



Ph. D. in CS

PROGRAM GUIDE

— **Orientation 2024**



Mahidol University
Faculty of Information
and Communication Technology



MAHIDOL UNIVERSITY

Faculty of Information and Communication Technology

Student Handbook 2024

Doctor of Philosophy in Computer Science

Welcome to Mahidol University!

For more than 130 years since 1888, Mahidol University has become a pillar of Thai higher education and healthcare. Mahidol University has since developed into one of the most prestigious universities in Thailand, internationally known and recognized for its high caliber research and teaching thanks to its faculty and outstanding achievements in teaching, research, international academic collaboration and professional services. This diversified institution now offers top quality programs in numerous medical, scientific, social and cultural disciplines. Its traditional excellence in medicine and the sciences is world renowned and the university is moving into the digital era with its strong foundation in science.

The overall **philosophy of Mahidol University** is best captured by the university motto: 'Do unto others as you would have others do unto you'. This underlying theme pervades every aspect of Mahidol University as it endeavors to imbue graduates with the conviction that, aside from achieving academic excellence, they have a solemn duty to improve the quality of life for all humanity.

The university's namesake, H.R.H. Prince Mahidol, has eloquently stated Mahidol University's **universal view of higher education**: 'True success is not in the learning, but in its application to the benefit of mankind'. With the Royal Philosophy as a guiding light, Mahidol University continues to take progressive action to internationalize and diversify itself, so that its graduates will be globally informed as well as socially aware. In this globalized and interconnected world, Mahidol University recognizes that achieving academic and moral excellence requires maintaining strong relationships with the world community, and offering lifelong and equitable quality education for all.

The guiding philosophy and view of higher education of Mahidol University has set Mahidol University on to the path of academic excellence for the benefits of society and mankind. Mahidol University has a **vision** to be a world class university with the **mission** to excel in health, sciences, arts, and innovation with integrity for the betterment of Thai society and the benefit of mankind.

Recognizing the challenges facing humanity in the new millennium and the fundamental responsibility of higher education institutions to assist in meeting those challenges, Mahidol University follows a policy of constant expansion in the breadth and depth of its facilities and academic endeavors. By remaining globally aware and staying abreast of new academic discoveries and technologies worldwide, Mahidol University continues not only to meet the needs of Thailand for education, training and research, but through internationalization, the needs of the global community as well.



Welcome to the Faculty of Information and Communication Technology

The Faculty of Information and Communication Technology (ICT), Mahidol University (MUICT) was established in 2009 to cope with the rapid change of education and technology landscape of the world towards digital era and industry 4.0. Following Mahidol University guiding principles, the Faculty of ICT aims to provide higher education with the vision to be a united institution focusing on student in order to provide knowledge and capability suitable to the rising demands in the industry and society including computer science, cyber technology, and game technology with the computer science foundation focus on data analytics and data science, artificial intelligence, software engineering, cyber security, industrial automation, and the Internet of Things.

The strategic plans of the Faculty of ICT consist of the followings:

1. Building globally competent, lifelong, digital learners
2. Striving for excellence in research and innovation in computing technology
3. Providing response customer-centric computing technology services
4. Creating sustainable and effective organization
5. Fostering national culture, identity, and art using computing technology

The Faculty of ICT currently (in 2024) offers 6 degree programs including

1. Bachelor of Science in Digital Science and Technology (DST)
2. Bachelor of Science in Information and Communication Technology (ICT)
3. Master of Science in Computer Science (MCS)
4. Master of Science in Cyber Security and Information Assurance (MCY)
5. Master of Science in Game Technology (MGT)
6. Doctor of Philosophy in Computer Science (DCS)

The Faculty of ICT is proud of its faculty members and students. Most faculty members graduate from top universities around the world. Our students are top-notch with track records of winning numerous national and international awards and competitions. Most students are hired by top national and international companies. Those who seek higher education in post graduate degrees are able to further their studies in top universities abroad.

The Faculty of ICT consistently focuses on developing excellence in research and conducting research in order to develop and serve society and mankind, as well as to encourage innovative learning and teaching. The research areas that are emphasized include Business Intelligence, Database, Computer Communication and Networking, Artificial Intelligence, Software Engineering, Digital Image Processing and Computer Graphics and Animation.

More than 30 years before the Faculty of ICT, Mahidol was established, many researches were conducted and published within the Computer Science department of the Faculty of Science, Mahidol University. Currently, the Faculty of ICT consists of 2 research units and 5 research clusters as follows:

Research units

1. Mahidol Bremen Medical Informatics Research Unit (MIRU)
2. Mahidol-AIST Research Unit (MARU)

Research clusters

1. Software Engineering and Business Analytics Research Cluster (SEBA)
2. Technology Enhanced Learning and Human Centered Computing Research Cluster (TEL-HuCC)
3. Machine Intelligence and Knowledge Engineering Research Cluster (MIKE)
4. Medical Informatics Research Cluster (MI)
5. Cyber Security and IoT Research Cluster (CSI)

Research facilities

In some cases, students may request additional software and hardware support from the Faculty of ICT to assist their research projects. Available facilities include

1. High performance computing resource
2. Microelectronic and IoT devices
3. PCs
4. Office and computing software tools

The approval of the request is under the consideration of the Faculty of ICT.

Doctor of Philosophy in Computer Science

We would like to extend our congratulations on being admitted to [the Doctor of Philosophy in Computer Science \(DCS\) program](#) at Mahidol University. This is a new important chapter of your life to fulfill your dream of becoming a global citizen of the modern era where information technology and computing science have been blended into our lifestyle and business. The program aims to provide students with the knowledge, skills and experience in computer science to leverage traditional business operations into intelligent and effective actions.

Computer technology has transformed how we live, socialize, do business and even take care of ourselves today. Thanks to recent innovations in the mobile, the Internet, software development technology, we can enjoy our life as we do today and we have never looked back. These innovations are made possible by computer technology which is largely driven by the advancement in the field of computer science.

Faculty of ICT offers Ph.D. in Computer Science program with primary focus on deep and advanced research in computer science which is recognizable in prestigious international community. The program offers only a few taught courses which are important foundation to traditional computer science including mathematics and computational science. Students are responsible for learning necessary advanced knowledge and skills in order to be ready for conducting advanced research in computer science.

The primary focus of the doctoral program is research, with the philosophy that students learn best by doing such as beginning as apprentices and becoming junior colleagues working with faculty on scholarly research projects. The faculty members in the Faculty of ICT conduct research in major areas of computer science including but not limited to software engineering, database management, artificial intelligence, computer networks, cyber security, internet of things, and data science (see research clusters). The degree of Doctor of Philosophy requires a dissertation based on the candidate's original research, which is supervised by a faculty member, and all students in the Ph.D. program are actively engaged in research throughout the program. Ph.D. students spend at least half of their time on research under the direction of their faculty adviser from their first day in the program and devote themselves full time to research after coursework and qualifying exam have been completed. Ph.D. students are also expected to participate in faculty and university activities full time on campus throughout the program, except possibly for academic exchange or internships elsewhere.

The Ph.D. in Computer Science program is a three-year program. The candidate is required to have strong knowledge and skills in computer science or related areas in order to be admitted to the program.

Research and innovation in computer science and information technology are important for the advancement of the digital industries today to help drive the country forward. Thailand has initiated the policy of evolving Thai industry towards industry 4.0 era which rely on knowledge and automation. Conducting original research is not easy since the field of computer science has advanced so much. Students are prepared to review a lot of related literature in accordance to the industry demands for new and improved computer science research and innovation.

DCS Study Plan

In order to graduate from the DCS program, a student must choose the plan of study and then complete the coursework and thesis or project required by the plan of study. In summary, the study plan towards graduation is summarized as follows:

Semester	Plan 1.1	Plan 1.2	Plan 2.1	Plan 2.2
1	ITCS 671 Seminar in Computer Science I (1 credit)			
	ITCS 898 Dissertation (9 credits)	ITCS 533 Research Methodology in Computer Science (2 credits)		
		ITCS 899 Dissertation (9 credits)	ITCS 531 Mathematics for Computer Science (2 credits)	
				ITCS 523 Data Sciences Essentials (3 credits)
2	ITCS 672 Seminar in Computer Science II (1 credit)			
	ITCS 898 Dissertation (9 credits)	ITCS 899 Dissertation (9 credits)	ITCS 532 Foundations of Computational Science (2 credits)	
			Elective Course (3 credits)	Elective Courses (6 credits)
3	ITCS 673 Seminar in Computer Science III (1 credit)			
	ITCS 898 Dissertation (9 credits)	ITCS 899 Dissertation (9 credits)	ITCS 699 Dissertation (9 credits)	Elective Courses (6 credits)
				ITCS 799 Dissertation (3 credits)
	Qualifying Examination			
4	ITCS 898 Dissertation (9 credits)	ITCS 899 Dissertation (9 credits)	ITCS 699 Dissertation (9 credits)	ITCS 799 Dissertation (9 credits)
5	ITCS 898 Dissertation (6 credits)	ITCS 899 Dissertation (9 credits)	ITCS 699 Dissertation (9 credits)	ITCS 799 Dissertation (9 credits)
6	ITCS 898 Dissertation (6 credits)	ITCS 899 Dissertation (9 credits)	ITCS 699 Dissertation (9 credits)	ITCS 799 Dissertation (9 credits)
7		ITCS 899 Dissertation (9 credits)		ITCS 799 Dissertation (9 credits)
8		ITCS 899 Dissertation (9 credits)		ITCS 799 Dissertation (9 credits)

Note:

1. Student can take courses outside the program and transfer credits back to the program for graduation. The course description of the course that can be transferred must have at least 75% content match with the course description of the course to be transferred to.
2. Student may opt to do work-related internship to fulfill research project in computer science requirement under supervision of the course instructor. This is under the discretion of the company involving in the project. The DCS program can provide a list of industry partners for students to choose from.
3. International research and academic internship is highly recommended and Mahidol University can provide some financial support to students who participated in international research and academic internship with university partners.
4. If the student cannot graduate within 3 years (study plan), a student can maintain the student's status for up to 5 years.
5. For more information, please refer to the Doctor of Philosophy in Computer Science program curriculum document.



List of DCS courses

Required Courses

ITCS 523	Data Sciences Essentials (for plan 2.2)	2 credits
ITCS 531	Mathematics for Computer Science (for plan 2.1, 2.2)	2 credits
ITCS 532	Foundations of Computational Science (for plan 2.1, 2.2)	2 credits
ITCS 533	Research Methodology in Computer Science (for plan 1.2 *, 2.1, 2.2)	2 credits
ITCS 671	Seminar in Computer Science I (for plan 1.1 *, 1.2 *, 2.1, 2.2)	1 credit
ITCS 672	Seminar in Computer Science II (for plan 1.1 *, 1.2 *, 2.1, 2.2)	1 credit
ITCS 673	Seminar in Computer Science III (for plan 1.1 *, 1.2 *, 2.1, 2.2)	1 credit
ITCS 898	Dissertation (for plan 1.1)	48 credits
ITCS 899	Dissertation (for plan 1.2)	72 credits
ITCS 699	Dissertation (for plan 2.1)	36 credits
ITCS 799	Dissertation (for plan 2.2)	48 credits

* Register with Audit (AU)

Elective Courses for Plan 2.1 For students with Master's Degree

ITCS 638	Networks and Distributed Systems Security	3 credits
ITCS 642	Software Engineering Management	3 credits
ITCS 646	Requirements Engineering	3 credits
ITCS 687	Advanced Computer Security	3 credits
ITCS 692	Advanced Topics in Artificial Intelligence	3 credits
ITCS 693	Advanced Topics in Software Engineering	3 credits
ITCS 694	Bioinformatics	3 credits
ITCS 695	Independent Study	3 credits

Elective Courses for Plan 2.2 For students with Bachelor's Degree

Database			Network and Security		
ITCS 621	Database Design and Administration	3 credits	ITCS 551	Service-oriented and Cloud Computing	3 credits
ITCS 668	Cloud Database and Big Data Technology	3 credits	ITCS 554	Information Security Management	3 credits
ITCS 682	Advanced Database Systems	3 credits	ITCS 638	Networks and Distributed Systems Security	3 credits
			ITCS 687	Advanced Computer Security	3 credits
Artificial Intelligence			Software Engineering		
ITCS 517	Machine Learning	3 credits	ITCS 613	Tools and Environments for Software Development	3 credits
ITCS 518	Image Analysis and Understanding	3 credits	ITCS 615	Empirical Software Engineering	3 credits
ITCS 661	Advanced Artificial Intelligence	3 credits	ITCS 642	Software Engineering Management	3 credits
ITCS 665	Natural Language Processing	3 credits	ITCS 644	Software Quality Assurance	3 credits
ITCS 667	Advanced Computer Vision	3 credits	ITCS 646	Requirements Engineering	3 credits
ITCS 692	Advanced Topics in Artificial Intelligence	3 credits	ITCS 693	Advanced Topics in Software Engineering	3 credits
Other Elective Courses					
ITCS 503	Design and Analysis of Algorithms	3 credits			
ITCS 655	Computer Graphics	3 credits			
ITCS 694	Bioinformatics	3 credits			
ITCS 695	Independent Study	3 credits			
ITCS 696	Advanced Topics in Computer Science	3 credits			



Student Services

The Faculty of ICT (MUICT) provides student services related to

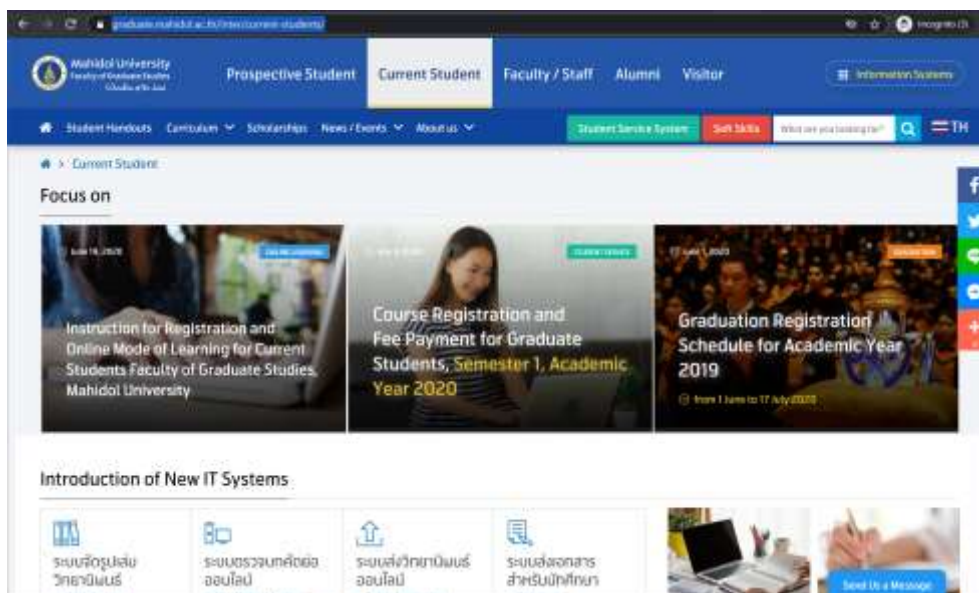
1. Teaching and learning
2. Facilities and equipment
3. Research support
4. Primary source for academic and non-academic questions
5. Liaison service between students and the Faculty of Graduate Studies

The Faculty of Graduate Studies (FGS) provides student services related to

1. Academic documentation procedure
2. English support service
3. Student registration and student visa.
4. Student financial services

Mahidol University Office of the President (OP) provides student services related to

1. Health services (through Health Center in association with the care of Mahidol University Hospitals including Siriraj Hospital and Ramathibodi Hospital)
2. International affairs such as student exchange and internship
3. Internet, email, and VPN services



Websites:

1. <https://graduate.mahidol.ac.th/inter/current-students/>
2. <https://graduate.mahidol.ac.th/thai/current-students/>

Academic and Registration Calendar 2024 – 2025

Website: <https://graduate.mahidol.ac.th/inter/current-students/?g=20>

	1 st Semester	2 nd Semester	Summer
1. Semester start–end dates	Aug 5 – Nov 29, 2024	Jan 6 – May 2, 2025	May 26 – Jul 18, 2025
2. Consultations with advisors for course registration approval (Regarding course registrations deviating from study plans, a request must be approved prior to registration)	From Jun 17, 2024	From Nov 18, 2024	From Apr 21, 2025
3.1 Regular Registration	Jul 1 – Jul 12, 2024	Dec 2 – Dec 13, 2024	May 5 – May 9, 2025
3.2 Last day of payment for tuition fees during the regular registration period (If the payment is made after this deadline, the students will be charged 2,000 baht for late registration.)	Aug 2, 2024 (before 10:00 p.m.)	Jan 3, 2025 (before 10:00 p.m.)	May 23, 2025 (before 10:00 p.m.)
3.3 Late registration (The students will be charged for 2,000 baht)	Aug 5 – Aug 16, 2024	Jan 6 – Jan 17, 2025	May 26 – May 30, 2025
3.4 Add / Drop course Registration (Refund Graduate Tuition Fee Drop Course)	Aug 5 – Aug 16, 2024	Jan 6 – Jan 17, 2025	May 26 – Jun 13, 2025

Note:

1. Please strictly follow the academic and registration schedule of the Faculty of Graduate Studies to avoid late fees and penalties.
2. Since 2020, due to Covid-19 pandemic, some courses can be provided onsite and online. Please check with your instructors for course offering options.

Towards Graduation

Graduation Requirements (example academic year 2023)

Website: <https://graduate.mahidol.ac.th/inter/current-students/?g=18>

No.	Details that students must complete according to the criteria for applying for graduation (Academic year 2023)	Master's Degree	Doctoral Degree
1.	Study all required courses specified in the curriculum and be awarded the study result symbols according to the criteria of the program.	✓	✓
2.	Have a cumulative GPA of no less than 3.00.	✓	✓
3.	Pass the foreign language proficiency assessment criteria.	✓	✓
4.	Pass the participation in activities related to professional and life skills (Soft Skills), as announced by the Faculty of Graduate Studies (for students enrolled in the academic year 2016 onwards).	✓	✓
5.	Comprehensive Examination with "Passed" result (only for Master's degree students, Plan B).	✓	-
6.	Qualifying Examination with "Passed" result (only for doctoral students).	-	✓
7.	Thesis or thematic paper defense examination with "Passed" result.	✓	✓
8.	Submit the thesis or thematic paper online .	✓	✓
9.	Submit a proof of thesis publication	✓	✓
10.	Submit a proof of thematic paper publication retrievable (only for Master's degree students, Plan B, and studied in a curriculum that abides by the standard criteria of graduate curriculum, 2015).	✓	-
11.	Programs submit GR.5 for approval of the degree .	By 10 th June 2024 at 4:30 p.m.	By 10 th June 2024 at 4:30 p.m.









Note:

1. students must complete the degree within the study plan (2 years). Study extension can be requested and may be granted by Mahidol University council based on the student study and research status (complete all courses and pass research proposal/defense examination). This is a strict requirement from Mahidol University.
2. Plan A student must publish an article in a peer-reviewed international journal accepted by the Faculty of Graduate Studies.
3. Plan B student must complete a research or industrial project in the field of the computer science accepted by the M.Sc. in Computer Science program committee.

Thesis / Thematic Paper Process

Website: <https://graduate.mahidol.ac.th/inter/current-students/?g=4>

Steps for Thesis / Thematic Paper Process

 Thesis Preparation and Submission	 Convert Microsoft Word file to PDF file
 30 Oral thesis defence / Oral thematic paper defence examination	 Prevention of Plagiarism in the Thesis/Thematic Paper
 Submission of Thesis/Thematic Paper to graduate	 Forms of Thesis/Thematic
 Submission of Thesis/Thematic to libraries	 Example for Thesis format / Thematic paper format

Ethics in Human/Animal Research

Any research project involving animals and human (even survey) **must** be approved by the Institutional Review Board (IRB) of Mahidol University. Please visit the websites below for more information.

Website:

1. <https://graduate.mahidol.ac.th/inter/current-students/?g=5>
2. <https://sp.mahidol.ac.th/>

Student Healthcare and Living

Website: <https://graduate.mahidol.ac.th/thai/current-students/?g=6>

English Requirements for Doctoral Level

Website:

1. <https://graduate.mahidol.ac.th/inter/current-students/?g=6>
2. <https://graduate.mahidol.ac.th/download/current-student/language-center/Engstandard2019-en.pdf>

Requirements

TEST	Entrance Requirement	Graduation Requirement (Pass)	
		Graduate Diploma / Masters Higher Graduate Diploma	Doctoral
IELTS	3.0	5.0 (W = 5.0, S = 5.0)	6.0 (W = 6.0, S = 6.0)
TOEFL-iBT	32	64 (W = 17, S = 15)	79 (W = 23, S = 19)
MU GRAD Plus (MU GRAD Test + Speaking)	40	70 (W = 10, S = 10)	90 (W = 12, S = 12)
MU ELT	84 (Except Doctoral Level)	84 (W = 10, S = 10)	-

W = Writing, S = Speaking

⬆ English score must not exceed 2 years.
⬆ Due to different score requirement, please check information of your chosen program.

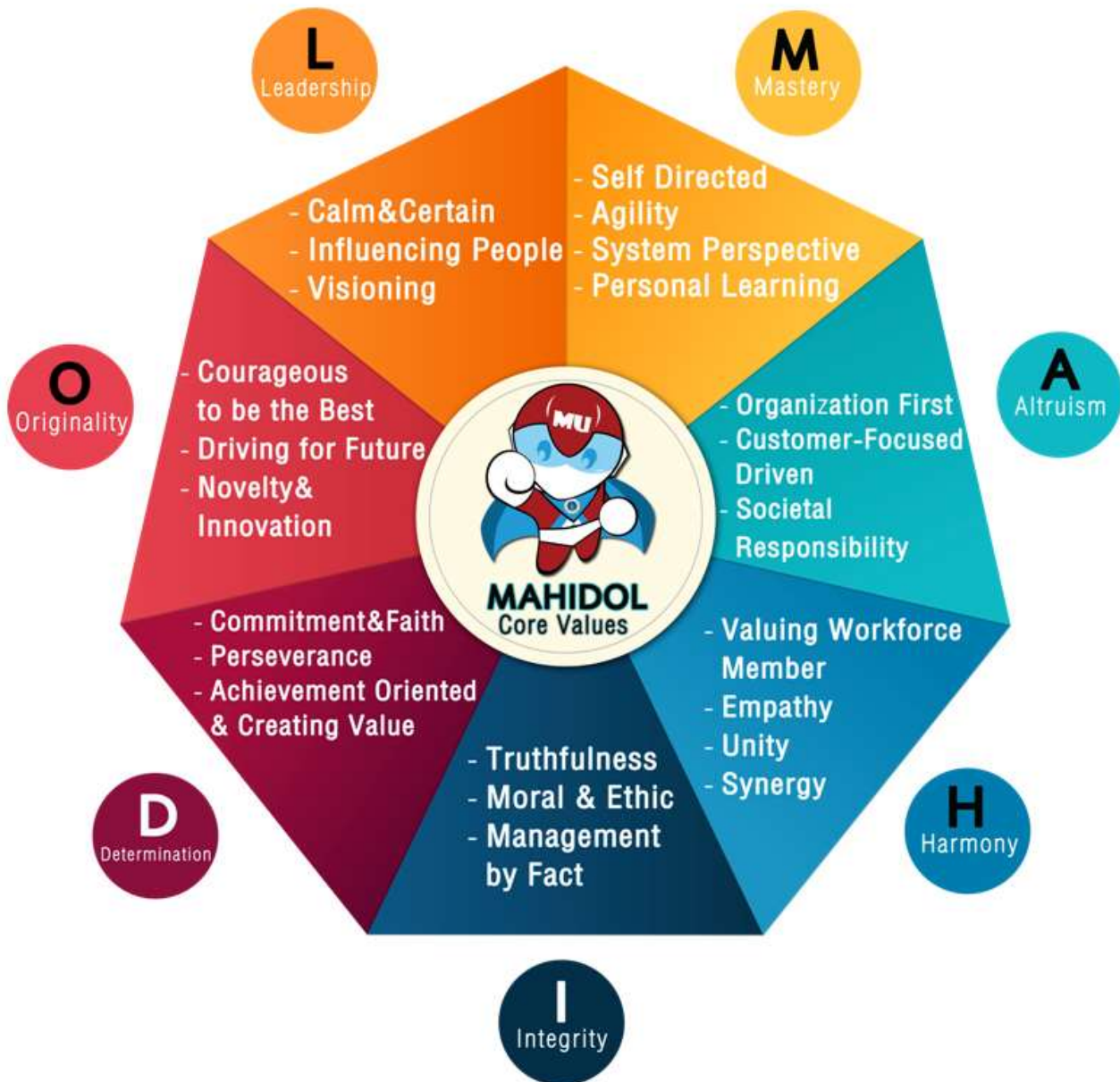
Alternative action: Passing English Proficiency by taking English course

Students whose the English language test results do not meet the English proficiency criteria can choose to take the English language proficiency test until they meet the English language standard, or they can register for the following English courses specified by the Faculty of Graduate Studies and pass such courses to fulfill the English Language Proficiency requirement prior to the final thesis or dissertation examination.

See: <https://graduate.mahidol.ac.th/thai/current-students/?g=6&t=4>

Mahidol University Core Values

There are 5 core values of Mahidol University that all students, faculty and staff must follow:






Contact Information

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