هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications
(Postgraduate Degree)

Course Title:	**Technology Futures**
Course Code:	**MSFS 6311**
Program:	**MsC Futures Studies**
Department:	**Futures Studies**
College:	**College of Sciences and Human Studies**
Institution:	**Prince Mohammad Bin Fahd University**

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A. Course Identification

1. Credit hours: 3
2. Course type ☒ Required ☐ Elective
3. Level/year at which this course is offered: MsC, Year 1
4. Pre-requisites for this course (if any)**: N/A**
5. Co-requisites for this course (if any)**: N/A**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	45	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
1	**Lecture**	25
2	**Laboratory/Studio**	10
3	**Seminars/demonstrations**	10
4	**Others** (specify)	
Total		45

B. Course Objectives and Learning Outcomes

1. Course Description

The Technology Futures curriculum is developed to provide a thorough overview of existing and exploring potential future technologies. Using a combination of lectures, a range of tutorials, hands-on workshops and demonstrations the course explores technology influences on potential new industries, markets, products and areas that contribute significantly to the continued, sustainable well-being of society globally. It also places the implications and values of emerging technologies in the context and framework of STEEPC and discusses factors, implications and maturation models that influence technology adoption. Students will have the opportunity to develop prototypes for their future visions and ideas.

The course emphasises the importance of data and contextualizes professional data science practices for innovation by drawing together skills and knowledge regarding data, communication, and ethics. Students examine contemporary cases illustrating how novel data sources can act as catalysts to drive innovation and transform industries and professions globally.

2. Course Main Objective

The goal of this program is to equip students with the capacity for critical thinking and with practical skills on technological changes, innovation and digital transformation that will help students succeed in private and public organizations as well as in international bodies.

It also eneables students to be future-proofed in terms of emerging employment and skill opportunities and requirements and to help them imagine novel inventions, approaches to innovation and to combine emerging technologies in order to

3. Course Learning Outcomes

Course Learning Outcomes (CLOs)		Aligned PLOs*
1	**Knowledge and Understanding**	
1.1	Acquire integrated practical and theoretical knowledge in design-driven innovation to spark, lead and perform future-oriented technology.	K1
1.2	Explore the power of transdisciplinary science and technologies, hybridization of technologies and their ability to create hitherto unthinkable solutions.	K2, K3
1.3	Understand that the future is a part of a harmonized STEEPC (Society, Economic, Environmental, Technological, Political/policy, Cultural) ecosystem.	K1, K2
1.4	Recognize the critical tenets of change theory and technology history.	K1
2	**Skills :**	
2.1	Identify the strengths and the weaknesses of various current and emerging technologies	S1, S3
2.2	Promote interdisciplinary Research and Development (R&D) by merging competencies and skills of futures technology with futures methods, techniques and tools from accompanying courses in the program.	S1, S3
2.3	Work in existing cooperation projects with industry, government partners or society looking for new opportunities for technology development into promising future products.	S1
3	**Values:**	
3.1	Demonstrate how the application of the various technologies could advance ethical global progress across a multiplicity of industries, martkets and products	V1

* Program Learning Outcomes

C. Course Content

No	List of Topics	Contact Hours

1	Data Science for Innovation, Information and Cyber Security	6
2	Cloud and Edge computing, software and hardware design and development	6
3	Machine Learning, AI and Robotics and their applications	6
4	Transdisciplinary Tech and its impact on the future of innovation and invention of emerging industries, markets and products	9
5	Learning from SciFi future worlds, habitats and the influence of xMedia and power of imagination	9
6	Approaches to R& D, design, development, prototyping for the future	9
Total		45

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	Acquire integrated practical and theoretical knowledge in design-driven innovation to spark, lead and perform future-oriented technology.	Lectures, seminars, demonstrations, workshops	Assignments/projects
1.2	Explore the power of transdisciplinary science and technologies, hybridization of technologies and their ability to create hitherto unthinkable solutions.	Lectures, seminars, tutorials, unfinished artefacts	Project and product designs -peer-to peer, team assignments
1.3	Understand that the future is a part of a harmonized STEEPC (Society, Economic, Environmental, Technological, Political/policy, Cultural) ecosystem.	Lectures, seminars	Assignments and contextualized visionary scenarios
1.4	Recognize the critical tenets of change theory and technology history.	Readings, videos and lectures	Assignments
2.0	**Skills**		
2.1	Identify the strengths and the weaknesses of various current and emerging technologies	Team work to develop imaginary and realistic future products, etc.	Prototypes
2.2	Promote interdisciplinary Research and Development (R&D) by merging competencies and skills of futures technology with futures methods, techniques	Workshops, seminars and team development work	Peer-to-peer and cross-faculty

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	and tools from accompanying courses in the program.		
2.3	Work in existing cooperation projects with industry, government partners or society looking for new opportunities for technology development into promising future products.	Seminars, tutorials and industry visits and consultations	Assignment and project evaluation (peer-to-peer) and industry Wexpert
3.0	**Values**		
3.1	Demonstrate how the application of the various technologies could advance ethical global progress across a multiplicity of industries, martkets and products	Seminars, lectures	Portfolios, exams

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Tutorials 2-15	2-15	20
2	Explain how to apply the power of data Science for Innovation, Information and Cyber Security. Use the concept of a smart city as an example. Describe which emerging applications will best benefit from Cloud and Edge computing Visualize how the affordances of software and hardware be reflected in designing future-relevant applications in the energy sector Develop policies on how we will deal with the ethical aspects of the march towards AGI and SEED Show future potential applications from the blending of the growing technologies, such as nanotechnology, biotech, neuro, AI and robotics together with the increased power of quantum and exascale computing Think autonomous everything molecular machines,) nanobots, self-healing materials, shapeshifting, bioengineering	2-15	10
3	Project 1	6	15
4	Project 2	10	15
5	Transdisciplinary Tech and its impact on the future of innovation and invention of emerging industries, markets and products	2-15	20
6	Learning from SciFi future worlds, habitats and the influence of xMedia and power of imagination	16	20
7	Approaches to R&D, design, prototyping for the future and development	16	30

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:
• Advisors are assigned in Banner Student System for individual (general) student consultations and academic advice. • Office hours are provided for students to ask questions related to the course.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	
Essential Reference Materials	
Electronic Materials	**Advanced Transdisciplinary Engineering and Technology** by - Azman Ismail, - Mohd Amran Mohd Daril, - Andreas Öchsner https://link.springer.com/book/10.1007/978-3-031-01488-8#author-1-0 - *How we think: Digital Media & Contemporary* - *Technogenesis - Katherine Hayles* *https://dms484.files.wordpress.com/2017/01/hayles-how-we-think.pdf* - *The Emerging Tech revolution by Robert A Manning* *https://www.atlanticcouncil.org/wp-content/uploads/2020/06/Emerging-Technologies-New-Challenges-To-Global-Stability-May-2020.pdf* - - *Life 3.0: Being Human in the Age of Artificial Intelligence by Max Tegmark* - *https://readyforai.com/download/life-3-0-being-human-in-the-age-of-artificial-intelligence-pdf* - *Who Will Be the Members of Society 5.0? by Mathew Gladden* - *https://ideas.repec.org/a/gam/jscscx/v8y2019i5p148-d230091.html* - *Paradigm Wars: Worldviews for a New Age by Mark Woodhouse* *https://books.google.com.vc/books?id=dejmdCWwEHsC&printsec=frontcover&source=gbs_atb#v=onepage&q&f=false*

Other Learning Materials	**Books** - Greg Bear: Darwin's Radio - Altered Carbon by Richard K Morgan - Heavy Weather *by Bruce Sterling* - Life in 2050: How We Invent the Future Today by Ulrich Eberl **Games** - Subnautica - Explore an underwater alien world - 2018 Version - Serious Games **Videos** TED Talks Jared Diamond – Collapse https://www.youtube.com/watch?v=IESYMFtLIis&t=40s - *Too Big to Know: Rethinking Knowledge, Now, that the Facts aren't the Facts, Experts are Everywhere, and the Smartest Person in the Room is the Room- David Weinberger* https://www.youtube.com/watch?v=Q266_WtFQ2U

2. Educational and research Facilities and Equipment Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom with computer, projector and smart board suitable for graduate students
Technology Resources (AV, data show, Smart Board, software, etc.)	Smart Board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Computer lab equipped with finite element software

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching and Assessment	Independent reviewers by Program leaders and Deanship of Quality and Accreditation	Course survey through online Course Evaluation System
Effectiveness of Assessment	Independent reviewers/peer review	Independent Evaluation of Assessment Forms
Achievement of Course Learning Outcomes	Faculty	Exam Questions, Rubrics
Learning Resources	Student	Learning Resources Annual Survey

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching and Assessment	Independent reviewers by Program leaders and Deanship of Quality and Accreditation	Course Survey through online Course Evaluation System
Effectiveness of Assessment	Independent reviewers/peer review	Independent Evaluation of Assessment Forms
Achievement of Course Learning Outcomes	Faculty	Exam Questions, Rubrics

Evaluation Areas/Issues (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	