

Game Application & Technology

Introduction

Computer, mobile, and console games represent a multi-billion dollars global industry. Game Application and Technology (GAT) Program offers dedicated degrees in game development, providing students with the technical expertise they need to enter the industry confidently.

GAT Program is designed specifically by Computer Science of BINUS UNIVERSITY to provide students with knowledge and skills to develop and create a variety of applied technology in the field of game technology. BINUS UNIVERSITY found this Program in September 2012, and it became one of the best programs under the coordination of the School of Computer Science. In collaboration with several renowned game industries, GAT Program always makes continuous improvement in our curriculum, human resources, and facilities. The GAT Laboratory, equipped with high specification computers, cutting edge technologies (e.g. Virtual Reality, Augmented Reality, and Mixed Reality) and a dedicated audio editing studio, will facilitate the students and lecturers to collaborate and deliver high-quality games.

GAT Program is designed to adapt to the dynamically changing creative industries landscape while ensuring a solid academic foundation and aligned to industry expectations. GAT focuses on game art, game design, and game programming. Derived from Computer Science Study Program, GAT Program offers game programming and development blended with creativity and innovation in Game Technology. The program will not only focus on the game development for entertainment tools but also for other purposes (e.g. serious games for learning and training, and gamification tool to a non-game application to enhance its user's motivations and engagements). The structure of the course allows students to gain valuable practical experience in building software systems and also apply knowledge in creative game design. GAT Program has a strong base in computer science foundation subjects as well as offering the theoretical and critical thinking behind current digital technologies. Students will learn in a project-orientated environment that encourages collaboration with industries. This collaboration helps them discover creative solutions to contemporary design challenges. Students are encouraged to collaborate, work according to deadlines, maintain attendance levels and develop strong communication skills. As a result, graduates are internationally renowned for their expertise and confidence to enter the workplace as newly skilled professionals rather than technicians.

Vision

A world class study program by providing excellent educational experiences in Computer Science, which focuses on developing creative technology solutions, fostering and empowering the society in building and serving the nation.

Mission

The mission of Game Application and Technology is to contribute to the global community through the provision of world-class education by:

1. Educating students to effectively apply their educational experiences in developing creative solutions in computer science, to solve real-world problems.
2. Preparing graduates to develop exemplary soft skills & technical skills required as computer science professionals, leaders, and entrepreneurs in global market.
3. Promoting high impact computer science research that contributes to the nation.
4. Fostering BINUSIAN as computer science lifelong learners through self-enrichment.

5. Empowering BINUSIAN to continuously improve society's quality of life through knowledge in computer science.

Program Objective

The objectives of the program are:

1. Graduates will become successful professionals in ICT fields;
2. Graduates will obtain employment in global companies or become entrepreneurs;
3. Graduates will obtain professional certification or continue their study to the postgraduate.

Student Outcomes

After completing the study, graduates are:

1. Able to analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions;
2. Able to design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of computer science;
3. Able to communicate effectively in a variety of professional contexts;
4. Able to recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles;
5. Able to function effectively as a member or leader of a team engaged in activities appropriate to computer science;
6. Able to apply computer science theory and software development fundamentals to produce computing-based solutions;
7. Able to create game software with the implementation of multimedia, computer network, and applicative database with use of artificial intelligence algorithm to solve real industry problems.

Prospective Career of the Graduates

After finishing the Program, the graduate of Game Application and Technology Program is able to follow a career in:

- | | |
|---|--|
| 1. Game Engineer / Developer | 6. Game Content Provider |
| 2. Game Designer | 7. Gamification & Serious Games Designer |
| 3. Game Artist / Technical Artist | 8. Game Consultant |
| 4. Game Audio Engineer | 9. Game Publisher |
| 5. Game Director / Chief Technology Officer | 10. Entrepreneur |

Curriculum

With an international certification from The ASEAN University Network-Quality Assurance (AUN-QA) in 2018, the program ensures that the stakeholders will have an international quality in learning experiences. The current curriculum used in the GAT Program has been developed in line with the National Curriculum. Also, the local content has been developed in line with the Computer Science Curriculum standard of ACM (Association for Computing Machinery), several local and foreign universities, national and international game industry and community (developer, publisher), up-to-date game technologies, and market trends. In addition, the students will have the opportunity to forge their Employability & Entrepreneurial Skills in the university's enrichment program to ensure the students are well prepared for their future career. In the program, the students will have the opportunity to work in the internship program offered by various global industries; experience study abroad; start their own business; involved in world-class research project; implement their skills in the community development program.

With these, our graduates are expected to be able to compete at both national and international level. Generally, the subjects of the curriculum are divided into the following groups of subjects:

Core Computer Science Group

This group's objective is to provide a grounding in GAT Program through practice as well as the applied theory, which is required by business both now and in the future. The subjects included are Programming, Algorithm Design and Analysis, Software Engineering, Database, Computer Graphs, Artificial Intelligence, Interactive Multimedia, Human and Computer Interaction, Operation System, Game Art, Game Programming & Development, and Game Design.

Science

This group's objective is to provide an understanding of natural sciences, statistics, and mathematics as one of the principal foundations of computer science. Another objective is to understand scientific methodology (data collection, hypothesis, market research, analysis) in problem-solving.

Professional Practices

The objective of this group is to develop the personal strengths of the students and to provide them with a professional character, professionalism in their field, management skills, oral and written communication skills, understanding of business ethic, ability to work as a team and to develop a "Binusian" Character.

The Field of GAT Subject

The objective is to give the students a solid foundation of software development skills and introduce the specific skills needed to develop game applications. The students are expected to develop their skills and master the techniques which will allow them to research their thesis and to continue their studies.

The field of GAT subjects are as follows:

1. Game Programming and Development: to explore the various programming techniques and algorithm in-game using industry-standard software and game engine.
2. Game Art: to explore various methodologies and techniques of game art and learn how to transform arts into assets for computer games and related industries using the latest technology and industry-standard software (2D and 3D, animation, modeling, character design).
3. Game Design: to explore the various methodologies and techniques of game story design, level design, gameplay design, human and computer interaction design.

Students of the GAT Program are required to follow these three fields to become our eligible graduates. These fields' objective is to provide the students with the knowledge and skills required by business & industry and those who want to develop their own game company.

Course Structure

Sem	Code	Course Name	SCU	Total
1	CHAR6013001	Character Building: Pancasila	2	20
	MATH6025001	Discrete Mathematics	4	
	MATH6030001	Linear Algebra	2	
	COMP6047001	Algorithm and Programming**	4/2	
	GAME6002001	Game Design*&***	2	
	LANG6027001	Indonesian	2	

Sem	Code	Course Name	SCU	Total	
	GAME6081001	2D Game Art	2		
2	CHAR6014001	Character Building: Kewarganegaraan	2	20	
	MATH6031001	Calculus	4		
	COMP6048001	Data Structures*&***	4/2		
	ENTR6509001	Entrepreneurship: Ideation	2		
	COMP6232001	Human and Computer Interaction**	2/1		
	MATH6183001	Scientific Computing	2/1		
3	CHAR6015001	Character Building: Agama	2	21	
	COMP6049001	Algorithm Design and Analysis*	4		
	COMP6065001	Artificial Intelligence**	4		
	STAT6171001	Basic Statistics	2		
	SCIE6063001	Computational Physics	2/1		
	GAME6085001	Object Oriented Game Programming*&***	2		
	COMP6798001	Program Design Methods*	2		
	English University Courses				
	ENGL6129001	English Savvy	2		
	ENGL6131001	English for Written Business Communication	2		
4	CPEN6247001	Computer Networks	2/1	21	
	SCIE6062001	Computational Biology	2/1		
	GAME6069001	Game Programming*&***	4		
	COMP6100001	Software Engineering**	4		
	GAME6082001	Game Animation*&***	2		
	COMP6799001	Database Technology**	2/1		
	COMP6697001	Operating System	2		
5	COMP6696001	Research Methodology in Computer Science*	2	18	
	COMP6062001	Compilation Techniques	4		
	ENTR6511001	Entrepreneurship: Market Validation	2		
	GAME6091001	Advanced Game Development	2		
	GAME6084001	Game Development Capstone Project*&***	4		
	GAME6071001	3D Modeling for Games*&***	2		
	GAME6092001	Fundamental in Game Balancing	2		
6	Enrichment Program I		20	20	
7	Enrichment Program II		20	20	
8	GAME6087001	Pre-Thesis	2	6	
	GAME6088001	Thesis	4		
	GAME6026001	Thesis	6		
			Total Credits 146 SCU		

*) This course is delivered in English

***) Global Learning System Course

English University Courses:

-) For English University Courses, students with Binus University English Proficiency Test scores less than 500 will take English Savvy, and students with test scores greater than or equal to 500 will take English for Written Business Communication.

Pre-thesis (2 SCU) & Thesis (4 SCU) can be taken in the 6th and/or 7th semester by the students who meet the requirements from the Study Program/Program

Enrichment Program I (6th Semester) & Enrichment Program II (7th Semester):

-) Student will take one of enrichment program tracks (off campus). See enrichment appendix for the tracks detail.

Enrichment Track Scheme

Track	Semester 6							Semester 7							
	IN	RS	EN	CD	SA	IS	etc	IN	RS	EN	CD	SA	IS	FS	etc
1	v							v							
2		v							v						
3			v							v					
4				v				v							
5				v							v				
6				v								v			
7					v			v							
8					v						v				
9					v							v			
10						v		v							
11						v			v						
12	v													v	
13		v												v	

Note:

IN	: Internship	SA	: Study Abroad
RS	: Research	FS	: Further Study
EN	: Entrepreneurship	IS	: Certified Specific Independent Study
CD	: Community Development	etc	: Study Program Special Purposes

Description:

Student will take one of enrichment program tracks

Students who failed in Enrichment Program I can retake with the same track or change into another track. As for Enrichment Program II, students who failed with Certified Internship, Certified Research, Certified Community Development, and Certified Study Abroad track on Enrichment Program II, can retake with the same track or change into another track. However, students who take Certified Entrepreneurship track on Enrichment Program II, should retake with another track.

Certified Internship Track

Code	Course Name	SCU	Total
Enrichment Program I			
GAME6061001	Game Industry Experience	8	20
GAME6089001	Game Production in Industry	8	
GAME6052001	EES in Game Industry	4	
Enrichment Program II			
GAME6062001	Game Development Practice in Industry	8	20
GAME6090001	Game Research in Industry	8	
GAME6063001	EES in Game Development Experience	4	

Certified Entrepreneurship Track

Code	Course Name	SCU	Total
Enrichment Program I			20
ENTR6653001	New Venture Initiation in Game Technology & Industry	8	
ENTR6655001	Product Development Process in Game Technology & Industry	8	
ENTR6657001	EES in Game Technology & Industry I	4	
Enrichment Program II			20
ENTR6654001	Product Launching in Game Technology & Industry	8	
ENTR6656001	Business Development in Game Technology & Industry	8	
ENTR6658001	EES in Game Technology & Industry II	4	

Certified Research Track

Code	Course Name	SCU	Total
Enrichment Program I			20
RSCH6244001	Research Experience I	8	
RSCH6532001	Scientific Writing I in Game Technology	8	
RSCH6033001	Global EES I (Team Work, Communication, Problem Solving & Decision Making)	4	
Enrichment Program II			20
RSCH6259001	Research Experience II	8	
RSCH6533001	Scientific Writing II in Game Technology	8	
RSCH6267001	Global EES II (Self-Management, Planning & Organizing, Initiative & Enterprise)	4	

Certified Community Development Track

Code	Course Name	SCU	Total
Enrichment Program I			20
CMDV6160001	Community Outreach Project Implementation	8	
CMDV6314001	Community Outreach Project Design in Game Technology	8	
CMDV6265001	Employability and Entrepreneurial Skills in Game Application and Technology Community	4	
Enrichment Program II			20
CMDV6185001	Community Development Project Implementation	8	
CMDV6315001	Community Development Project Design in Game Technology	8	
CMDV6194001	Employability and Entrepreneurial Skills in Game Application and Technology Community Development	4	

Certified Study Abroad Track

Code	Course Name	SCU	Total
Elective courses list for study abroad*			20
Enrichment Program I			
GLOB6005001	Elective Course for Study Abroad 1	4	
GLOB6006001	Elective Course for Study Abroad 2	4	
GLOB6007001	Elective Course for Study Abroad 3	4	
GLOB6008001	Elective Course for Study Abroad 4	4	

Code	Course Name	SCU	Total	
GLOB6009001	Elective Course for Study Abroad 5	2		
GLOB6010001	Elective Course for Study Abroad 6	2		
GLOB6011001	Elective Course for Study Abroad 7	2		
GLOB6012001	Elective Course for Study Abroad 8	2		
GLOB6013001	Elective Course for Study Abroad 9	2		
GLOB6014001	Elective Course for Study Abroad 10	2		
GLOB6015001	Elective Course for Study Abroad 11	2		
GLOB6016001	Elective Course for Study Abroad 12	2		
GLOB6251001	Elective Course for Study Abroad 29	4		
Enrichment Program II				20
GLOB6017001	Elective Course for Study Abroad 13	4		
GLOB6018001	Elective Course for Study Abroad 14	4		
GLOB6019001	Elective Course for Study Abroad 15	4		
GLOB6020001	Elective Course for Study Abroad 16	4		
GLOB6021001	Elective Course for Study Abroad 17	2		
GLOB6022001	Elective Course for Study Abroad 18	2		
GLOB6023001	Elective Course for Study Abroad 19	2		
GLOB6024001	Elective Course for Study Abroad 20	2		
GLOB6025001	Elective Course for Study Abroad 21	2		
GLOB6026001	Elective Course for Study Abroad 22	2		
GLOB6027001	Elective Course for Study Abroad 23	2		
GLOB6028001	Elective Course for Study Abroad 24	2		
GLOB6253001	Elective Course for Study Abroad 31	4		

*) Transferred courses will be transferred based on credit transfer policies on study program with total of 20 credits

Certified Specific Independent Study

Code	Course Name	SCU	Total
Elective courses list for certified specific independent study*			20
Enrichment Program I			
MICR6033001	Course Certification I	3	
MICR6034001	Technical Skill Enrichment I	4	
MICR6035001	Industrial Project I	9	
MICR6036001	Soft Skill Enrichment I	4	
MICR6001001	Elective Course for Specific Independent Study 1	8	
MICR6002001	Elective Course for Specific Independent Study 2	8	
MICR6003001	Elective Course for Specific Independent Study 3	6	
MICR6004001	Elective Course for Specific Independent Study 4	6	
MICR6005001	Elective Course for Specific Independent Study 5	6	
MICR6006001	Elective Course for Specific Independent Study 6	5	
MICR6007001	Elective Course for Specific Independent Study 7	5	
MICR6008001	Elective Course for Specific Independent Study 8	5	
MICR6009001	Elective Course for Specific Independent Study 9	5	

Code	Course Name	SCU	Total
MICR6010001	Elective Course for Specific Independent Study 10	4	
MICR6011001	Elective Course for Specific Independent Study 11	4	
MICR6012001	Elective Course for Specific Independent Study 12	4	
MICR6013001	Elective Course for Specific Independent Study 13	4	
MICR6014001	Elective Course for Specific Independent Study 14	4	
MICR6015001	Elective Course for Specific Independent Study 15	3	
MICR6016001	Elective Course for Specific Independent Study 16	3	
MICR6017001	Elective Course for Specific Independent Study 17	3	
MICR6018001	Elective Course for Specific Independent Study 18	3	
MICR6019001	Elective Course for Specific Independent Study 19	3	
MICR6020001	Elective Course for Specific Independent Study 20	3	
MICR6021001	Elective Course for Specific Independent Study 21	2	
MICR6022001	Elective Course for Specific Independent Study 22	2	
MICR6023001	Elective Course for Specific Independent Study 23	2	
MICR6024001	Elective Course for Specific Independent Study 24	2	
MICR6025001	Elective Course for Specific Independent Study 25	2	
MICR6026001	Elective Course for Specific Independent Study 26	2	
MICR6027001	Elective Course for Specific Independent Study 27	2	
MICR6028001	Elective Course for Specific Independent Study 28	2	
MICR6029001	Elective Course for Specific Independent Study 29	1	
MICR6030001	Elective Course for Specific Independent Study 30	1	
MICR6031001	Elective Course for Specific Independent Study 31	1	
MICR6032001	Elective Course for Specific Independent Study 32	1	

*) For students who take BINUS certified specific independent study courses, they should take the first 4 courses on the list above (20 credits). Meanwhile, electives courses 1 to 32 are transferred courses for students who take certified specific independent study outside BINUS University. Transferred courses will be transferred based on credit transfer policies on study program with total of 20 credits.

Further Study Track

Code	Course Name	SCU	Total
Enrichment Program II (Master of Management Information Systems: Information Systems Strategic Management Stream)			20
ISYS6829001	Digital Technology and Transformation	4	
ISYS6830001	Data Analytics for Business	6	
ISYS6831001	Applied Technology in Information Systems*	4	
ISYS6806001	Strategic Planning for Information Systems	6	
Enrichment Program II (Master of Management Information Systems: Digitalpreneurship Stream)			20
ISYS6829001	Digital Technology and Transformation	4	
ISYS6830001	Data Analytics for Business	6	
ISYS6831001	Applied Technology in Information Systems*	4	
ISYS6848001	New Media Ventures and Innovation	6	20
Enrichment Program II (Master of Computer Science: Data Science Stream)			
COMP6816001	Wireless and Cloud Computing Technologies	4	

Code	Course Name	SCU	Total
COMP6997001	IT Disaster Recovery	6	
COMP6981001	Applied Technology in Computer Science*	4	
COMP6998001	Knowledge Engineering	6	
Enrichment Program II (Master of Computer Science: Information Security Management)			
COMP6816001	Wireless and Cloud Computing Technologies	4	
COMP6997001	IT Disaster Recovery	6	
COMP6981001	Applied Technology in Computer Science*	4	
COMP6980001	Networking and Security Concepts	6	

**) Students are required to obtain certification no later than the end of the first semester of the master's (S2) program, as outlined in the university's official guidelines. This certification will be transferred as an undergraduate (S1) course and reported in the seventh semester of the undergraduate program.*

Student should pass all of these quality controlled courses as listed below:

No	Course Code	Course Name	Minimal Grade
1	CHAR6013001	Character Building: Pancasila	B
2	ENTR6511001	Entrepreneurship: Market Validation	C
3	COMP6047001	Algorithm and Programming*	C
4	COMP6048001	Data Structures*	C
5	COMP6798001	Program Design Methods*	C
6	COMP6100001	Software Engineering*	C
7	COMP6799001	Database Technology	C
8	COMP6697001	Operating System	C

**) Tutorial & Multipaper*