam in e.g. *Numerical Programming*. However, if you achieve a bad grade, you could additionally attend (and pass the exam in) *Introduction to Scientific Computing* and *Basic Mathematical Methods for Imaging and Visualization*, in order to replace *Numerical Programming*.

¹ However, it should be clear that you cannot attend the same course twice. Thus, once you passed the exam for one module the grade for this module is fixed.

Other important changes:

There are two other changes in the new regulations which are of importance:

- Firstly, the individual study advisors will be replaced by a general consultation. The reason is that the new regulations are much more tight with respect to the general direction of Biomedical Computing due to the fact that you have to take elective modules in many different categories. These categories are, however, so specialized that it will no longer be necessary to consult you individually. Thus, a general *consultation hour*, where you can drop by and ask questions, will be established. We will inform you very soon about that.
- Secondly, the old regulations require a C++-course or a clinical project – both are required elective modules. As we encountered several problems with this construction in the past, we will create a new *required module* called *clinical internship*, which combines the C++ course with a clinical project.

All in all, I think that the new regulations are much more “student-friendly” than the old ones and I hope that the advantages of the new regulations are convincing you to switch.

Best regards,

Maximilian Baust

Required Modules

Informatics

ID.	Modulbezeichnung	Lehrform	Sem	SWS	ECTS	Prüfungst	Prüfungsdauer	Sprache
IN2021	Computer Aided Medical Procedures	4V	WS	4	6	mündlich/schriftlich	30-40/90 min.	Englisch
IN2022	Computer Aided Medical Procedures II	2V+2Ü	SS	4	5	mündlich/schriftlich	30-40/90 min.	Englisch
IN2107	Master-Seminar	2S	WS/SS	2	4	Prüfungsleitungen sind Ausarbeitungen bzw. Vorträge		Deutsch/Englisch
IN ????	Clinical Internship	6P	WS	6	10	Prüfungsleitungen sind Ausarbeitungen bzw. Vorträge		Englisch

Medicine

ID.	Modulbezeichnung	Lehrform	Sem	SWS	ECTS	Prüfungst	Prüfungsdauer	Sprache
????	Medical Instrumentation	2P	WS	2	4	schriftlich	90 min.	Englisch
????	Clinical Applications and Techniques of Computer Aided Surgery	2P	WS	2	4	schriftlich	90 min.	Englisch
????	Computer Aided Trauma Surgery	2P	WS	2	4	schriftlich	90 min.	Englisch
????	Imaging in Radiology, Nuclear Medicine and Radiation Therapy	2P	SS	2	4	schriftlich	90 min.	Englisch
????	Medical Information Processing	2V	WS	2	3	schriftlich	90 min.	Englisch
????	Pathophysiology	2V	WS	2	3	schriftlich	90 min.	Englisch

Imaging

ID.	Modulbezeichnung	Lehrform	Sem	SWS	ECTS	Prüfungst	Prüfungsdauer	Sprache
????	Case Studies on Modern Imaging	2V+1Ü	SS	3	4	schriftlich	90 min.	Englisch

Elective Modules

Imaging

You need at least **3 ECTS** from these courses:

ID.	Modulbezeichnung	Lehrform	Sem	SWS	ECTS	Prüfungst	Prüfungsdauer	Sprache
000000 0141 TUM online ID	Biomedical Physics 2	2V	SS	2	3	schriftlich	90 min.	Englisch
EI3999	Introduction to Biological Imaging	2V+1 Ü	WS	3	4	schriftlich	90 min.	Englisch

Mathematical Methods and Scientific Computing

You need at least **8 ECTS** from these courses:

ID.	Modulbezeichnung	Lehrform	Sem	SWS	ECTS	Prüfungst	Prüfungsdauer	Sprache
IN2001	Algorithms for Scientific Computing	4V+2 Ü	SS	6	8	mündlich/ schriftlich	30/120 min	Englisch
IN2002	Algorithms for Scientific Computing II	2V+1 Ü	WS	3	4	mündlich/ schriftlich	30/ 60-100 min.	Englisch
IN2005	Introduction to Scientific Computing	2V	WS	2	3	mündlich/ schriftlich	30/90 min.	Englisch
IN2124	Basic Mathematical Methods for Imaging and Visualization	2V+2 Ü	WS	4	5	schriftlich	120 min.	Englisch
IN2141	Introduction to Scientific Computing II	2V+1 Ü	SS	3	4	mündlich/ schriftlich	30/ 90-120 min.	Englisch
IN2156	Numerical Programming	4V+2 Ü	WS	6	8	schriftlich	120 min.	Englisch
IN3400	Selected Topics in Algorithms and Scientific Computing	-	-	-	-	-	-	Deutsch/ Englisch

Programming and Software Engineering

You need at least **3 ECTS** from these courses:

ID.	Modulbezeichnung	Lehrform	Sem	SWS	ECTS	Prüfungsart	Prüfungsdauer	Sprache
IN1503	Advanced Programming	2V+2 Ü	WS	4	5	mündlich/schriftlich	30/90-120 min.	Englisch
IN2087	Software Engineering for Business Applications - Master's Course	2V+2 Ü	SS	4	5	schriftlich	120 min.	Deutsch
IN2126	Software Engineering I	3V+2 Ü	WS	5	6	schriftlich	90-150 min.	Deutsch/Englisch
IN2157	Fundamental Algorithms	2V	WS	2	3	schriftlich	90 min.	Englisch
IN2187	Software Engineering for Engineers	3V+1 Ü	SS	4	5	schriftlich/mündlich	-	Englisch
IN3050	Selected Topics in Software Engineering	-	-	-	-	-	-	Deutsch/Englisch-

Image Processing, Computer Vision und Pattern Recognition

You need at least **10 ECTS** from these courses:

ID.	Modulbezeichnung	Lehrform	Sem	SWS	ECTS	Prüfungsart	Prüfungsdauer	Sprache
IN2023	Machine Vision Algorithms	2V	SS	2	3	mündlich	30 min.	Deutsch
IN2057	3D Computer Vision	2V+2 Ü	SS	4	5	mündlich/schriftlich	30/90 min.	Englisch
IN2064	Machine Learning	3V+2 Ü	WS	5	6	schriftlich	90 min.	Englisch
IN2065	Machine Learning II	3V	unregelm.	3	4	mündlich	25 min.	Deutsch
IN2123	3D Computer Vision II	2V+2 Ü	WS	4	5	mündlich/schriftlich	30/90 min.	Englisch
IN2133	Principles of Computer Vision	3V	WS	3	4	mündlich/schriftlich	20/75 min.	Englisch
IN2210	Tracking and Detection in Computer Vision	2V+2 Ü	WS	4	5	schriftlich	90-120 min.	Englisch
IN2228	Multiple View Geometry	4V+2 Ü	unregelm.	6	8	mündlich/schriftlich	120-180 min.	Englisch
IN2237	Variational Methods and Convex Optimization in	2V+1 Ü	WS	3	4	schriftlich	90 min.	Englisch

	Computer Vision II							
IN2238	Analysis of Three-Dimensional Shapes	2V+1 Ü	WS	3	4	schriftlich	90 min.	Englisch
IN3200	Selected Topics in Computer Graphics and Vision	-	-	-	-	-	-	Deutsch/Englisch

Computer Graphics, Augmented Reality, and Visualization

You need at least **10 ECTS** from these courses:

ID.	Modulbezeichnung	Lehrform	Sem	SWS	ECTS	Prüfungsart	Prüfungsdauer	Sprache
IN2015	Image Synthesis	3V	WS	3	4	mündlich	30-45 min.	Deutsch
IN2017	Computer Graphics	4V	SS	4	6	mündlich/schriftlich	30-45/60-100 min	Deutsch
IN2018	Augmented Reality	2V+2 Ü	WS	4	5	mündlich/schriftlich	20/90 min.	Englisch
IN2020	Geometry Processing	3V	unregelm.	3	4	mündlich	20 – 60 min.	Deutsch
IN2025	Simulation and Animation	3V	SS	3	4	mündlich	20-60 min.	Deutsch
IN2026	Scientific Visualization	3V	WS	3	4	mündlich/schriftlich	30-45/60-100 min.	Englisch
IN2111	3D User Interfaces	2V+2 Ü	SS	4	5	mündlich/schriftlich	20/90 min.	Englisch
IN2112	2D graphical User Interfaces for Desktop-based and Mobile Computer Applications	2V+2 Ü	WS	4	5	mündlich/schriftlich	20/90 min.	Englisch
IN2139	Information Visualization	2V+2 Ü	SS	4	5	mündlich/schriftlich	20/90 min.	Englisch

Additional Modules

You need at least **3 ECTS** from these courses:

ID.	Modulbezeichnung	Lehrform	Sem	SWS	ECTS	Prüfungsart	Prüfungsdauer	Sprache
IN2163	Information Systems in Health Care	2V	unregelm.	2	3	schriftlich	60 min.	Deutsch

IN9006	Entrepreneurship for small software-oriented enterprises	1S	SS	1	2	Prüfungsleitungen sind Ausarbeitungen bzw. Vorträge	Deutsch
IN9017	Entrepreneurship	2S	WS/SS	2	4	Prüfungsleitungen sind Ausarbeitungen bzw. Vorträge	Deutsch
IN9038	Medical Imaging Entrepreneurship	1V	WS/SS	1	2	Prüfungsleitungen sind Ausarbeitungen bzw. Vorträge	Englisch
220000 EN47 (TUM Online ID)	English - Writing Academic Research Papers C2	2S	WS	2	4	Prüfungsleitungen sind Ausarbeitungen bzw. Vorträge	Englisch
WI000 159	Business Idea and Market: Business Plan - Basic Course	2S	WS	2	4	Prüfungsleitungen sind Ausarbeitungen bzw. Vorträge	Deutsch
WI000 180	Business Model, Sales and Finance: Business Plan - Advanced Course	2S	SS	2	4	Prüfungsleitungen sind Ausarbeitungen bzw. Vorträge	Deutsch