



## Course Specifications (Postgraduate Degree)

<b>Course Title:</b>	<b>Industry Futures</b>
<b>Course Code:</b>	<b>MSFS 6324</b>
<b>Program:</b>	<b>MsC Futures Studies</b>
<b>Department:</b>	<b>Futures Studies</b>
<b>College:</b>	<b>College of Sciences and Human Studies</b>
<b>Institution:</b>	<b>Prince Mohammad Bin Fahd University</b>

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## A. Course Identification

<b>1. Credit hours:</b> 3
<b>2. Course type</b> <input checked="" type="checkbox"/> Required <input type="checkbox"/> Elective
<b>3. Level/year at which this course is offered:</b> MsC, Year 1
<b>4. Pre-requisites for this course (if any):</b> N/A
<b>5. Co-requisites for this course (if any):</b> 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	10
4	Others (specify)	
<b>Total</b>		45

## B. Course Objectives and Learning Outcomes

### 1. Course Description

Industry Futures provides students with a comprehensive overview of the impact and implications of the radical shift to Industry 4.0, the influence of Postnormal Times phenomena and the emerging techno-economic paradigms that fashion the emerging and future industrial landscape. It considers future industries manufacturing technologies and inventions, as well as the workplaces, jobs, skills, organizational and operational structures required to leverage the advancements in transdisciplinary science and technologies. These are discussed in the context of innovative transactional spaces, models and means, as well as the changing human and society and the emergence of decentralized thinking techniques and the arrival of new currencies of knowledge. The course allows considerable opportunity for discussion, collaborative workshops and futures scenario-centered projects that provide students with the opportunity to imagine and create visions of future sustainable industrial environments that will lead to increased societal well-being.

### 2. Course Main Objective

To prepare students for their future work life, by demonstrating the accelerated changes within society, industry and the marketplace as well as the potential industries, workplaces and likely required skills that could offer them amazing opportunities in the future. By approaching the topic through a futures lens, the students will more easily understand the connectivity between the multidimensional elements that drive their future professional lives.

### 3. Course Learning Outcomes

Course Learning Outcomes (CLOs)		Aligned PLOs*
<b>1</b>	<b>Knowledge and Understanding</b>	
1.1	Collaborate with individuals, businesses and societal institutions to ensure effective outcomes as technologies evolve	K1
1.2	Prepare students for employment and career advancement in local, national, and international markets.	K3
1.3	Acknowledge new types of techno-economic paradigms	K2
<b>2</b>	<b>Skills :</b>	
2.1	Assess current and projected trends, early signals of change and potential disruptors for the Fourth Industrial Revolution – identifying necessary actions to move towards a desirable industrialized future.	S1
2.2	Develop good oral and written communication skills necessary to the profession.	S1
2.3	Explore new channels of communication and collaborative work that transcends departmental and institutional boundaries.	S3
<b>3</b>	<b>Values:</b>	
3.1	Understand the ethical and societal impacts of 4IR. i.e, how the new technologies introduced by companies and managers affect the broader community.	V2
3.2	Engage students with the community for them to apply their classroom knowledge to public use.	V1

\* Program Learning Outcomes

### C. Course Content

No	List of Topics	Contact Hours
1	Introduction to the thinking and foundations of futures studies	3
2	Highlights of the different industrial revolutions	4.5
3	A Broader vision of the complexities of Postnormal times, geopolitical change and Global Futures: Living with emerging technologies. The impact on human and societal advancement. Living as an avatar – from synthetic to augmented. Human Singularity - a role for Cyborgs and transhumans?	4.5
4	Technologies of the 4th Industrial Revolutions (IR): the shift and its implications for manufacturing and society. Smart manufacturing, nanomanufacturing, additive manufacturing, energy futures.  Transdisciplinarity. Nano, robo, bio, neuro and quanta. Hybridization and future products . Learning from the military and Space.  What will be the new industries? Autonomous everything. Predictive living: from AI and machine learning and data to smart cities. What will generative artificial intelligence achieve, ethics and policies? Computing, power, new support networks, quantum, and exascale where will they take us?	24
5	Meta economics, Society 5.0, and decentralization - where next? New transactional spaces, currencies, and distribution: Blockchain, cyber	6

	currencies, security, and decentralized economies From gaming to the Metaverse: New frontiers for multimedia.	
6.	Skills and Characteristics needed to stay relevant in the 4th IR and the power of HMR (Human Machine Resources) – Future of jobs and workforce.	3
<b>Total</b>		<b>45</b>

#### D. Teaching and Assessment

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

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and Understanding</b>		
1.1	Collaborate with individuals, businesses and societal institutions to ensure effective outcomes as technologies evolve	Group workshops and exercises Lectures and debates Applied learning for projects	Peer to peer evaluation Mid-term test Final project
1.2	Prepare students for employment and career advancement in local, national, and international markets.	Experimental and decentralized convergent and divergent think approaches, futures techniques and discussion	Assignments, in-class discussion evaluation
1.3	Acknowledge new types of techno-economic paradigms	Lectures and tutorials	Assignments and class discussion
<b>2.0</b>	<b>Skills</b>		
2.1	Assess current and projected trends, early signals of change and potential disruptors for the Fourth Industrial Revolution – identifying necessary actions to move towards a desirable industrialized future.	Scenario development using creative tools and techniques A plethora of futures studies techniques, especially scanning and weak signals. Discontinuity, disruption and wildcards.	Assignments
2.2	Develop good oral and written communication skills necessary to the profession.	In class discussion and student oral summaries and papers	Assignments, Peer-to-peer evaluation
2.3	Explore new channels of communication and collaborative work that transcends departmental and institutional boundaries.	Group workshops and collaborative concept development Technology testing including AI, visualization tools, etc.	Peer-to-peer, final project
<b>3.0</b>	<b>Values</b>		
3.1	Understand the ethical and societal impacts of 4IR. i.e, how the new technologies introduced by companies	Presentations and discussion on STEEP ethics challenges,	Assignments

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	and managers affect the broader community.	processes and application today and in the future. Changing society (cultural, societal, technological and human) including HMR	
3.2	Engage students with the community for them to apply their classroom knowledge to public use.	Futures Club and collaboration on innovation projects with regional industry.	

## 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignment 1: Watch the various videos and complete all readings and write 200 words on how your life and the life of society will be different in the year 2035.	2	5
2	Assignment 2: Taking each of the five drivers (Causals) for 4IR and the emerging techno-economic paradigms; (Intelligent Assets; Humanizing economics; the Remix Society/Changing human; the Age of Transdisciplinarity and Recoding thinking; describe succinctly how they will influence change in the year 2040.	3	10
3	Assignment 3: What will be the new industries and what role will technologies such as smart manufacturing, molecular machines, nanomanufacturing, self-assembly and cyberphysical production play	4	10
4	Assignment 5: Discuss Future of Smart cities and the future workscape/ and the role of emerging industries	6	10
5	Assignment 7: Select one of the Sustainable Development Goals (SDGs) from Slide 3, Explain how future industries could significantly reduce the issues or reach the goal by 2040. Discuss the key problem areas and the possible solutions.	7	10
6	Mid Term	9	15
7	Assignment 9. Workshop of future communications, computing, xmedia and the Metaverse, living as an avatar. Reconfigured and recombinant identities.	10	10
8	Assignment 10: As discussed in the workshop, each of you please write a brief description of your outcomes from your group and submit here. I am wanting to see if you have different perspectives on that outcome.	11	5
9	Final Project; Choose one of the weekly topics and consider it through the lens of the other weekly topics	14	25

#	Assessment task*	Week Due	Percentage of Total Assessment Score
	and how the key drivers and dynamics of that topic will change by the year 2040? You should describe this through a scenario.		

\*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

<b>Required Textbooks</b>	
<b>Essential Reference Materials</b>	<ul style="list-style-type: none"> <li>• Xun Xu <sup>a</sup>, Yuqian Lu <sup>a</sup>, Birgit Vogel-Heuser <sup>b</sup>, Lihui Wang: <b>Industry 4.0 and Industry 5.0—Inception, conception and perception (2021)</b></li> <li>• Carlota Perez: Technological Revolutions and Techno-economic Paradigms (2009)</li> <li>• Zaudin Sardar: The three Tomnorrow of Postnormal Times (2015)</li> </ul>
<b>Electronic Materials</b>	<ul style="list-style-type: none"> <li>• Qinglin Qi and Fei Tao: Digital Twin and Big Data towards Smart Manufacturing and Industry 4.0: 360 degree comparison (2018)</li> <li>• Matthew E. Gladden: Who will be the Membetrs of Society 5.0? Towards an Anthropology of technologically posthumanized future societies. (2020)</li> <li>• Guido Gorgoni: Stay human The Quest for in the Algorithmic society</li> <li>• Derek Woodgate: Workers and Machines of the World Unite. The machine in the human meets the human in the Machine.(2021)</li> <li>• Barbur Wasim Arif: Industrial Clusters, Schumpeterian innovations and entrepreneurs' Human and Social Capital (2012)</li> </ul>
<b>Other Learning Materials</b>	

## 2. Educational and research Facilities and Equipment Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom with computer, projector and smart board suitable for graduate students
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	Smart Board
<b>Other Resources</b> (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
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

<b>Council / Committee</b>	
<b>Reference No.</b>	
<b>Date</b>	