

MASTER OF SUSTAINABILITY SCIENCE

Department of Science and Technology Studies
Faculty of Science
Universiti Malaya

<https://sts.um.edu.my/master-of-sustainability-science.html>

Module Synopses

SQE7015 Research Methodology (3 credit hours)

This course will provide guidance on how STI issues in sustainable development can be meaningfully researched from a sustainability science approach. Students will be exposed to a range of quantitative and qualitative methods that can be used for this purpose. The course will also highlight methodological particularities of science management and sustainability – especially its interdisciplinary, transdisciplinary, value-laden, and solution/action-oriented character.

SQE7002 Research Project (Pre-requisite - SQE7015) – 12 Credit hours

This course requires students to conduct a research project related to science, technology, and sustainability under one supervisor. Students will complete their research over two semesters, and one written report will be submitted at the end of the second semester. Students are encouraged to undertake projects from government agencies, industries, and other types of organizations and provide solutions to the specific problems identified by the respective organizations. Representatives of various agencies will be invited as guest presenters in class.

SQE7011 Science, Technology and Industrial Policy (3 credit hours)

This course explores the various actors involved in the generation, deployment, and diffusion of knowledge. It examines various descriptions of the national innovation system. The importance of developing technological capabilities and emerging technologies in sustainable economic growth will be addressed. The development of such capabilities is vital in ensuring that indigenously developed solutions can be fashioned to address issues pertaining to the sustainable development of a nation.

SQE7016 Sociology of Science (3 credit hours)

The Sociology of Science course aims to understand the social aspects of science, which include history and theories in sociology, emphasizing roles and interactions between stakeholders in science. It applies the understanding of sociological knowledge in the context of current issues in science and technology.

SQE7017 Sustainability and Strategic Thinking (3 credit hours)

This course has been designed to provide an introduction to strategic approaches and skills for addressing the interdisciplinary and transdisciplinary challenges of sustainable development. It encompasses knowledge of strategic competencies essential for sustainability practitioners, as well as skills in systems analysis and approaches to sustainability transitions. By the end of the course, students should be equipped to utilize this knowledge and these skills to develop a holistic understanding of how science and technology can be strategically positioned to tackle sustainable development.

SQE7018 Policy and Management of Science for Sustainable Development (3 credit hours)

This course introduces the concept of Sustainable Development Goals (SDGs) and how they are influenced by the progress of science and technology (S&T). It provides a local contextual understanding of the development of S&T for a sustainable future. Students will also be exposed to technology foresight, basic techniques of S&T policy formulation, and using these techniques to make comparisons of S&T policies between Malaysia and other selected countries in the context of sustainable development.

SQE7019 Ethics in Science and Technology (3 credit hours)

This course introduces students to the key ethical theories and principles that can be used in analyzing contemporary ethical issues in science and technology. Through the analysis of various problems, students will be guided to develop comprehensive and effective ethical decision-making skills, thus suggesting optimal solutions. In addition, students will be exposed to professional ethics that can be practiced in their respective careers. Ethical guidelines and the role of ethics in science and technology-related policies will also be discussed in this course.

SQE7020 Philosophy of Science (3 credit hours)

In this course, we will explore both Western and non-Western perspectives on science. Regarding the Western perspective, we will examine the main schools of thought in contemporary philosophy of science and provide a brief account of its evolutionary development. Within this context, we will offer an exposition of the philosophies of science of the Logical Positivists, Karl Popper, Thomas Kuhn, Feyerabend, and the Post-Modernists. For the Islamic perspective on science, we will delve into the ideas of S.H. Nasr, Syed Naguib Al-Attas, and Ziauddin Sardar, particularly in relation to the discourse on the 'Islamization of Knowledge/Science.' In addition to the Islamic view, we will also explore various Oriental perspectives on science, such as those from Buddhist and Taoist traditions. Among the issues to be discussed are: (i) scientific rationality, (ii) modernist and post-modernist perspectives on science, (iii) Western and non-Western perspectives on science, and (iv) science and universalism.

SQE7021 Science, Technology and Law (3 credit hours)

This course emphasizes the critical interaction of science and technology with law to raise professional understanding and public awareness of technical and ethical challenges. Students will be exposed to basic legal analysis, namely pure, applied, doctrinal, and multidisciplinary approaches, on selected national and international laws pertaining to science and technology. Towards the end of this course, students will be able to apply legal analysis to contemporary science and technology issues.

SQE7022 Evidence-based Policy Making (3 credit hours)

This course emphasizes the importance of avoidance and indicators and examines the relationship between information and policymaking. This includes assessing the impacts of policymaking methods on the development of research, development, and commercialization of science and technology through appropriate indicators and evidence. Students will also be exposed to basic techniques for analyzing evidence and using these techniques to make comparisons on policymaking in Malaysia and other selected countries.

SQE7023 Innovation Strategy and Entrepreneurship (3 credit hours)

This course aims to equip students with the knowledge to understand and the skills to manage innovation at both operational and strategic levels. It introduces students to an integrative approach to the management of innovation, particularly in integrating market management, technological advancements, and organizational change to enhance the competitiveness of firms and the sustainability of organizations. Additionally, students will be exposed to the foundations of technopreneurship, such as

high-tech markets and technology entrepreneurship, innovation strategies for new technology ventures, financing of startups, etc. The students will obtain basic knowledge in the preparation of a business canvas.

SQE7024 Media, Public Understanding and Science (3 credit hours)

Awareness of the duty and responsibility of publicly funded scientists to make their work more accessible to the general public is crucial. The role of journalists in this process is paramount. Effective mass communication about the benefits of science, as well as areas of concern, is essential. This includes reporting debates and issues surrounding the impact of science on society. Additionally, reviewing public understanding of science and science communication is imperative.

SQE7025 Bioethics and Society (3 credit hours)

This course aims to introduce university students to the bioethical principles outlined in the Universal Declaration on Bioethics and Human Rights. Its content is founded on the principles established by UNESCO, articulating ethical standards that are embraced by scientific experts, policymakers, and health professionals worldwide, regardless of their cultural, historical, or religious backgrounds. Additionally, the course provides students with an interdisciplinary perspective on the moral, social, political, and conceptual challenges that emerge at the dynamic intersection of life sciences, health, and society.

SQE7026 Science, Technology and Modernisation (3 credit hours)

This course provides students with a platform for studying the development of science in Malaysia, from the time of British administration up to the 21st century. Students will be exposed to changes in modern science in terms of its features, concepts, and character. They will also discuss contemporary issues in society related to science and modernization.

SQE7027 Critical Thinking for Sustainability (3 credit hours)

This course will equip students with the skills to think critically and systematically in solving the problems posed by the theories and concepts learned. Students will have the opportunity to learn the basics and methods of analysis through both oral and written submissions, distinguishing between authentic and inauthentic deductive and inductive arguments. Students will be exposed to various types of fallacies in thought and speech, including Ad Hominem, Ad Populum, Hasty Generalization, False Alternatives, Bandwagon Argument, Slippery Slope, and Overstatement.