DigiPen
INSTITUTE OF TECHNOLOGY
SINGAPORE

COURSE CATALOG ADDENDUM

2014–2015

Updated: April 28, 2014

Rules and Policies for the Academic Year 2014–2015

General Information

PROJECTFUN WORKSHOPS
[Updated: April 2014]

Now entering their 20th year, the ProjectFUN workshops engage elementary, middle and high school students in the arts and sciences by immersing them in the tools and techniques of today's high-tech careers. The workshops in Animation, Game Design, Video Game Programming, Multimedia Production, and Robotics enhance students' critical thinking skills, improve their knowledge of core subjects like math and physics, and excite their interest in the academic concepts underlying modern technology.

These workshops are taught at DigiPen's Redmond, WA, campus, DigiPen's branch campuses in Singapore and Spain, and various locations across the US and Canada. These workshops are also offered in a synchronous online environment year-round.

Important Dates

INSTITUTIONAL CALENDAR
[Updated: April 2014]

FALL 2014

- **August 29, 2014**
  Orientation—First Year Students

- **September 1, 2014**
  Classes Begin—Fall Semester

- **September 8, 2014**
  Last day to add classes for Fall Semester

- **September 15, 2014**
  Final day to drop classes for Fall Semester without academic penalty

- **October 5, 2014**
  Hari Raya Haji Observed*
  No Classes

- **October 22, 2014**
  Deepavali Observed*
  No Classes

- **October 23, 2014**
  Final day to receive 'W' on transcript for Fall Semester withdrawals.

  Withdrawals from the Institute after this date will receive 'F' grades on transcript.

  Final day to drop a class for Fall Semester.

- **November 24, 2014**
  Last day to submit Change of Major Requests for Spring 2015

- **November 30, 2014**
  Last day to register for Spring 2015 classes

  Last day to submit Transfer/Waiver Credit Requests for Spring 2015

- **November 24, 2014**
  Last day to submit Change of Major Requests for Spring 2015

- **December 8–12, 2014**
  Fall Semester Final Exams

- **December 12, 2014**
  Fall Semester Ends

- **December 13, 2014–January 4, 2015**
  Winter Break
  No Classes

- **January 2–4, 2015**
  Intersession
  No Classes

SPRING 2015

- **January 5, 2015**
  Classes Begin—Spring Semester

- **January 12, 2015**
  Last day to add classes for Spring Semester

- **January 19, 2015**
  Final day to drop class for Spring Semester without academic penalty

- **February 3, 2015**
  Founder's Day
  No Classes

- **February 19–20, 2015**
  Chinese New Year Observed*
  No Classes

- **February 26, 2015**
  Final day to receive 'W' on transcript for Spring Semester withdrawals.

  Withdrawals from the Institute after this date will receive 'F' grades on transcript.

  Final day to drop a class for Spring Semester.

- **March 30, 2015**
  Last day to submit Change of Major Requests for Summer 2015

- **March 31, 2015**
  Last day to register for Summer 2015 classes.

  Last day to submit Transfer/Waiver Credit Requests for Summer 2015.

- **April 1, 2015**
  Last day to submit Intercampus Transfer Requests for Fall 2015

- **April 3, 2015**
  Good Friday Observed*
  No Classes

- **April 13–17, 2015**
  Spring Semester Final Exams

- **April 17, 2015**
  Spring Semester Ends

- **April 18–May 3, 2015**
  Intersession
  No Classes

SUMMER 2015

- **May 4, 2015**
  Classes Begin—Summer Session

- **May 11, 2015**
  Last day to add classes for Summer Semester

- **May 18, 2015**
  Final day to drop class for Summer Semester without academic penalty

- **June 1, 2015**
  Vesak Day Observed*
  No Classes

- **June 25, 2015**
  Final day to receive 'W' on transcript for Summer Semester withdrawals.

  Withdrawals from the Institute after this date will receive 'F' grades on transcript.

  Final day to drop a class for Summer Semester.

- **July 1, 2015**
  Last day to submit Transfer/Waiver Credit Requests for Fall 2015.

  Last day to sumit Intercampus Transfer Requests for Spring 2016.

- **July 17, 2015**
  Hari Raya Puasa Observed*
  No Classes

- **July 27, 2015**
  Last day to submit Change of Major Requests for Fall 2015

- **August 1, 2015**
  Last day to register for Fall 2015 classes

- **August 9, 2015**
  National Day Observed*
  No Classes

- **August 10–14, 2015**
  Summer Semester Final Exams
  No Classes

- **August 14, 2014**
  Summer Semester Ends

*Singapore Public Holiday

The Institute is closed on all public holidays. If a public holiday falls on a Sunday, the following Monday will be a public holiday. Singapore public holidays that fall during normal intersessions (i.e. Christmas Day) have not been listed. Exam periods and breaks may be subject to change. The laboratory facilities may be closed for a period of two consecutive days per month for maintenance, usually at the last two working days of the month unless otherwise posted.

Admission/Denial to DigiPen Institute of Technology Singapore's Programs

SUBMISSION OF OFFICIAL TRANSCRIPTS OF NON-DIGIPEN INSTITUTE OF TECHNOLOGY SINGAPORE COURSEWORK
[Updated: April 2014]

All readmission applicants to DigiPen Institute of Technology Singapore must request an official transcript from the Institute's Registrar's Office to be sent to the SIT Admissions Office as part of their application. Additionally, if the applicant has taken courses from another college since leaving the Institute, he/she must also have any and ALL official transcripts forwarded to the SIT Admissions Office from the Registrar of each institution attended. The transcripts should show all academic work until the last semester or quarter completed. If the applicant is approved for readmission with coursework in progress, his/her admission status will be provisional, pending receipt of the final transcript(s). Finally, readmission applicants who are applying for readmission more than one year after withdrawing and who are not native English speakers may have to submit additional Proof of English language proficiency. Please see the Proof of English Language Proficiency section.

Requesting a Change of Major

IMPORTANT INFORMATION REGARDING CHANGE OF MAJOR REQUESTS
[Updated: April 2014]

- Change of majors will only take effect on the first day of a new semester. To be considered, requests must be submitted at least fifteen working days prior to the end of the current semester; otherwise, the request will be considered for the next available semester.

- Students requesting a change of major should remember to consider add/drop deadlines. Requests for change of majors do not exempt students from the add/drop policies at the Institute.

- Students may register for classes in any major prior to the deadline for adding a class, but it is recommended that they speak to their academic advisors if they have not yet had their requests for a change of major approved.

- Students should speak to the degree program faculty if they have specific questions about transferring from one degree program to another.

Any questions about the status of a change of major request or about this process should be directed to the Admissions Office.

Student Affairs

PLACEMENT ASSISTANCE
[Updated: April 2014]

Advice on career options is available to enrolled students. With the assistance of Student Affairs and faculty members, the Student Affairs office works to establish relationships with prospective employers on an on-going basis. It offers resume and job-hunting workshops to supplement career education found in the curriculum.

The Institute provides placement services in the form of internships that may be available during the summer; the placement program bases its recommendations of students on their academic performance. Additionally, the Institute hosts an annual career fair that attracts employers from around the country to the campus to review student portfolios and conduct interviews. The Institute also attends industry events, such as the Game Developer's Conference, to promote the Institute's programs and its students. Placement assistance continues beyond graduation as these services are extended to alumni. For further information, please contact the Student Affairs office. Please note that employment upon graduation is not guaranteed.

Degree Programs for the Academic Year 2014–2015

Bachelor of Science in Computer Science in Real-Time Interactive Simulation

PROGRAM OVERVIEW
[Updated: April 2014]

The electronic and digital entertainment industry is one of the fastest growing and most exciting career choices of the future. The video game, movie, and military industries are only a few of those that demand well-trained, enthusiastic programmers, designers, artists, and managers. DigiPen Institute of Technology is a key provider of these individuals, and the Bachelor of Science in Computer Science in Real-Time Interactive Simulation prepares programmers for these industries. Designed and developed by industry experts and DigiPen faculty, the Institute's four-year BS in Computer Science in Real-Time Interactive Simulation program is a computer science degree that is highly focused on the technical area of graphics and simulations. Participants in the BS in Computer Science in Real-Time Interactive Simulation program specialize in the skills and tools necessary to create real-time simulations of real-life events and imaginary situations.

The BS in Computer Science in Real-Time Interactive Simulation program offers extensive training in mathematics and physics as a foundation for the various topics presented in general computer science and computer graphics. Throughout the degree program, BS in Computer Science in Real-Time Interactive Simulation students participate in several team-based projects. These substantial projects are designed to give students concrete experiences in which they apply the theoretical knowledge gained from their courses. Forming the cornerstone of the program, these projects exemplify many of the skills necessary in the video game industry today: teamwork, design, implementation, follow through, and business knowledge, among others. BS in Computer Science in Real-Time Interactive Simulation students gain the experience of designing, programming, and testing a variety of simulations and games, including text-based, scrolling, simulation, and 2D and 3D games.

Students in this degree program work both individually and collaboratively to learn the fundamentals of game design, production, and programming. Additionally, they write game design documents and technical design documents, learn how to schedule tools and techniques, and participate in the full production of several games. These game-oriented productions are a perfect media to present complicated subjects in a format agreeable to students. These productions:

- are graphics-oriented simulations, including 2D and 3D simulations.

- can realistically reproduce or simulate natural phenomena and real-life events. Flight simulators are excellent examples of such simulations.

- are highly interactive, requiring an elaborate and efficient graphical user interface (GUI). The development of a GUI requires the management of windows, menus, dialog boxes, and hardware resources including keyboards, mice, and display monitors.

- react in real time. The implementation of such simulations requires a thorough knowledge of computer hardware and computer languages.

- are story-based simulations requiring a plot in which game objects must interact intelligently with each other. Therefore, in order to make games challenging and interesting, students must design and implement good artificial intelligence algorithms, which serve as the cognitive processes for the computer-controlled game objects.

- could be designed for either a single-player or multi-player environment. The development of the latter requires the understanding of subjects such as computer networks, TCP/IP, and Internet programming.

- are excellent examples of large and complex productions. Teamwork is essential to the successful completion of such productions. Therefore, students are divided into teams and are rigorously trained in object-oriented programming languages, paradigms, and software engineering techniques and practices.

Graduates of this degree program will be prepared to enter the video game industry as entry-level computer scientists and software engineers. Possible entry-level position titles include computer scientist, software engineer, software developer, software development engineer, software development engineer in test, software analyst, computer programmer, gameplay programmer, engine programmer, physics programmer, graphics programmer, networking programmer, artificial intelligence programmer, user interface programmer, tools programmer, web programmer, or game scripter. After many years in the industry, graduates may attain titles such as lead engineer, lead developer, development manager, principal engineer, technical director, and chief technology officer. This degree program also includes secondary training that can contribute directly to a graduate obtaining positions with titles such as producer, program manager, technical program manager, technical designer, and technical writer.

Rather than attempt to provide a broad, general education, this degree program is an intensive educational experience in a specialized and highly technical area, and it prepares students for a career in several rapidly expanding industries. Staff and faculty are prepared to guide students desiring more general education course work about supplementary opportunities available through other institutions.

Bachelor of Science in Computer Science and Game Design

PROGRAM OVERVIEW

[Updated: February 2013]

The field of digital entertainment has grown from using small teams of just a handful of developers for an entire game to using large teams of one hundred or more on a single title. This large increase in the size of teams, scope, and investment in digital entertainment titles has naturally resulted in more and more specialization into the roles of engineer, artist, and designer. Despite this increased specialization overall, the digital entertainment industry has also seen a growing demand for a hybrid engineer/designer: someone who has strong programming and mathematics skills, combined with formal training in game design. This type of developer is the bridge between the scientific and creative sides of game development, able to work as an engineer or designer as needed.

Graduates of this program will be trained to write computer programs in core languages such as C and C++, as well as the scripting languages commonly used by all designers. Graduates of this program will be well versed in programming game logic, user interfaces, artificial intelligence, databases, and design tools. Graduates will also be well versed in game design theory for digital and non-digital games, level design, system design, and behavior design, with their strong foundation in programming and mathematics generally making them strong system and behavior designers. Graduates will have extensive experience testing, iterating, and polishing both digital and non-digital designs, through the completion of many individual projects and multiple team game projects.

Graduates of this degree program will be prepared to enter the video game industry as entry-level software engineers and game designers. Possible entry-level position titles include software engineer, software developer, software development engineer, software development engineer in test, software analyst, computer programmer, gameplay programmer, artificial intelligence programmer, user interface programmer, tools programmer, game scripter, technical designer, system designer, level designer, content designer, encounter designer, and game designer. This degree program also includes secondary training that can contribute directly to a graduate obtaining positions with titles such as producer, program manager, technical writer, and technical program manager. After many years in the industry, graduates may obtain titles such as lead engineer, lead designer, technical director, creative director, and director.

DEGREE REQUIREMENTS

Number of Credits and GPA

The BS in Computer Science and Game Design requires completion of at least 154 semester credits with a cumulative GPA of 2.0 or better. The program usually spans eight semesters of 15 weeks each, or four academic years.

Grade Requirements and Core Courses

Students must receive a grade of "C-" or higher in all core courses for the BS in Computer Science and Game Design. (In a non-core course, a grade of "D" is considered passing.) The core courses include all courses except open electives.

Art Requirements

The following courses are required: ART 105, ART 260, ART 310, CG 102 or CG 201, and CG 125 or CG 225. (Total: 15 credits)

Computer Science Requirements

The following courses are required: CS 100, CS 120, CS 120L, CS 170, CS 170L, CS 180, CS 225, CS230, CS 251, CS 280, CS 311, CS 330, and CS 380. (Total: 36 credits)

Design Requirements

The following courses are required: GAT 110, GAT 120, GAT 210, GAT 211, GAT 240, GAT 250, GAT 251, GAT 315, and GAT 316. Three additional credits must be selected from other courses with the designation GAT. (Total: 29 credits)

Humanities and Social Science Requirements

The following courses are required: COL 499, COM 150, ENG 110, and PSY 101. Three additional credits must be selected from other courses with the designation COM, ENG, ECN, HIS, LAW, PHL, PSY, or SOS. (Total: 13 credits)

Mathematics Requirements

The following courses are required: MAT 140, MAT 150 or MAT 180, MAT 200 or MAT 230, MAT 258, and either MAT 340 or MAT 364. (Total: 18 credits)

Open Electives Requirements

At least six credits from any courses in any departments at DigiPen Institute of Technology Singapore. (Total: 6 credits)

Physics Requirements

One course is required: PHY 200. (Total: 3 credits)

Projects Requirements

The following courses are required: GAM 100, GAM 150, GAM 200, GAM 250, GAM 302, GAM 352. Two courses from the following list are also required: GAM 375, GAM 390, GAM 400, GAM 450, and GAM 490. (Total: 34 credits)

Note on General Education Courses

The following courses satisfy the general education requirement for the BS in Computer Science and Game Design: COM 150 (3), ENG 110 (3), ENG 120 (3), MAT 140 (4), MAT 150 or MAT 180 (4), MAT 200 or MAT 230 (4), MAT 258 (3), PHY 200 (3), PSY 101 (3), and one Humanities and Social Sciences elective (3), for a total of 33 credits.

RECOMMENDED COURSE SEQUENCE CHART
Bachelor of Science in Computer Science and Game Design
[Updated: April 2014]

SEMESTER	COURSE	COURSE TITLE	CORE	CREDITS
Semester 1	CS 100	Computer Environment	X	4
	CS 120	High-Level Programming I—The C Programming Language	X	3
	CS 120L	High-Level Programming I Lab	X	1
	GAM 100	Project Introduction	X	3
	GAT 110	Game History	X	3
	GAT 120	Game Analysis	X	2
	MAT 140	Linear Algebra and Geometry	X	4
	Semester Total			20
Semester 2	CS 170	High-Level Programming II—The C++ Programming Language	X	3
	CS 170L	High-Level Programming II Lab	X	1
	CS 230	Game Implementation Techniques	X	3
	ENG 110	Composition	X	3
	GAM 150	Project I	X	3
	GAT 210	Game Mechanics I	X	3
	MAT 150 or MAT 180	Calculus and Analytic Geometry I or Vector Calculus I	X	4
	Semester Total			20
Semester 3	CS 225	Advanced C/C++	X	3
	GAM 200	Project II	X	4
	GAT 211	Game Mechanics II	X	3
	GAT 240	Technology for Designers	X	3
	MAT 200 or MAT 230	Calculus and Analytic Geometry II or Vector Calculus II	X	4
	PHY 200	Motion Dynamics	X	3
	Semester Total			20
Semester 4	ART 105	Art Processes	X	3
	COM 150	Interpersonal and Work Communication	X	3
	CS 180	Operating System I, Man-Machine Interface	X	3
	CS 280	Data Structures	X	3
	GAM 250	Project II	X	4
	GAT 250	2D Game Design I	X	3
	Semester Total			19

SEMESTER	COURSE	COURSE TITLE	CORE	CREDITS
Semester 5	ART 260	Graphic Design, User Experience, and Input	X	3
	CS 251	Introduction to Computer Graphics	X	3
	CS 380	Artificial Intelligence for Games	X	3
	GAM 302	Project III for Designers	X	5
	GAT 251	2D Game Design II	X	3
	PSY 101	Introduction to Psychology	X	3
	Semester Total			20
Semester 6	ART 310	Architectural Spaces, Design, and Lighting I	X	3
	CG 102	2D Raster and Vector Graphics for Designers	X	3
	CG 125	Introduction to 3D Production for Designers	X	3
	GAM 352	Project III for Designers	X	5
	GAT 315	3D Game Design I	X	3
	MAT 258	Discrete Mathematics	X	3
	Semester Total			20
Semester 7	CS 311	Introduction to Databases	X	3
	CS 330	Algorithm Analysis	X	3
	GAM 400	Project IV	X	5
	GAT 316	3D Game Design II	X	3
	MAT 340 or MAT 364	Probability and Statistics or Combinatorial Game Theory	X	3
	Design Elective	Any three-credit course with the GAT designation	X	3
	Semester Total			20
Semester 8	COL 499	Career Search Preparation: Materials, Logistics and Communication	X	1
	GAM 450	Project IV	X	5
	Open Elective	An elective of the student's choice from any department at DigiPen Institute of Technology Singapore		3
	Open Elective	An elective of the student's choice from any department at DigiPen Institute of Technology Singapore		3
	HSS Elective	Any three-credit COM, ENG, ECN, HIS, LAW, PHL, PSY, or SOS course	X	3
	Semester Total			15
Degree Total				154 minimum

Course Descriptions for the Academic Year 2014–2015

Department of Animation and Production

FILM COURSES

FLM 399 Special Topics in Film (3 Cr.)
[Updated: April 2014]
Prerequisite(s): Permission of Instructor

The content of this course may change each time it is offered. It is for the purpose of offering a new or specialized course of interest to the faculty and students that is not covered by the courses in the current catalog.

PROJECT COURSES

PRJ 402 Senior Game Art Project I (5 Cr.)
[New: April 2014]
Prerequisite(s): ART 350, ENG 116, PRJ 350 & CG 310 or CG 350

This course is the first half of a two semester sequence on the production of an innovative interactive experience. It focuses on concept, pre-production and asset creation in a team environment. Students may use current software and hardware technologies such as web technologies, consoles, mobile devices.

Teams include other BFA students registered in PRJ 402 and will collaborate with students registered for GAM classes. Projects can be produced in 2D or 3D. Additional topics may include effective presentations, managing scope and team dynamics.

PRJ 452 Senior Game Art Project II (5 Cr.)
[New: April 2014]
Prerequisite(s): PRJ 402

Having completed the pre-production work for a team-based interactive experience production in PRJ 402, students are guided through final implementation, debugging and polish of their projects. Students face the challenges of commercial art direction, quality control, production deadlines, and team dynamics, as well as the many technical challenges.

Teams include other BFA students registered in PRJ 452 and will collaborate with students registered for GAM classes.

Department of Computer Science

COMPUTER SCIENCE COURSES

CS 100 Computer Environment (4 Cr.)
[Updated: April 2014 – CS 100L is no longer needed as a concurrent course.]
Prerequisite(s): None

This course provides students with a detailed examination of the fundamental elements on which computers are based.

Topics covered include number systems, representation of numbers in computation, basic electricity, electric circuits, digital systems, logic circuits, data representations, digital memory, computer architecture, and operating systems. Operational code and assembly languages are discussed, examined, and used in either a microprocessor or micro-controller environment, such as a personal computer or an autonomous car.

CS 180 Operating System I, Man-Machine Interface (3 Cr.)
[Updated: April 2014]
Prerequisite(s): CS 100 & CS 170

This course presents an overview of modern operating systems, in particular Windows and Linux/Unix as implemented on modern PCs. After an overview of what an operating system is and does, the following is also covered: organization and design (the kernel and various subsystems), process management (creation and management of processes and threads, including an introduction to multi-threaded programming), networks (the TCP/IP stack and the organization of the Internet), interprocess communication, process synchronization (locks, semaphores, and methods to avoid deadlocks), memory management (hardware and process views of memory layout and demand-paged virtual memory), file systems, and security and protection (viruses, worms, and Trojan horses).

CS 312 Advanced Databases (3 Cr.)
[New: April 2014]
Prerequisite(s): CS 311

This course covers advanced database topics with particular emphasis on the large scale database systems used by modern applications. Data mining and data warehousing will also be explored with emphasis on search and analysis. Non-relational databases will also be covered in detail. Students will examine case studies of real-world companies and the techniques they use to manage vast quantities of ever-growing data.

CS 315 Low-level Programming (3 Cr.)
[Updated: April 2014]
Prerequisite(s): CS 100, CS 120 & CS120L, & CS 180

This course introduces students to modern microprocessor architectures using x86 series for case studies. In this course, students are expected to write both assembly language programs and to use assembly language to optimize various C/C++ programs. Topics may include pipelining, superscalar/VLIW machines, register-renaming, out-of-order execution, multi-core architecture, caches, multicore-cache coherency, x86 instruction set architecture, application binary interfaces, Flynn's taxonomy, and Streaming SIMD extensions.

CS 355 Parallel Programming (3 Cr.)
[New: April 2014]
Prerequisite(s): CS 330

This course presents an introduction to multi-threaded and distributed programming. The course covers some classical problems and synchronization mechanisms, as well as modern libraries that support parallel programming. The course also covers distributed programming models and applications to video-game programming.

CS 375 Compilers and Interpreters (3 Cr.)
[New: April 2014]
Prerequisite(s): CS 330 & MAT 280

This course presents fundamental topics in the field of compiler construction. Topics covered in the course will help students understand and implement a compiler for a high-level programming language. The course will guide the students towards an in-depth understanding of compilation techniques and runtime implementation for a modern programming language.

CS 385 Machine Learning (3 Cr.)
[New: April 2014]
Prerequisite(s): CS 381

This course introduces a wide range of machine learning techniques. The topics include early machine learning algorithms like genetic algorithms, classifier systems, neural network, and various clustering algorithms. Then the course explores probabilistic algorithms like Bayesian networks, hidden Markov models, and Monte Carlo methods.

Department of Digital Arts

COMPUTER GRAPHICS COURSES

CG 102 2D Raster Graphics and Animation for Designers (3 Cr.)
[Updated: April 2014]
Prerequisite(s): ART 126
Concurrent Course(s): CG 125

This course introduces students to industry-standard software and practices of raster graphics and animation. The course begins with basic information, such as interface organization strategies, system components, bit depth, resolution, memory management, and output strategies. Then it explores techniques and critical thinking skills for digital painting, scanning, character development and animation for 2D games. Additionally, it looks at basic interface customization options and strategies in 2D raster graphics.

CG 330 Hair and Cloth Simulation (3 Cr.)
[New: April 2014]
Prerequisite(s): CG 275

This course focuses on concepts and tools for the construction and simulation of hair and clothing models in 3D animation. Students explore techniques for generating models suitable for simulation, and the complexities inherent in simulating their behavior in the context of animation. Topics may include: evaluating and interpreting reference material, using a simulator, using parameters to control behavior, UV parameter assignment and texturing, detailing a model, fixing simulation problems, and shading and lighting as it pertains to their models.

CG 360 Lighting and Rendering (3 Cr.)
[Updated: April 2014—FLM 350 is no longer needed as a prerequisite course]
Prerequisite(s): FLM 201 or FLM 210 & CG 275

CG artists must develop strong lighting skills. This course looks at the subject through the world of film cinematography and covers the process of lighting both interior and exterior virtual environments. At the technical and artistic levels, students explore rendering techniques and strategies that efficiently produce a more convincing result.

Department of Mathematics

MATHEMATICS COURSES

MAT 140 Linear Algebra and Geometry (4 Cr.)
[Updated: April 2014—MAT 103 is no longer needed as a prerequisite course]
Prerequisite(s): None
Credit may be received for either MAT 100 or MAT 140, but not for both.

The two main themes throughout the course are vector geometry and linear transformations. Topics from vector geometry include vector arithmetic, dot product, cross product, and representations of lines and planes in three-space. Linear transformations covered include rotations, reflections, shears and projections. Students study the matrix representations of linear transformations along with their derivations. The curriculum also presents affine geometry and affine transformations along with connections to computer graphics. This course also includes a review of relevant algebra and trigonometry concepts.

MAT 352 Wavelets (3 Cr.)
[Updated: April 2014 —MAT 552 was removed, as it is not offered at the Singapore Campus]
Prerequisite(s): MAT 250 & MAT 258

This course presents the foundations of wavelets as a method of representing and approximating functions. It discusses background material in complex linear algebra and Fourier analysis. Basic material on the discrete and continuous wavelet transforms forms the core subject matter. This includes the Haar transform, and multi-resolution analysis. Other topics may include subdivision curves and surfaces, and B-spline wavelets. Applications to computer graphics may include image editing, compression, surface reconstruction from contours, and fast methods of solving 3D simulation problems.

MAT 400 Introduction Analysis I (3 Cr.)
[Updated: April 2014]
Prerequisite(s): MAT 250

This course introduces the foundations of real analysis by means of a rigorous reexamination of the topics covered in elementary calculus. The course starts with the topology of the real line and proceeds to a formal examination of limits, continuity, and differentiability. The course also covers the convergence of sequences and series of real numbers and the uniform convergence of sequences of real valued functions.

MAT 410 Introduction Analysis II (3 Cr.)
[Updated: April 2014]
Prerequisite(s): MAT 400

A continuation of MAT 400, this course emphasizes the formal treatment of the theory of integration of functions of a real variable. It reexamines the Riemann integral and the Fundamental theorem of calculus as well as the theory of the Stieltjes and Lebesgue integral and their applications in probability and Fourier analysis. The course concludes with a discussion of the topology of R^n, and the differentiability and integrability of functions of several variables, including the theorems of Green and Stokes and the divergence theorem.