Literature	[E] P.Etingof et al, Introduction to representation theory, AMS, available at the Polybuchhandlung http://www.polybuchhandlung.ch Much of the material (but not the historical interludes) can be found at http://math.mit.edu/~etingof/replect.pdf
	Additional literature that might be helpful: [F] W.Fulton, Representation theory, A first course. [L] S. Lang, Algebra. [S] J-P. Serre, Lie Algebras and Lie Groups [BGP] I N Bernstein, I M Gel'fand and V A Ponomarev "COXETER FUNCTORS AND GABRIEL'S THEOREM" Russ. Math. Surv. 28 [D] Igor Dolgachev McKay's correspondence for cocompact discrete subgroups of SU(1,1) available at http://arxiv.org/pdf/0710.2253
Prerequisites / notice	Prerequisites: linear algebra and basic notions of algebra. Please refresh (or learn) basic notions of multilinear algebra to be able to solve the first problems on tensor products of vector spaces in [E]. Website: www.math.ethz.ch/education/bachelor/seminars/hs2014/representation-theory-of-associative-algebras/

401-3200-64L	**Proofs from THE BOOK**	**W**	**4 credits**	**2S**	**M. Burger**

Objective	Ziel des Seminares ist zu lernen wie man Mathematik vortraegt. Als Vorlage fuer dieses Seminar dient das Buch von Aigner und Ziegler "Proofs from the BOOK" das aus allen Gebieten der Mathematik fundamentale Saetze und deren "schoensten" Beweise praesentiert. Die Auswahl der Themen ist also gross und es gibt etwas fuer jeden Geschmack. Vortraege koennen auf Deutsch, Franzoesisch oder Englisch gehalten werden.

401-3050-64L	**Student Seminar in Combinatorics: Mathematical Software**	**W**	**4 credits**	**2S**	**K. Fukuda**

Abstract	In this seminar we study how computer can be used to do rigorous mathematics. More explicitly we will have case studies on how computer programs and systems have been developed and used for mathematics. Since the computer runs on finite resources. writing rigorous mathematical programs is essentially combinatorial mathematics itself.
Objective	The main objective is to learn how rigorous mathematical tools can be made for the purpose of doing mathematics with help of computers.
Content	In this seminar we study how computer can be used to do rigorous mathematics. More explicitly we will have case studies on how computer programs and systems have been developed and used for mathematics. Since the computer runs on finite resources. writing rigorous mathematical programs is essentially combinatorial mathematics itself. There are two different types of mathematical software: (1) mathematical software systems, such as maple, mathematica and sage, which are general platforms to do mathematics with computers, (2) mathematical software tools (including callable libraries), targeted to deal with a special class of mathematical disciplines or problems, such as linear algebra, graphs, combinatorics, polynomial systems, optimization, polyhedra, geometry, number theory, etc. For our study, we mainly focus on open-source software tools because without source codes it is difficult to learn how to write rigorous mathematical tools. Each student is expected to select one mathematical software tool. The presentation is first to review the basic mathematical concepts and theory that are addressed by the solfware tool. Then he/she gives how the tool can be used to solve or deal with concrete examples with this tool. Most importantly, each presenter understands what it takes to write the software tool.
Lecture notes	We will have a list of recommended papers for presentation. Typically these papers are available from the website of International Congress of Mathematical Software: http://www.math.kobe-u.ac.jp/icms2010/ http://voronoi.hanyang.ac.kr/icms2014/ and proceedings: http://link.springer.com/book/10.1007%2F978-3-642-15582-6 .
Literature	Here is a document containing articles and scheduling for the seminar: http://www.inf.ethz.ch/personal/fukudak/lect/mssemi/msseminar2014_ref.pdf (last update on 2014-10-17). It will get updated as the seminar progresses. Please check the revised dates frequently. You can find students' presentation files in http://www.inf.ethz.ch/personal/fukudak/lect/mssemi/presentation . Final reports: http://www.inf.ethz.ch/personal/fukudak/lect/mssemi/reports .
Prerequisites / notice	Good knowledge of mathematics and basic programming languages

401-3640-64L	**Numerical Analysis Seminar: Applied Harmonic Analysis and Sparse Approximation**	**W**	**4 credits**	**2S**	**G. Kutyniok**

401-3650-64L	**Numerical Analysis Seminar** *Does not take place this semester.*	**W**	**4 credits**	**2S**	to be announced

263-4200-00L	**Seminar SAT**	**W**	**2 credits**	**2S**	**E. Welzl**
Abstract	Study and presentation of research papers from the literature on "Boolean Satisfiability-Combinatorics and Algorithms".
Objective	Goal of this seminar is to study and present, in continuation of the course "Boolean Satisfiability-Combinatorics and Algorithms", research papers from the literature.
Literature	A list of papers for presentations will be distributed at the beginning of the seminar.
Prerequisites / notice	The seminar builds heavily on the material covered in the course "Boolean Satisfiability-Combinatorics and Algorithms." Successful completion of that course is a prerequisite for participation in the seminar.

263-4203-00L	**Geometry: Combinatorics and Algorithms** *Does not take place this semester.*	**W**	**2 credits**	**2S**	**B. Gärtner**, **E. Welzl**
Abstract	This seminar is held once a year and complements the courses Computational Geometry and Geometric Graphs: Combinatorics & Algorithms. Students of the seminar will present original research papers, some classic and some of them very recent. The seminar is a good preparation for a master, diploma, or semester thesis in the area.