DEPARTMENT OF INFORMATICS

SCHOOL OF INFORMATION TECHNOLOGY

UNIVERSITAS CIPUTRA SURABAYA, INDONESIA

2021
PROSPECTUS

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Department of Informatics

Overview

In the era of the global free market, increasing the capacity and competency of human resources becomes an essential decision especially for building the mindset of an entrepreneur. The Department of Informatics at Universitas Ciputra Surabaya eagerly produces entrepreneurs with the ability to develop world-class information technology applications.

The study programme aims to bring knowledge and skills for developing IT products based on the web, mobile and multimedia technologies that are relevant to the real world's problems and needs. The technology and tools introduced to the students include PHP-MySQL, Java – Android, Kotlin, Python, Google Cloud Platform, Linux, Adobe System, Unity, Autodesk 3D and many more. The programme encourages students to sharpen their critical and logical thinking skills for building an IT product that can solve a particular problem. The students are also equipped with the knowledge and skill for designing and analysing systems, structuring and managing IT infrastructure, building artificial intelligence/internet of things/video games solutions and creating stories with multimedia technology.

To become an entrepreneur, students are enriched with social and organisation skills (such as communication, learning method, ethics, teamwork, leadership, management, etc.), entrepreneurial skills (such as innovation, networking, market sensitivity, and risk management) and business management skills. By combining the lecturers from various fields including professionals, entrepreneurs and academia, the learning method in informatics becomes interactive with the balance of theoretical and practical approaches. The assignments and projects during the courses are structured dynamically so that students can incorporate the knowledge captured from the classes to solve a real-world business problem.

The Department of Informatics has a special partnership with the Apple Developer Academy whereby informatics students may have a higher priority to be selected as participants in the 10-month intensive course from Apple Developer Academy. As participants in this prestigious programme, participants will be supported with Apple devices, such as the latest iPhone and MacBook Pro laptop, to help them develop an IOS application.

Goal

Vision

To become a study programme that cultivates world-class graduates with not only excellent skills in the fields of informatics, but also strong integrity, professionalism, and entrepreneurial spirit so that we are able to contribute added value to the global society by solving current problems and issues.

Mission

- Establish a learning strategy that supports entrepreneurial spirit in the field of informatics and balances practical skills and character development
- Increase lecturers' ability by providing relevant training and research to keep up with the latest trends and needs in the industry
- Conduct societal support by guiding small to midsize companies to utilise IT products in their business
- Expand strong global collaboration with academic and non-academic partners

Objective

- To become a study programme focused on entrepreneurship education in the field of informatics
- To become a study programme that inspires entrepreneurial spirit for designing and implementing strategies and work programmes
- To become a world-class informatics programme

Graduate Outcomes

Graduate Competencies

After completing the programme, graduates are expected to have the ability to:

1. Build software products based on the theoretical concepts focusing on Artificial Intelligence, Internet of Things and Game Development to solve the actual needs and problems in the society;
2. Proactively and innovatively contribute to developing a certain venture for implementing professional ethics;
3. Continuously flourish due to their potential in the field of informatics and equipped with a mindset and behaviours that reflect Integrity, Professionalism and Entrepreneurialism;
4. Create a sustainable business venture or social venture in the field of information technology based on societal needs; and
5. Perform analytical thinking for designing and developing information technology products with appropriate scientific methodology.

Knowledge Coverage

The curriculum is designed and structured to support the student in expanding their skills in both in a technical and theoretical manner. After completing the four-year programme, students are expected to have mastered the following knowledge and skills:

1. Knowledge and skills in Artificial Intelligence, Internet of Things and Game Development;
2. Computer science concepts including Mathematics, Statistics, Algorithms and Programming, Software Engineering, Computer Networks, Distributed Systems, Computer Graphics, Multimedia etc.;
3. The concept of Professional Ethics and Interpersonal Skills;
4. The concept of Entrepreneurism, Business Management, and Leadership; and
5. State-of-the-art products and technologies in the fields of Informatics and Entrepreneurship.

Prospective Careers

There is a wide range of opportunities for the students in both informatics and other fields. Graduates usually begin their careers in positions such as

1. Software Developers
2. Industrial Computer Scientists
3. Technology Entrepreneurs
4. Academics
5. Researchers

Teaching, Learning and Assessment Strategies

- The Department of Informatics adopts student-centred and project-based learning in which the student becomes the main actor in the learning process. In order to manage the dynamic and fast environment, we conduct the lectures using blended learning and flipped classroom approaches by utilising online learning system and resources. The lecturers come from different backgrounds and affiliations with both domestic and international universities.
- The Department is committed to adopt the concept of Outcome-Based Education (OBE). By adopting the OBE approach, assessments are performed based on the learning outcomes. The assessment methods can be varied from written exam (midterm or final exam) to project-based assessment. Each course is conducted in a 16–week block. Typically, there are four to five learning outcomes. Therefore, each learning outcome is achieved in three to four weeks.

- The vision of our schools is to enrich the graduates with an entrepreneurial mindset and skills. Students have the opportunity to attend a series of entrepreneurial subjects that focus on technology and provide them with the necessary skills and knowledge to create and market their work.
- In their fourth or final year, students may choose their enrichment track by selecting either Entrepreneurship, Internship, Research, or Apple Developer Academy as suitable for their future goals.
- Through the study abroad activities and international standards curriculum, students have the opportunity to work on international projects and attain professional certifications in major areas of the IT industry that will enable them to be successful in their careers.
- We equip students with an interactive web-based information system for monitoring their education progress and extracurricular activities to enhance their soft skills and social competencies.

Programme Award and Degree

Degree

Sarjana Komputer (Bachelor of Informatics) from Universitas Ciputra Surabaya (144 credits)

Major and Streams

Stream	Credits	Degree
Artificial Intelligence (AI)	9	S.Kom
Internet of Things (IoT)	9	
Game Development (GameDev)	9	

Title:

S.Kom (Sarjana Komputer)

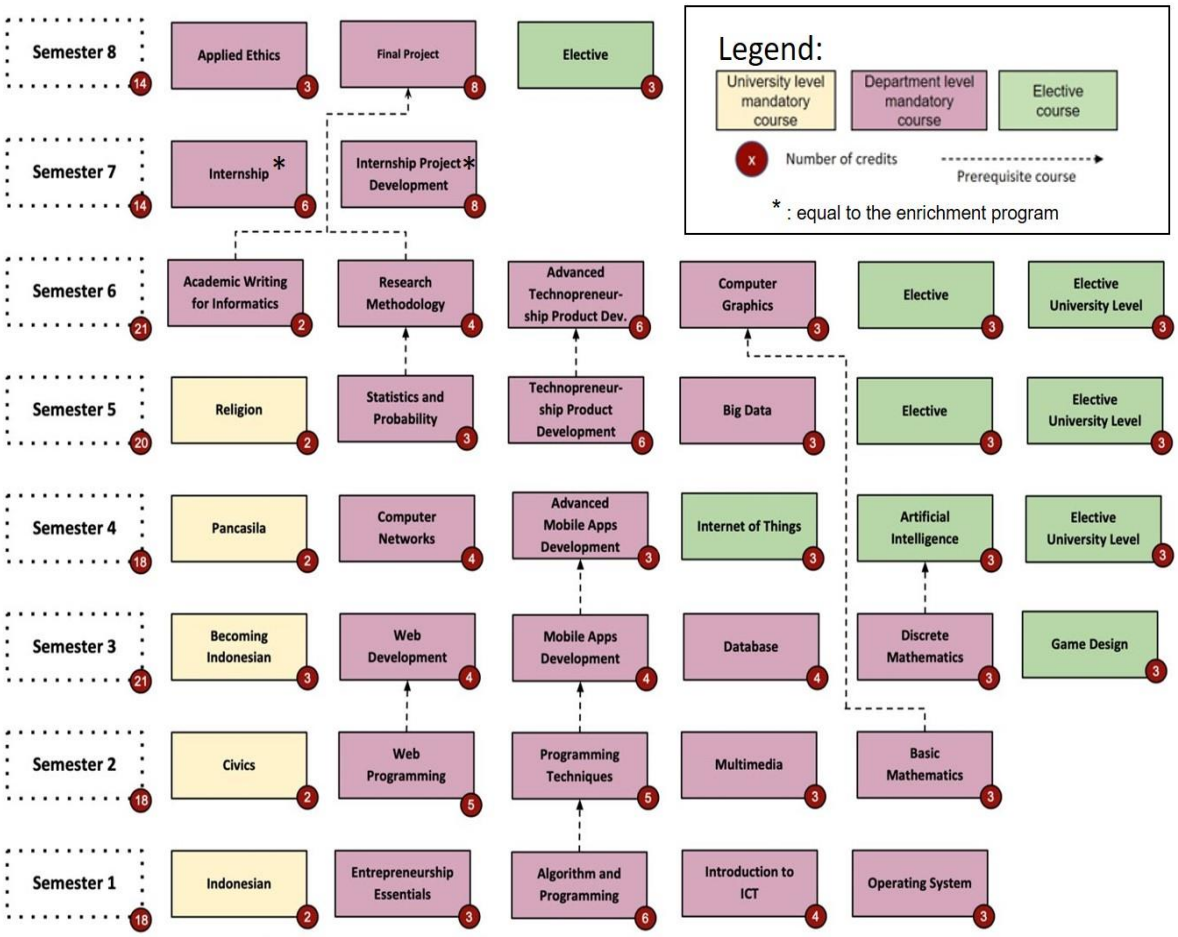
Study Completion Requirements

To achieve a degree from the Department of Informatics in Universitas Ciputra Surabaya, students must complete the minimum credits requirements of 144 academic credits. Those credits consist of the following course types:

Type	Total Credits
Compulsory subjects	104
University-level elective subjects	9
Department-level (stream-based) elective subjects	9
Enrichment programmes	14
Final project	8

Degree Roadmap

This is the common roadmap, with many possible permutations based on the selected university-level and department-level elective courses. Students may choose the provided electives based on their selected stream.



Course Structure

Semester	Code	Course Name and Description	Credits
1 (18 credits)	IMT2001	**Introduction to Information and Communication Technology** Through this module, students will be able to analyse the efficiency and effectiveness of the management process with the basic principles of Planning, Organising, Actuating and Controlling (POAC) in groups through organisational simulation.	4
	IMT2002	**Algorithm and Programming** Through this module, students independently or in groups are able to create desktop application programs with structured programming that applies the principle of algorithms through simulation studies.	6
	IMT2003	**Operating System** Through this module, students are able to independently explain the use of the operating system (OS) in accordance with the correct rules and procedures.	3
	UNC2001	**Entrepreneurship Essentials** Through experiential-based learning, students will learn to utilise their entrepreneurial competencies to contribute positive values to the community.	3
	UNC2010	**Indonesian Language** In this module, students will learn to communicate values found in texts written in Indonesian through the process of analysis and appreciation in various contexts, and to communicate concepts contextually in a written form that is structured through the process of synthesis using proper Indonesian language.	2
2 (18 credits)	IMT2004	**Web Programming** Through this module, students independently or in groups are able to make dynamic web page design and programming in accordance with the rules of human computer design and interaction through the concept of structured programming equipped with database usage.	5
	IMT2005	**Programming Techniques** Through this module, students independently or in groups are able to create desktop applications with the principle of object-based programming and data structure theory through simulation studies.	5

	IMT2006	**Multimedia** Through this module, students independently or in groups are able to create multimedia elements and multimedia applications with the basic theory of appropriate and optimal media elements.	3
	IMT2007	**Basic Mathematics** Through this module, students independently or in groups are able to create desktop applications with the principle of object-based programming and data structure theory through simulation studies.	3
	UNC2013	**Citizenship** In this module, students will be able to comprehend the concept of nationality and citizenship through the process of analysing, comparing and evaluating important issues related to Indonesia's current conditions such as foreign threats, disintegration, corruption, human rights, legal obedience, mental damage, emergency drugs and racial and religious conflict. Thus, students will learn to internalise national and state life values into the context of everyday life, from the smallest scope to the national and state scope.	2
3 (21 credits)	IMT2008	**Web Development** Through this module, students independently or in groups are able to design and program dynamic web pages with the MVC concept and utilise the framework for web development with a shorter time.	4
	IMT2009	**Mobile Apps Development** Through this module, students independently or in groups are able to make mobile-based interface designs and programming applications with the principle of developing mobile applications that can be easily installed and utilised.	4
	IMT2010	**Database** Through this module, students independently or in groups are able to design a relational database based on the study of various system needs and create a database with SQL language through simulation studies.	4
	IMT2011	**Discrete Mathematics** Through this module, students are able to dependently classify and answer computational cases/problems with discrete mathematical theories and automata through simulation studies.	3

	IMT2012	**Game Design** Through this module, students are able to independently design 2D and 3D game programs in various genres that are innovative in character and based on the principle of game design theory through simulation studies.	3
	UNC2011	**Becoming Indonesia** In this module, students are encouraged to appreciate and internalise the concept of 'Being Indonesia' in the context of diversity, the wealth of natural resources and their utilisations in the context of everyday life from the smallest scope to the national and state scope. Students should also be able to creatively and pro-actively design and implement an innovative solution project to address problems in the context of 'Being Indonesia'.	3
4 (20 credits)	IMT2013	**Computer Networks** Through this module, students are able to independently implement the concept of TCP/IP-based computer networks on a small office home office (SOHO) scale.	6
	IMT2014	**Advanced Mobile Apps Development** Through this module, students independently or in groups are able to make mobile-based applications with the principle of developing mobile applications and utilising various sensors and hardware as well as cloud services.	3
	IMT2015	**Artificial Intelligence** Through this module, students independently or in groups are able to create web or mobile applications of artificial intelligence in various topics by applying appropriate basic learning machine models through simulation studies and problems.	3
	IMT2016	**Internet of Things** Through this module, students are able to independently explain the basic concepts of the Internet of Things and apply them to solve a problem.	3
	University level elective course	**Cross-Disciplinary Entrepreneurship** In this module, students are given the opportunity to develop their entrepreneurial skills, mindset and venture by taking cross-disciplinary modules provided by other schools and departments.	3
	UNC2014	**Pancasila** Through the process of analysis, comparison and	2

		evaluation of various contexts, students will be able to appreciate the values in Pancasila and to internalise its values into the context of everyday life, from the smallest scope to the national and state scope.	
5 (20 credits)	IMT2017	**Statistics and Probability** Through this module, students are able to understand statistical theory and probability and are able to apply them appropriately in case studies.	3
	IMT2018	**Technology Entrepreneurship Product Development** Through this module, students independently or in groups are able to make application programs using models in software engineering based on the principle of the system development life cycle to control the development of projects properly and correctly through simulation studies.	6
	IMT2019	**Big Data** Through this module, students independently or in groups are able to design various topics of knowledge-generating systems from big data by applying the concept of big data management and based on opportunity studies on community problems or needs through simulation studies and problems.	3
	UNC2009	**Religion** Through this module, students will be able to appreciate the concept of faith, devotion and humanity through the process of analysing, comparing and evaluating important issues related to Indonesia's current condition (corruption, human rights, law abiding, mental damage and racial and religious conflicts) and to internalise and implement faith, devotion and humanity in accordance with their religion into the context of everyday life.	2
	University level elective course	**Cross-Disciplinary Entrepreneurship** In this module, students are given the opportunity to develop their entrepreneurial skills, mindset and venture by taking cross-disciplinary modules provided by other schools and departments.	3
	Department level elective course	**Elective Course** In this module, students have to choose the course related to their selected stream.	3
6	IMT2020	**Academic Writing for Computer Science**	2

(21 credits)		Through this module, students independently or in groups are able to produce a software development proposal by applying the concept of scientific writing and based on the study of opportunities for community problems/needs.	
	IMT2021	**Research Methodology** Through this module, students are independently able to plan research by applying research methodology in the field of computer science based on opportunity studies through simulation studies and problems.	4
	IMT2022	**Advanced Technology Entrepreneurship Product Development** Through this module, students are able to independently or in groups apply various cloud computing service features to mobile devices as well as publish products from the development of the application based on the study of opportunities properly and correctly through simulation studies.	6
	IMT2023	**Computer Graphics** Through this module, students independently or in groups are able to make 2D and 3D computer graphics according to thematic or specific needs based on the concept of computational geometry and basic 3D modelling through simulation studies and problems.	3
	University level elective course	**Cross-Disciplinary Entrepreneurship** In this module, students are given the opportunity to develop their entrepreneurial skills, mindset and venture by taking cross-disciplinary modules provided by other schools and departments.	3
	Department level elective course	**Elective Course** In this module, students have to choose the course related to their selected stream.	3
7 (14 credits)	Department level elective course	**Enrichment Program** In this module, students may choose the Internship, Research or Technopreneurship program to enrich their skills.	14
8 (14 credits)	IMT2026	**Applied Ethics** Through this module, students are able to independently apply various kinds of attitudes and behaviours based on ethical principles in the IT and other professions.	3

	Department level elective course	**Elective Course** In this module, students have to choose the course related to their selected stream.	3
	IMT2027	**Final Project** In this module, students build an individual project related to their selected stream.	8

Enrichment Programme

Track Name	Description	Credits
Internship	The internship track is conducted by assigning the students to a specific company. In this programme, students receive real-world work experience by applying their knowledge and skills to a given task.	14
Technopreneurship	In this track, students will conduct a real business incubation in which they develop and market their product. The student performs all business activities including pitching and marketing.	14
Research	In this track, students will join a research programme conducted by faculty members in the Department of Informatics. Students will gain various experience on how research should be conducted in a systematic manner.	14
Apple Developer Academy	Students can join the 10-month programme conducted by Apple Developer Academy. This is a special and prestigious programme in which Ciputra University students have higher priority to be selected than other applicants.	14

Informatics Department Elective Courses

Code	Course Name	Streams	Credits
IMT2028	**Game Development** Through this module, students are able to design a game while considering technical aspects including collision, game play, mathematical and AI concepts.	Game Dev	3
IMT2029	**3D Modelling and Animation** Through this module, students independently or in groups are able to design and model a 3D animation using standardised 3D modelling tools	Game Dev	3
IMT2030	**Game Assets** In this course, students independently or in groups are able to learn the fundamentals of design concept and create game artefacts using comprehensive techniques including thumbnail design, reference usage and design illustration.	Game Dev	3
IMT2031	**Machine Learning** In this course, students learn the theoretical aspects of machine learning including math and algorithms, and practical aspects including tools and techniques.	AI	3
IMT2032	**Natural Language Processing** In this course, students independently or in groups are able to learn the method for handling text data for data mining and other learning processes in AI applications.	AI	3
IMT2033	**Deep Learning** In this course, students independently or in groups are able to apply deep learning algorithms to real-world applications.	AI	3
IMT2034	**Information Security** In this course, students independently or in groups are able to explore information security concepts including to cryptography, security management and network, and computer security.	IoT	3
IMT2035	**Computer Vision** In this course, students independently or in groups are able to learn the fundamentals of computer vision including image formation, feature detection and matching, motion estimation and tracking, and classification.	IoT	3
IMT2036	**Internet of Things Standards and Protocols** Through this module, students independently or in groups are able to understand the concept of IoT networks and to build an IoT application.	IoT	3

Cross-Disciplinary and Entrepreneurship Course

Students may choose any course that belongs to a certain cluster.

Cluster Name	Description
Entrepreneurship	This cluster is used to enhance students entrepreneurship competencies so that they can plan, develop and maintain their business venture in various industries.
Corporate Entrepreneurship	This cluster is used to facilitate students interested in becoming a professional entrepreneur by instilling entrepreneurship values as implemented in a corporate or organisation.
Creative Management	This cluster is suitable for the student who has talent and passion in art, sports or performing arts to conduct reputable events that demonstrate their knowledge in event management.
Digital Marketing	This cluster is intended for the students interested in digital marketing especially for their personal or business branding. Students will be equipped with digital data to create the best strategy for their organisation in the context of marketing management.
Innovative Multimedia	This cluster is intended for the students who are interested in design graphics and illustration so that they will learn the basics of manual illustration, bitmap-based software and vector-based software as tools for doing graphic design.
Lifestyle, Wellness and Leisure	This cluster is intended for the students who are interested in increasing their quality of life through lifestyle, wellness and leisure development both for their personal and significant others purposes. Students will learn how to maintain their physical health, increase their psychological strength and manage their leisure time optimally.

Our Partners