

## SQJ7001 - RESEARCH METHODOLOGY

### Synopsis:

The course consists of two parts, namely the academic research methodology; and project design and delivery. This course is a prerequisite before starting the research/placement project. The first part of this course guides students to conduct academic research in the field of science communication and public engagement. Students will be exposed to scientific research methodology, social science research method methodology, i.e. qualitative and quantitative as well as dissertation writing methods. In the second part, students will be exposed to the concepts, key principles and fundamentals of project management in science communication and public engagement, identifying important factors and steps involved in planning and implementing public engagement projects. Both parts of the course emphasize writing, communication as well as processing and analysing research data.

### Assessment Methods:

Continuous Assessment 100%

### Medium of Instruction:

English

### Transferable Skills:

None

### References:

1. Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches*. SAGE publication.
2. Flick, U. (2018). *An introduction to qualitative research*. Los Angeles: SAGE Publication.
3. Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation*. San Francisco: John Wiley & Sons.
4. Mertz, M. et al. (2014) Research across the discipline: a road map for quality criteria in empirical ethics research. *BMC Medical Ethics*, 15(17).
5. Braun, V., & Clarke, V. (2013). *Successful qualitative research: A practical guide for beginners*. London: SAGE.

## SQJ7013- RESEARCH PROJECT

### Synopsis:

For the final project, students will be given the choice of either conducting a research-based project or a placement-based project that will last for two consecutive semesters. For students who choose projects based on scientific research, they are required to do academic research on science communication and public engagement. These students will be assessed through presentations and dissertations. For students who choose placement-based projects, they are required to undergo placement in selected organizations such as science centres, public relations firms, research facilities, journalistic and media organizations, non-governmental community engagement organizations etc. to undertake a prescribed project(s) that the organisation has nominated. The focus of project placements is to complete a defined project relevant to science communication and public engagement. Students may have direct client contact, usually as a part of the project. The students will be supervised on-site by some suitably qualified personnel on a regular basis. They will be evaluated through the writing of reports and feedback from the organizations.

### Assessment Methods:

Continuous Assessment 100%

### Medium of Instruction:

English

### Transferable Skills:

None

### References:

1. Yin, R. K. (2018). *Case study research and application: Design and methods*. Sage publications.
2. Harrington, E. (2019). *Academic Libraries and Public Engagement with Science and Technology*. Chandos Publishing.
3. Pettey, G., Bracken, C. C., & Pask, E. B. (2017). *Communication research methodology: A strategic approach to applied research*. Taylor & Francis.

## SQJ7003- PRINCIPLES IN SCIENCE COMMUNICATION AND PUBLIC ENGAGEMENT

### Synopsis:

This course introduces science communication as a main subfield in science and technology studies, and public engagement as an effective approach in communicating science with the public. It explores fundamental aspects of science communication and public engagement including the principles in strategic and effective communication, the history of science communication, key actors, models of public communication of science and technology, issues and challenges. Students will assess the strategy of communication and public engagement that have been used on specific science topic in Malaysia.

### Assessment Methods:

Continuous Assessment 100%

### Medium of Instruction:

English

### Transferable Skills:

None

### References:

1. Bucchi, M. and Trench, B. (Eds.) (2021). *Routledge handbook of public communication of science and technology*. Routledge.
2. Jamieson, K. H., Kahan, D., & Scheufele, D. (Eds.). (2017). *The Oxford handbook of the science of science communication*. New York: Oxford University Press.
3. Van Dam, F., De Bakker, L., and Dijkstra, A. M. (Eds.). (2020). *Science communication: An introduction*. Singapore: World Scientific Publishing.

## SQJ7004 - SCIENCE AND MEDIA IN MULTICULTURAL SOCIETY

### Synopsis:

This course is a combination of science communication in media and dialogue between multi-stakeholders in science communication. The first part of the course focuses on enhancing the relevant skills for science communication in broadcast and new media. The students will be exposed to the current practice in these media fields, especially in communicating science in various media platform. The second part of this course prepares the students to become facilitators of conversations between researchers, practitioners, citizens and policy makers through 'dialogue', an approach that aims for mutual listening, learning and understanding, decision-making processes (deliberative dialogue). In general, this course enables students to become skilful and reflective communicators and facilitators capable of communicating effectively in various media as well as designing and facilitating dialogic processes.

### Assessment Methods:

Continuous Assessment 100%

### Medium of Instruction:

English

### Transferable Skills:

None

### References:

1. Lechman, E., & Popowska, M. (2020). *Society and technology: Opportunity and challenges*. Routledge.
2. Illingworth, S., & Allen, G. (2020). *Effective Science Communication (Second Edition)*. IOP Publishing.
3. Gascoigne, T., Schiele, B., & Leach, J., et.al (2020). *Communicating science: A global perspective*. ANU Press.

## SQJ7005 - SCIENCE, POLICY AND PUBLIC IMPACT

### Synopsis:

This course emphasises the importance of science policy in promoting science communication and social engagement. Based on the analytical framework of National Innovation Systems, the course assesses the efficiency and effectiveness of public policy mechanisms and instruments in the dissemination of the outcomes of science, technology and innovation programmes. By using appropriate indicators and measures, students will also be exposed to basic techniques of analysing science policies and using these techniques in making comparisons on science policies in Malaysia and other selected countries.

### Assessment Methods:

Continuous Assessment: 60%

Final Examination: 40%

### Medium of Instruction:

English

### Transferable Skills:

Skills in analysing policy document

### References:

1. Simon, D., Kuhlmann, S., Stamm, J., & Canzler, W. (eds.) (2019), *Handbook on Science and Public Policy*, Cheltenham: Edward Elgar
2. Meltzer, R., & Schwartz, A. (2018). *Policy Analysis as Problem Solving: A Flexible and Evidence-based Framework*. New York: Routledge.
3. Omar, A.R. (2013), *The Essentials of Science, Technology and Innovation Policy*, Kuala Lumpur, Academy of Sciences Malaysia

## SQJ7006 - BIG DATA IN SCIENCE COMMUNICATION

### Synopsis:

Big data involves huge amounts of data (volume), supports heterogeneous data format (variety) and can be accessed at high speed (velocity). The course includes fundamentals on big data storage and management related issues. The course provides exposure on recent technologies in manipulating, storing and analysing big data studies on mass communication, digital technologies, political communication, health communication, and many other areas related to science and communication. The course provides basic principles on important steps of the process which include data collecting, curating, analysing, building predictive models etc.

### Assessment Methods:

Continuous Assessment: 60%

Final Examination: 40%

### Medium of Instruction:

English

### Transferable Skills:

Master steps of the big data processing in science communication

### References:

1. Ghavami, P. (2020). Big data management: Data governance principles for big data analytics: Walter de Gruyter GmbH & Co KG.
2. Subasi, A. (2020). Practical machine learning for data analysis using python: Academic Press.
3. Dulhare, U. N., Ahmad, K., & Ahmad, K. A. B. (2020). Machine learning and big data: concepts, algorithms, tools and applications: John Wiley & sons.
4. Saleem T. J., Chishti M. A. (2021). Big Data Analytics for Internet of Things: John Wiley & sons.

## SQJ7007 - CONTROVERSIAL ISSUES IN SCIENCE AND TECHNOLOGY

### Synopsis:

This course provides students with an understanding of science and technology (S&T) discourse in the modern world. At the beginning, the influences of S&T on economic and social development will be discussed. This course will next touch on the concepts and theories of S&T socio-economic impact assessment. Finally, students have the opportunity to explore more on the issues of socio-economic impact of S&T based on selected case studies.

### Assessment Methods:

Continuous Assessment: 100%

### Medium of Instruction:

English

### Transferable Skills:

None

### References:

1. Ewa Lechman and Magdalena Popowska. (2020). *Society and technology: Opportunity and challenges*. Routledge.
2. Toss Gascoigne, Bernard Schiele, Joan Leach, et.all. (2020). *Communicating science: A global perspective*. ANU Press.
3. Bünyamin Ayhan. (2017). *Digitalization and society*. PL, Academic Research.

## SQJ7008 - SYSTEMS THINKING FOR DECISION MAKING

### Synopsis:

This course expounds on the importance of systems thinking in pertaining to rapid science and technological development especially in overcoming crisis of science communication in the society. Systems thinking can be observed in a holistic and multidimensional way, not in an isolation through creative and critical reasoning. Therefore, issues and knowledge in science and technology can be conveyed to the public and related stakeholders efficiently. Students will be guided to understand the concepts and elements in a system such as the feedback loops, emergentism, and chaos theory. Through systems thinking, disputes over science and technological issues can be solved through a holistic view from various aspects related to the system.

### Assessment Methods:

Continuous Assessment: 60%

Final Examination: 40%

### Medium of Instruction:

English

### Transferable Skills:

None

### References:

1. Jackson, M. C. (2019), *Critical Systems Thinking and the Management of Complexity*, US: John Wiley & Sons Inc.
2. Blokdyk, G. (2020). *Critical Systems Thinking: A Complete Guide*, US: 5STARCOOKS.
3. Stroh, D. P. (2015). *Systems Thinking for Social Change: A Practical Guide to Solve Complex Problems, Avoiding Unintended Consequences, and Achieving Lasting Results*, US: Chelsea Green Publishing Co.



## SQJ7009 - SOCIAL INNOVATIONS

### Synopsis:

Social innovation – or the development of new ideas, initiatives, or solutions to better address social issues - is a concept that has become known world-wide over the last couple of decades. Social innovation often involves the empowerment of disadvantaged groups and the restructuring of power relations in the ways they are implemented. Social innovation often emerges from civil society to disrupt or pose an alternative to the status quo, and can imply new forms of collaboration that encourage new and less hierarchical relationships. Increasingly, those encouraging, facilitating and delivering social innovation, whether in the private, public or third sectors, are looking for the right mix of entrepreneurial thinkers in the sciences who are armed with the knowledge and mindset needed to tackle some of the world's most pressing problems. In this course, special focus will also be given to the fast-growing field of citizen science as an example of social innovation

### Assessment Methods:

Continuous Assessment: 100%

### Medium of Instruction:

English

### Transferable Skills:

Skills in analysing contemporary ethical and legal issues

### References:

1. Voinea et al (2021). *Sustainable Innovation: Strategy, Process and Impact*. Routledge
2. Logue, D. (2019). *Theories of Social Innovation*. Edward Elgar
3. Mulgan, G. (2019). *Social Innovation: How societies find the power to change*. Policy Press.
4. Rogers, Everett (2003). *Diffusion of Innovations*, 5th Edition. Simon and Schuster.

## SQJ7010 - DIGITAL LAW AND COMMUNICATION ETHICS

### Synopsis:

DLCE is a course that deals with ethical and legal issues in the digital age pertaining to communication, the internet or cyber law. Some examples regarding the issues are data protection, copyright and freedom of speech or expression (negligent misstatement & defamation). The areas under this course are print media, social media or digital media. Not all media follow the same rules and regulations under national or international law. Therefore, this subject will provide ethical and legal guidelines, understanding, and exposure, as well as prepare students to become good science communicators who are ethically and legally compliant.

### Assessment Methods:

Continuous Assessment: 60%

Final Examination: 40%

### Medium of Instruction:

English

### Transferable Skills:

Skills in analysing contemporary ethical and legal issues

### References:

1. Danley, S., & Christiansen, G. (2019). Conflicting responsibilities: The multi-dimensional ethics of university/community partnerships. *Journal of Community Engagement and Scholarship*, 11(2), 3.
2. Lipschultz, J. H. (2017). *Social media communication: Concepts, practices, data, law and ethics*. Taylor & Francis.
3. Mhiripiri, N. A., & Chari, T. (Eds.). (2017). *Media law, ethics, and policy in the digital age*. IGI Global.

## SQJ7011 - MANAGING SCIENCE AND TECHNOLOGY EVENTS

### Synopsis:

Project management ensures that project requirements are met by applying tools, techniques, skills, and knowledge to project activities (or tasks). This course gives students exposure to the fundamental structure of science and technology project and event management which is defined by the project stakeholders, e.g. project sponsor, project team, suppliers, support staff, customers, and users. Other fundamental areas of project management are project management tools and techniques, and project management knowledge areas – project integration, scope, time, cost, quality, human resource, communication, procurement and risk management.

### Assessment Methods:

Continuous Assessment: 100%

### Medium of Instruction:

English

### Transferable Skills:

Event management

### References:

1. Zwikael, O., & Smyrk, J. R. (2019). *Project Management: A Benefit Realisation Approach*. Springer.
2. Spalek, S. (Ed.). (2018). *Data analytics in project management*. CRC Press.
3. Wu, T. (2020). *Optimizing Project Management*. CRC Press.

## SQJ7012 - SCIENCE DIPLOMACY

### Synopsis:

The course explores the role of science in foreign policy and international relations (encompassing international politics and economics, geostrategy, international diplomacy, and national/international security and defense) to advance both indirect and direct national interests as well as to address global needs and challenges. Topics explored may include but not limited to (a) science in diplomacy where science plays a role of providing advice to inform and support foreign policy objectives; (b) diplomacy for science where international diplomacy plays a role of facilitating international scientific cooperation; and (c) science for diplomacy where scientific cooperation plays a role of improving international relations.

### Assessment Methods:

Continuous Assessment: 60%

Final Examination: 40%

### Medium of Instruction:

English

### Transferable Skills:

None

### References:

1. Galluccio, M. (2021) *Science and Diplomacy: Negotiating Essential Alliances*. Cham, Springer Nature.
2. Olga Krasnyak. (2018). *National Styles in Science, Diplomacy, and Science Diplomacy*. Brill, Leiden.
3. Pierre-Bruno Ruffini. (2017). *Science and Diplomacy: A New Dimension of International Relations*. Cham: Springer.