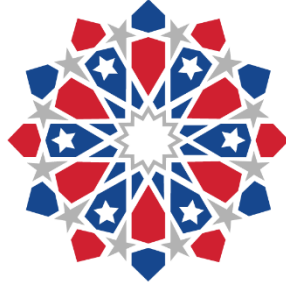


الجامعة  
الأمريكية  
بالبحرين



AMERICAN  
UNIVERSITY  
OF BAHRAIN

# Academic Catalog

## 2023-2024

---

August 2023

<b>ABOUT</b>	<b>2</b>
OVERVIEW	2
MISSION	ERROR! BOOKMARK NOT DEFINED.
VISION	ERROR! BOOKMARK NOT DEFINED.
HEC APPROVALS	ERROR! BOOKMARK NOT DEFINED.
<b>LIBERAL ARTS EDUCATION</b>	<b>2</b>
GENERAL EDUCATION REQUIREMENTS	3
<i>Mission of General Education</i>	3
<i>Goals of General Education</i>	3
<i>General Education Learning Outcomes</i>	3
<b>ACADEMIC PROGRAMS</b>	<b>4</b>
<b>THE COLLEGE OF BUSINESS AND MANAGEMENT</b>	<b>5</b>
BACHELOR OF BUSINESS ADMINISTRATION IN FINANCE	5
BACHELOR OF BUSINESS ADMINISTRATION IN MANAGEMENT	8
BACHELOR OF BUSINESS ADMINISTRATION IN HUMAN RESOURCE MANAGEMENT	12
BACHELOR OF BUSINESS ADMINISTRATION IN DIGITAL MARKETING AND SOCIAL MEDIA	16
MASTER IN BUSINESS ADMINISTRATION (MBA)	20
<b>COLLEGE OF MEDIA AND DESIGN</b>	<b>22</b>
BACHELOR OF ARTS IN MULTIMEDIA DESIGN	22
<b>COLLEGE OF ENGINEERING</b>	<b>25</b>
BACHELOR OF SCIENCE IN COMPUTER ENGINEERING	25
BACHELOR OF SCIENCE IN COMPUTER SCIENCE	28
BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING	33
BACHELOR OF SCIENCE IN CIVIL ENGINEERING	37
BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING	41
BACHELOR OF SCIENCE IN CYBERSECURITY	44
MASTER OF SCIENCE IN ENGINEERING MANAGEMENT	48
<b>COURSE DESCRIPTIONS</b>	<b>51</b>
<b>COURSE DESCRIPTIONS ABBREVIATIONS</b>	<b>95</b>

## **ABOUT**

### **Overview**

AUBH is the first comprehensive American-model co-educational university in the Kingdom of Bahrain. The University offers a holistic journey for students and a unique approach to education that fosters interaction and collaboration between students, faculty, and the professional community.

The contemporary, 75,000 square meter campus is located in Riffa, Bahrain. The innovative and high-tech campus enhances the teaching and learning experience for both faculty and students. Along with classrooms, library and labs, the campus includes a Sports Center with indoors and outdoors courts and fields, vast Student Commons, and an Auditorium for special events.

AUBH curricula is built by experts and specialists to equip students with the knowledge and soft skills to succeed in a rapidly, ever-changing environment. The AUBH quality of American-model education mirrors that of the best universities in the United States. The University's unique academic structure enables students to find their real passions and allows them to develop their abilities, leading to long successful careers in their chosen industry.

### **Mission**

Our mission is to provide transformative, flexible, and innovative learning opportunities to position graduates to launch and sustain satisfying and successful careers. We will foster learner success by promoting interdisciplinarity and entrepreneurial endeavors, providing analytical and technical skills necessary to thrive in the digital economy, and engaging with our communities to foster respect, positive impact, and social responsibility.

### **Vision**

The American University of Bahrain will be internationally recognized for quality and innovation in learning, the success of the leaders it graduates, and its positive impact on social and economic transformation.

### **HEC Approvals**

The American University of Bahrain is a licensed provider of academic qualifications by the Bahraini Higher Education Council (HEC); all academic programs addressed in this document are approved by the HEC.

## **Liberal Arts Education**

The educational purpose of American University of Bahrain is to create an academic and social environment where students are guided and supported in developing and achieving personal and professional goals. Students are challenged to develop as independent, effective, active, rational, and creative thinkers who appreciate and respect social, moral, and ethical values. To this end, the

academic programs of American University of Bahrain are characterized by an integrated general education curriculum and strong academic and career concentrations.

## **General Education Requirements**

The diverse and comprehensive general education curriculum gives students the foundation to connect ideas and apply concepts across disciplines. General education content encourages and supports the general development of all students alongside the specific professional knowledge and skills of the professional program content. The American University of Bahrain aims for graduates to understand the world in which they live and to contribute to society.

All our degree programs share a “General Education” component which sits at the heart of the American model of education. The General Education Program ensures that students are equipped with the key transferable skills that they need, not only to succeed in their academic program of choice, but also in their future career. It provides them with a foundation in all major areas of knowledge, including mathematics, social sciences, natural sciences and humanities, and widens the scope of their horizon. In addition, the General Education Program allows students to transfer credits from one degree to another, if they decide to change majors, without hindering their academic progression.

### Mission of General Education

The mission of the general education curriculum is to broaden students’ understanding of the arts, mathematics, natural sciences, and social sciences, and to support the development of individual common skills, which will enable students to perform effectively, not only in their future careers but also as functional and confident members of society.

### Goals of General Education

The specific goals of the general education curriculum are as follows:

- Develop English language competency.
- Provide an introduction to the sciences, technology, mathematics, social sciences, and Arabic heritage.
- Foster individual development.
- Develop cultural awareness and understanding.
- Develop critical thinking skills.
- Foster understanding of the roles and responsibilities of citizenship in the global community.
- Enable students to be lifelong learners capable of adapting to the changing demands of work and society.
- To enhance creativity and build real-world problem-solving skills.

### General Education Learning Outcomes

By the end of the general education curriculum, a student will be prepared to do the following:

- Demonstrate detailed knowledge and understanding of methods, intellectual approaches and fundamental concepts from relevant disciplines as well as connections across disciplines.

- Effectively apply concepts and principles specific to relevant disciplines as well as across disciplines.
- Develop an understanding and suggest solutions to solve local and global issues using critical analysis and drawing information from various sources and/or perspective.
- Use numeracy and ICT skills to interpret, evaluate and employ reasoning in various contexts.
- Communicate clearly and effectively in written, oral and/or performative forms in a variety of contexts.
- Operate efficiently individually, in teams as leaders and team members, to achieve desired goals.
- Develop lifelong learning skills that are transferable to different contexts.

## **ACADEMIC PROGRAMS**

The American University of Bahrain offers the following degree programs:

The College of Business and Management

- Bachelor of Business Administration in Finance
- Bachelor of Business Administration in Management
- Bachelor of Business Administration in Human Resource Management
- Bachelor of Business Administration in Digital Marketing and Social Media
- Master of Business Administration

The College of Media and Design

- Bachelor of Arts in Multimedia Design

The College of Engineering

- Bachelor of Science in Computer Engineering
- Bachelor of Science in Industrial Engineering
- Bachelor of Science in Mechanical Engineering
- Bachelor of Science in Computer Science
- Bachelor of Science in Civil Engineering
- Bachelor of Science in Cybersecurity
- Master of Science in Engineering management

## **THE COLLEGE OF BUSINESS AND MANAGEMENT**

### **Mission and Objectives of the College of Business and Management**

The mission of the College of Business and Management is to transform students into effective decision-makers who are ready to compete in a dynamic business environment by being socially responsible, ethically focused, and globally oriented. In support of the mission of American University of Bahrain, the fundamental objectives of the College of Business and Management are as follows:

CEO. 1: Demonstrate specialized knowledge in a particular field of study such as accounting, marketing, management, finance, and economics, and general understanding of the core business concepts and theories. [Knowledge: Theoretical Understanding]

CEO. 2: Demonstrate an ability to apply common quantitative and qualitative analysis with the aid of analytical tools in the field of business studies. [Knowledge: Applied Understanding, Skills: Communications, ICT, and Numeracy]

CEO. 3: Critically analyze business related issues, constructing viable solutions to solve real life problems. [Skills: Generic Problem Solving & Analytical Skills]

CEO. 4: Demonstrate effective oral and written communication skills, including the ability to develop sound and coherent arguments in the context of business through formal or informal presentations and/ or other forms of written communication. [Skills: Communications, ICT, and Numeracy]

CEO. 5: Demonstrate the ability to work professionally, ethically, and effectively individually as well as in a team in familiar and unfamiliar contexts to achieve specific outcomes. [Competence: Autonomy, Responsibility & Context]

### **Bachelor of Business Administration in Finance**

The Bachelor of Business Administration in Finance is a 4-year undergraduate curriculum that prepares students for careers in industry, public accounting, government, and nonprofit organizations, as well as for advanced study. The goal of the Bachelor of Business Administration in Finance is to provide students with a foundation in business with an emphasis in finance. The use of problem analysis, critical thinking, communication skills, and technological skills is emphasized to analyze ambiguous situations and provide relevant business alternatives. Graduates of the Bachelor of Business Administration in Finance can pursue a wide range of activities including auditing, accounting, financial planning, budgeting, and management consulting.

### **Program Learning Outcomes**

1. Demonstrate critical theoretical and practical knowledge of practices, concepts, and theories in the business field with a focus on finance. [Knowledge: Theoretical Understanding]
2. Effectively apply the concepts and principles of business to practical applications that may include – but are not limited to- financial analysis, budgeting, forecasting, investment management, capital budgeting, and risk management. [Knowledge: Practical Application]
3. Critically synthesize complex information into meaningful business perspectives that facilitate actionable solutions [Skills: Generic Problem Solving & Analytical Skills]

4. Develop ability to utilize relevant software and technological aids to analyze data with specific applications in finance . [Skills: Communication, ICT and Numeracy, Skills: Generic Problem Solving & Analytical Skills]
5. Demonstrate effective oral and written communication skills, including the ability to develop sound and coherent arguments in the context of business through formal or informal presentations and/ or other forms of written communication. [Skills: Communication, ICT and Numeracy]
6. Demonstrate the ability to work professionally, ethically, and effectively individually as well as in a team in familiar and unfamiliar contexts to achieve specific outcomes. [Competence: Autonomy, Responsibility & Context]

All students pursuing the Bachelor of Business Administration in Finance must complete a minimum of 125 credits with a cumulative GPA of 2.0 or better. Specifically, the requirements are as follows:

- A minimum of 38 credits of general education requirements
- A minimum of 39 credits of business core requirements
- A minimum of 30 credits of major requirements
- A minimum of 9 credits of major electives
- A minimum of 9 credits of professional elective options

### **General Education Requirements (38 credits)**

The following courses constitute the general education requirements for the Bachelor of Business Administration in Finance:

#### English Requirements (6 credits)

ENGL 101	Composition I	(3 credits)
ENGL 102	Composition II	(3 credits)

#### National Requirements (7 credits)

ARHG 104/101	Arabic for Arabic Speakers/Arabic for non-Arabic speakers	(3 credits)
ARHG 107	Human Rights	(2 credits)
ARHG 106	Modern History of Bahrain	(2 credits)

#### Mathematics Requirements (6 credits)

MATH 115	Introduction to Probability and Statistics	(3 credits)
Choose one course:		
MATH 130*	College Algebra	(3 credits)
MATH 131*	Finite Math with Calculus	(3 credits)

\*Students can be exempted from these courses if they successfully completed any 100 level (NQF level 5) university math course

#### ICT Requirements (3 credits)

COSC 101	Introduction to Computing	(3 credits)
----------	---------------------------	-------------

#### Lifelong Learning Requirements (1 credit)

UNSS 101	University Success	(1 credit)
----------	--------------------	------------

### Arts and Humanities Requirements (3 credits) – Choose one course

Students may choose any of the course that satisfies the Art and Humanities Requirements approved by the Division of Art & Science. For example, world history, humanities, public speaking, and others.

### Natural Science Requirements (4 credits) – Choose one course and its lab

Examples of course subjects that satisfy the Natural Sciences Requirements include Biology, Chemistry, Geology, and Physics. Other courses may be considered if approved by the academic unit in advance.

### Social and behavioral Science Requirements (3 credits)

ENGL 205      Business Communication      (3 credits)

### General Education electives (5 credits)

A maximum of 5 credits can be taken from any of the general education courses (free general education electives).

### **Business Core Requirements (39 Credits)**

The following courses constitute the business core requirements for the Bachelor of Business Administration in Finance:

- ACCT 101      Introduction to Financial Accounting      (3 credits)
- ACCT 102      Introduction to Managerial Accounting      (3 credits)
- BUSN 101      Introduction to Business      (3 credits)
- BUSN 301      Business Law      (3 credits)
- ECON 101      Principles of Microeconomics      (3 credits)
- ECON 102      Principles of Macroeconomics      (3 credits)
- FINC 101      Essentials of Financial Analysis      (3 credits)
- MGMT 101      Principles of Management      (3 credits)
- MGMT 205      Organizational Behavior      (3 credits)
- MGMT 350      Business Ethics      (3 credits)
- MGMT 410      Business Policy and Strategic Management      (3 credits)
- MRKG 101      Principles of Marketing      (3 credits)
- MSYS 101      Principles of Management Information Systems      (3 credits)

### **Major Requirements (30 Credits)**

The following courses constitute the major core requirements for the Bachelor of Business Administration in Finance:

- FINC 111      Banking      (3 credits)
- FINC 211      Financial Services      (3 credits)
- FINC 231      Managerial Finance      (3 credits)
- FINC 311      Corporate Finance      (3 credits)



- FINC 312 International Finance (3 credits)
- FINC 321 Investments (3 credits)
- BUSN 401 Business Research Methods (3 credits)
- BUSN 402 Case study, project or dissertation (6 credits)
- FINC 401 Internship (3 credits)

### Major Electives (9 Credits)

- FINC 331 Portfolio Management (3 credits)
- FINC 341 Financial Analysis (3 credits)
- FINC 351 Starting a New Business (3 credits)
- FINC 361 Mergers and Acquisitions (3 credits)
- FINC 371 Financial markets and Institutions (3 credits)
- FINC 410 Data Mining and Machine Learning (3 credits)
- FINC 412 Data Driven Financial Analysis (3 credits)
- BUSN 410 Artificial Intelligence for Business (3 credits)

Students pursuing a Bachelor of Business Administration in Finance must complete a minimum of nine elective credits in finance (FINC) coursework offered at or above the 300 level and which are not considered courses within the major requirements.

### Professional Elective Options (9 Credits)

Students pursuing a Bachelor of Business Administration in Finance must complete a minimum of 9 elective credits. Elective credits can be earned via any courses offered at or above the 200 level.

## Bachelor of Business Administration in Management

The Bachelor of Business Administration in Management is a 4-year undergraduate curriculum designed to provide students with the necessary knowledge and leadership skills to succeed in managerial functions. The Bachelor of Business Administration in Management prepares students for careers in industry, government, and nonprofit organizations, as well as for advanced study. The goal of the Bachelor of Business Administration in Management is to provide students with a foundation in business with an emphasis in management. The use of problem analysis, critical thinking, communication skills, and technological skills is emphasized to analyze ambiguous situations and provide relevant business alternatives.

### Program Learning Outcomes

1. Demonstrate critical knowledge and understanding of a range of contemporary business and management concepts, theories, and issues in the global business environment. [Knowledge: Theoretical Understanding]
2. Demonstrate critical thinking with the ability to assess the policies and actions of an organization against best practice [Knowledge: Practical Application]

3. Use qualitative and quantitative methods to analyze current and potential problems facing an organization and recommend possible solutions [Skills: Generic Problem Solving & Analytical Skills; Skills: Communication, ICT and Numeracy]

4. Demonstrate effective oral and written communication skills, including the ability to develop sound and coherent arguments in the context of business through formal or informal presentations and/ or other forms of written communication. [Skills: Communication, ICT and Numeracy]

5. Demonstrate the ability to work professionally, ethically, and effectively individually as well as in a team in familiar and unfamiliar contexts to achieve specific outcomes. [Competence: Autonomy, Responsibility & Context]

6. Demonstrate the ability to collaborate with managers from other core business functions to address organizational needs. [Competence: Autonomy, Responsibility & Context]

All students pursuing the Bachelor of Business Administration in Management must complete a minimum of 125 credits with a cumulative GPA of 2.0 or better. Specifically, the requirements are as follows:

- A minimum of 38 credits of general education requirements
- A minimum of 39 credits of business core requirements
- A minimum of 30 credits of major requirements
- A minimum of 9 credits of major electives
- A minimum of 9 credits of professional elective options

### **General Education Requirements (38 credits)**

#### English Requirements (6 credits)

ENGL 101	Composition I	(3 credits)
ENGL 102	Composition II	(3 credits)

#### National Requirements (7 credits)

ARHG 104/101	Arabic for Arabic Speakers/ Arabic for non-Arabic speakers	(3 credits)
ARHG 107	Human Rights	(2 credits)
ARHG 106	Modern History of Bahrain	(2 credits)

#### Mathematics Requirements (6 credits)

MATH 115	Introduction to Probability and Statistics	(3 credits)
----------	--	-------------

Choose one course:

MATH 130*	College Algebra	(3 credits)
MATH 131*	Finite Math with Calculus	(3 credits)

\*Students can be exempted from these courses if they successfully completed any 100 level (NQF level 5) university math course

#### ICT Requirements (3 credits)

COSC 101	Introduction to Computing	(3 credits)
----------	---------------------------	-------------

Lifelong Learning Requirements (1 credit)

UNSS 101 University Success (1 credit)

Arts and Humanities Requirements (3 credits) – Choose one course

Students may choose any of the course that satisfies the Art and Humanities Requirements approved by the Division of Art & Science. For example, world history, humanities, public speaking, and others.

Natural Science Requirements (4 credits) – Choose one course and its lab

Examples of course subjects that satisfy the Natural Sciences Requirements include Biology, Chemistry, Geology, and Physics. Other courses may be considered if approved by the academic unit in advance.

Social and behavioral Science Requirements (3 credits)

ENGL 205 Business Communication (3 credits)

General Education electives (5 credits)

A maximum of 5 credits can be taken from any of the general education courses (free general education electives).

**Business Core Requirements (39 Credits)**

The following courses constitute the business core requirements for the Bachelor of Business Administration in Management:

- ACCT 101 Introduction to Financial Accounting (3 credits)
- ACCT 102 Introduction to Managerial Accounting (3 credits)
- BUSN 101 Introduction to Business (3 credits)
- BUSN 301 Business Law (3 credits)
- ECON 101 Principles of Microeconomics (3 credits)
- ECON 102 Principles of Macroeconomics (3 credits)
- FINC 101 Essentials of Financial Analysis (3 credits)
- MGMT 101 Principles of Management (3 credits)
- MGMT 205 Organizational Behavior (3 credits)
- MGMT 350 Business Ethics (3 credits)
- MGMT 410 Business Policy and Strategic Management (3 credits)
- MRKG 101 Principles of Marketing (3 credits)
- MSYS 101 Principles of Management Information Systems (3 credits)

**Major Requirements (30 Credits)**

The following courses constitute the major requirements for the Bachelor of Business Administration in Management:

- MGMT 301 Operations Management (3 credits)

- MGMT 302 Managing Human Resources (3 credits)
- MGMT 303 Management and Leadership Development (3 credits)
- MGMT 305 International Business (3 credits)
- MGMT 306 Cross-Cultural Management (3 credits)
- MGMT 380 Project Management (3 credits)
- BUSN 401 Business Research Methods (3 credits)
- BUSN 402 Case study, project or dissertation (6 credits)
- MGMT 401 Internship (3 credits)

### **Major Electives (9 Credits)**

- MGMT 310 Fundamentals of Family Business (3 credits)
- MGMT 312 Negotiations and Conflict Management (3 credits)
- MGMT 313 Managing Change and Innovation (3 credits)
- MGMT 314 Management Intervention and Consultation (3 credits)
- MGMT 403 Entrepreneurship (3 credits)
- BUSN 410 Artificial Intelligence for Business (3 credits)

Students pursuing a Bachelor of Business Administration in Management must complete a minimum of nine credits in management (MGMT) coursework offered at or above the 300 level and which are not considered courses within the major requirements.

### **Professional Elective Options (9 Credits)**

Students pursuing a Bachelor of Business Administration in Management must complete a minimum of 9 elective credits. Elective credits can be earned via any courses offered.

## **Bachelor of Business Administration in Human Resource Management**

### **Objectives of the Program**

The BBA in Human Resource Management degree program at the American University of Bahrain provides a focused professional foundation for students wishing to enter careers in the field of Human Resource Management. In order to achieve competitive advantage, contemporary organizations place considerable emphasis on aligning the contribution of employees to the strategic objectives of organizations. This degree aims to provide students with the knowledge, skills and competencies required by HRM practitioners. They will develop an appreciation of the impact of internal and external issues facing their company's employees, the strategic nature of human resource management interventions, empathy and active listening and communication skills, global thinking, the challenges of working in a changing environment and the key behaviors of a HR professional practitioner.

### **Why a Student Should Take This Program**

Human Resource Management is an essential business function that exists in every professional organization. Graduates of the program will be able to pursue career opportunities in private organizations and public institutions in the following areas:

- Compensation and Benefits Specialist
- Employee Relations Specialist
- Recruiter / Talent Specialist
- Training and Professional Development Specialist

### **Program Learning Outcomes**

Upon successful completion of the program a graduate will be able to:

1. Demonstrate understanding of the contribution of HRM interventions and strategic initiatives in domestic and multinational organizations.
2. Adapt appropriate HRM strategies in domestic and multinational organizations in order to formulate solutions to improve human performance and enhance company competitive standing.
3. Demonstrate creativity in designing effective HRM policies and analyze the validity of the results within the organization
4. Interpret and evaluate numerical and graphical data obtained from HRM functions such as recruitment and selection, performance management, training evaluation, and compensation administration.
5. Demonstrate effective communication skills, critical thinking skills, and professional and personal development skills that enable them to manage complex problems in the workplace effectively
6. Display a range of personal and interpersonal skills, including the capacity for continuous learning, taking initiatives, performing to deadlines, working in a team, communicating effectively and persuasively, skills which are necessary to enter a career in business organizations or undertake further study.

### **General Description of Graduate Profile**

Students will develop both general and specific competencies in the human resource management field. These include critical thinking, informed and responsible decision making, achievement of professional responsibilities effectively in both local and international contexts, the ability to work with diverse populations to complete tasks and meet team objectives and the ability to lead and inspire others by effective and targeted communications.

Graduates will develop their mastery of not only technical competencies, but also of behavioral competencies required in the Human Resource Management profession, such as Ethical Practice, Leadership & Navigation, Business Acumen, Relationship Management, Communication, Consultation, Critical Evaluation and Global & Cultural Effectiveness.

### **Program Structure**

All students pursuing the BBA in Human Resource Management must complete a minimum of 125 credits with a cumulative minimum GPA of 2.0. Specific requirements are:

- A minimum of 38 credits of General Education Requirements
- A minimum of 39 credits of Business Core Requirements
- A minimum of 30 credits of Major Requirements
- A minimum of 9 credits of Major Electives Requirements
- A minimum of 9 credits of Professional Elective Requirements

### **General Education Requirements (38 credits)**

Courses listed below are common to all AUBH Business courses and have received approval from the Higher Education Council (HEC).

#### English Requirements (6 credits)

ENGL 101	Composition I	(3 credits)
ENGL 102	Composition II	(3 credits)

#### National Requirements (7 credits)

ARHG 104/101	Arabic for Arabic Speakers/Arabic for non-Arabic speakers	(3 credits)
ARHG 107	Human Rights	(2 credits)
ARHG 106	Modern History of Bahrain	(2 credits)

#### Mathematics Requirements (6 credits)

MATH 115	Introduction to Probability and Statistics	(3 credits)
Choose one course:		
MATH 130*	College Algebra	(3 credits)
MATH 131*	Finite Math with Calculus	(3 credits)

\*Students can be exempted from these courses if they successfully completed any 100 level (NQF level 5) university math course

ICT Requirements (3 credits)

COSC 101 Introduction to Computing (3 credits)

Lifelong Learning Requirements (1 credit)

UNSS 101 University Success (1 credit)

Arts and Humanities Requirements (3 credits) – Choose one course

Students may choose any of the course that satisfies the Art and Humanities Requirements approved by the Division of Art & Science. For example, world history, humanities, public speaking, and others.

Natural Science Requirements (4 credits) – Choose one course and its lab

Examples of course subjects that satisfy the Natural Sciences Requirements include Biology, Chemistry, Geology, and Physics. Other courses may be considered if approved by the academic unit in advance.

Social and behavioral Science Requirements (3 credits)

ENGL 205 Business Communication (3 credits)

General Education electives (5 credits)

A maximum of 5 credits can be taken from any of the general education courses (free general education electives).

**Business Core Requirements (39 Credits)**

The following courses constitute the business core requirements for the BBA in Human Resource Management:

- ACCT 101 Introduction to Financial Accounting (3 credits)
- ACCT 102 Introduction to Managerial Accounting (3 credits)
- BUSN 101 Introduction to Business (3 credits)
- BUSN 301 Business Law (3 credits)
- ECON 101 Principles of Microeconomics (3 credits)
- ECON 102 Principles of Macroeconomics (3 credits)
- FINC 101 Essentials of Financial Analysis (3 credits)
- MGMT 101 Principles of Management (3 credits)
- MGMT 205 Organizational Behavior (3 credits)
- MGMT 350 Business Ethics (3 credits)
- MGMT 410 Business Policy and Strategic Management (3 credits)
- MRKG 101 Principles of Marketing (3 credits)
- MSYS 101 Principles of Management Information Systems (3 credits)

### **Major Requirements (30 credits)**

The following courses constitute the Major Requirements for the BBA in Human Resource Management:

- HRMT 302 Recruiting the Best Talent (3 credits)
- HRMT 304 Compensation, Benefits and HRIS Systems (3 credits)
- HRMT 401 Labor Relations and Ethical Issues in HRM (3 credits)
- HRMT 402 Training, Coaching, and Succession Planning (3 credits)
- HRMT 403 Relationship and Performance Management (3 credits)
- HRMT 480 Human Resources Internship (3 credits)
- HRMT 495 Research Influence on HRM Practice (3 credits)
- HRMT 499 Research Project: HR Practitioner Case Study (6 credits)
- MGMT 302 Managing Human Resources (3 credits)

### **Major Elective Requirements (9 credits)**

Students pursuing a BBA in Human Resource Management degree must complete a minimum of 9 elective credits from the choices below:

- HRMT 305 Role of an HR Practitioner and Leader (3 credits)
- HRMT 406 International HRM (3 credits)
- MGMT 312 Negotiations and Conflict Management (3 credits)
- MGMT 313 Managing Change and Innovation (3 credits)
- MGMT 301 Operations Management (3 credits)
- MGMT 306 Cross-Cultural Management (3 credits)
- BUSN 410 Artificial Intelligence for Business (3 credits)

### **Professional Elective Requirements (9 credits)**

Students pursuing a BBA in Human Resource Management must complete a minimum of 9 Professional Elective credits. Professional Elective credits may be earned via any courses offered at or above the 200 level.



## **Bachelor of Business Administration in Digital Marketing and Social Media**

### **Objectives of the Program**

The BBA in Digital Marketing and Social Media at the American University of Bahrain is a 4-year undergraduate curriculum that prepares students for careers in industry, marketing companies, and social media platforms, as well as for advanced study. The goal of the Bachelor of Digital Marketing and Social Media is to prepare students to comprehensively manage and solve marketing tasks and to connect marketing with other fields. Moreover, the concentration in marketing and social media allows students to apply the gained knowledge of popular social channels in the context of growing business. Graduates of the Bachelor of Digital Marketing and Social Media can pursue a wide range of activities such as social media coordinators, marketing directors, social media managers, marketing communications managers, video/audio producer and web developer.

### **Why a Student Should Take This Program**

The Digital Marketing and Social Media Marketing program includes a unique combination of communication courses, business and marketing courses, and visual design courses designed to prepare students for jobs in the real world. The contemporary business world has an increasing need for professionals who can effectively comprehend, plan, and communicate brand messaging across various digital networks and platforms. Through targeted social media marketing courses, this bachelor's degree in marketing and social media prepares students with the knowledge to plan comprehensive social strategies including SEO, content marketing, and digital advertising, analyze sophisticated data, and drive the online solutions necessary for success. Bring advanced communication and technological skills to a variety of business sectors and industries with this marketing and social media degree.

### **Program Learning Outcomes**

Upon successful completion of the program a graduate will be able to:

1. Demonstrate critical understanding of the principles and concepts of digital and social media marketing, including relevant theories in associated fields of knowledge.
2. Apply appropriate methods of digital and social media marketing research and create effective content and campaigns using industry standard software and platforms.
3. Use qualitative and quantitative methods to analyze current and potential marketing and business-related problems facing an organization and recommend solutions.
4. Demonstrate effective oral and written communication skills, including the ability to develop coherent arguments in the context of the digital and social media marketing environment.
5. Demonstrate the ability to work individually and collaboratively with team members and managers from other core business functions to address marketing and business needs.
6. Demonstrate creativity and innovation in the planning, creation, and implementation of business and marketing strategies.

### **General Description of Graduate Profile**

The steady increase in the need for marketing managers, especially ones who understand social media marketing, is largely due to the rapid change technology has made to the field of marketing. The growing reliance on technology and the internet to convey marketing materials to consumers means that social media marketers will continue to be in need for years to come.

A graduate from digital marketing and social media program will have the knowledge of marketing research, strategic marketing planning and consumer behavior as well as social media marketing concentration courses such as social media marketing strategy and social media marketing management.

Holding a bachelor's degree in digital marketing and social media from the American University of Bahrain will enable marketers to implement consistent marketing strategies across social media platforms. Moreover, will have the knowledge of search engine optimization (SEO) and other web analytics. In addition, will be able to work collaboratively to identify social media content, topics and information flow.

### **Program Structure**

All students pursuing the BBA in Marketing and Social Media must complete a minimum of 125 credits with a cumulative minimum GPA of 2.0. Specific requirements are:

- A minimum of 38 credits of General Education Requirements
- A minimum of 39 credits of Business Core Requirements
- A minimum of 36 credits of Major Requirements
- A minimum of 6 credits of Major Electives Requirements
- A minimum of 6 credits of Professional Elective Requirements

### **General Education Requirements (38 credits)**

The following courses constitute the General Education Requirements for the BBA in Marketing and Social Media:

#### English Requirements (6 credits)

ENGL 101	Composition I	(3 credits)
ENGL 102	Composition II	(3 credits)

#### National Requirements (7 credits)

ARHG 104/101	Arabic for Arabic Speakers/Arabic for non-Arabic speakers	(3 credits)
ARHG 107	Human Rights	(2 credits)
ARHG 106	Modern History of Bahrain	(2 credits)

#### Mathematics Requirements (6 credits)

MATH 115	Introduction to Probability and Statistics	(3 credits)
----------	--	-------------

Choose one course:

MATH 130*	College Algebra	(3 credits)
MATH 131*	Finite Math with Calculus	(3 credits)

\*Students can be exempted from these courses if they successfully completed any 100 level (NQF level 5) university math course

#### ICT Requirements (3 credits)

COSC 101	Introduction to Computing	(3 credits)
----------	---------------------------	-------------

#### Lifelong Learning Requirements (1 credit)

UNSS 101	University Success	(1 credit)
----------	--------------------	------------

Arts and Humanities Requirements (3 credits) – Choose one course

Students may choose any of the course that satisfies the Art and Humanities Requirements approved by the Division of Art & Science. For example, world history, humanities, public speaking, and others.

Natural Science Requirements (4 credits) – Choose one course and its lab

Examples of course subjects that satisfy the Natural Sciences Requirements include Biology, Chemistry, Geology, and Physics. Other courses may be considered if approved by the academic unit in advance.

Social and behavioral Science Requirements (3 credits)

ENGL 205 Business Communication (3 credits)

General Education electives (5 credits)

A maximum of 5 credits can be taken from any of the general education courses (free general education electives).

### **Business Core Requirements (39 Credits)**

The following courses constitute the business core requirements for the BBA in Marketing and Social Media:

- ACCT 101 Introduction to Financial Accounting (3 credits)
- ACCT 102 Introduction to Managerial Accounting (3 credits)
- BUSN 101 Introduction to Business (3 credits)
- BUSN 301 Business Law (3 credits)
- ECON 101 Principles of Microeconomics (3 credits)
- ECON 102 Principles of Macroeconomics (3 credits)
- FINC 101 Essentials of Financial Analysis (3 credits)
- MGMT 101 Principles of Management (3 credits)
- MGMT 205 Organizational Behavior (3 credits)
- MGMT 350 Business Ethics (3 credits)
- MGMT 410 Business Policy and Strategic Management (3 credits)
- MRKG 101 Principles of Marketing (3 credits)
- MSYS 101 Principles of Management Information Systems (3 credits)

### **Major Requirements (36 credits)**

The following courses constitute the Major Requirements for the BBA in Marketing and Social Media program:

- DSGN 141 Computer Culture I (3 credits)

- DSGN 412 Media Law and Ethics (3 credits)
- MRKG 421 Data Analytics and Visualization (3 credits)
- MGMT 430 Project Management for Creative Industries (3 credits)
- MRKG 201 Consumer Behavior (3 credits)
- MRKG 202 Online Marketing Channels (3 credits)
- MRKG 401 Principles of Marketing Research (3 credits)
- MRKG 302 Marketing Strategy and Planning in a Digital World (3 credits)
- MRKG 480 Marketing Internship (3 credits)
- MRKG 431 Contemporary Issues in Social Media Campaigns (3 credits)
- MRKG 499 Marketing and Social Media Project (6 credits)

**Major Elective Requirements (6 credits)**

Students pursuing a BBA in Marketing and Social Media must complete a minimum of 6 elective credits which are either from the Design courses (DSGN) or from Business courses (MGMT/HOSP) offered at or above the 200 level and which are not considered courses within the Major Requirements:

- MGMT 305 International Business (3 credits)
- MGMT 313 Managing Change and Innovation (3 credits)
- MRKG 310 Integrated Marketing Communications in a Digital World (3 credits)
- BUSN 410 Artificial Intelligence for Business (3 credits)
- MGMT 404 Technology Entrepreneurship (3 credits)
- DSGN 301 Web Design (3 credits)
- 

**Professional Elective Requirements (6 credits)**

Students pursuing a BBA in Marketing and Social Media must complete a minimum of 6 Professional Elective credits. Professional Elective credits may be earned via any courses offered at or above the 200 level.

## Master in Business Administration (MBA)

### Objectives of the Program

The MBA program aims to develop candidates' critical thinking, analytical and problem-solving skills that professionals need to manage strategic decisions, processes, and people in multi-cultural, fast-paced, and international business contexts. The MBA program facilitates relevant business-driven research for professionals across diverse sectors. This is possible by ensuring scholarly rigor and theoretical understanding of management concepts are reached in core and elective courses.

MBA candidates will be exposed to global business thinking in core disciplines of management, strategy, finance, human resources, and economics. The MBA program encourages and engages graduate learning by connecting theoretical concepts to real-life business scenarios and draws on candidate's lived experiences in the professional world. The MBA has a keen focus on practice-led research, and this enables participants to develop deeper knowledge in their professional fields and apply techniques and tools, that can enhance organizational performance and management practice.

The MBA objectives include:

- Develop critical thinking, analytical and problem-solving skills
- Develop professional acumen and network connections
- Implement leadership skills to work effectively within diverse teams
- Develop research projects from undefined problems and business cases using appropriate technical and analytical research tools
- Integrate management theories and practice, and research skills to perform rigorous and ethical research

### Program Learning Outcomes

1. Demonstrate critical knowledge and understanding of core and specialized theories, principles, and processes in contemporary business and management subjects such as data analytics and data mining, strategic management and innovation, leadership and team development, human resource management, cross-cultural management, operations, marketing, economics, and finance.
2. Apply core and specialized theoretical concepts, ethical practices, methods, and analytical techniques with elements of creativity and originality in different business and management settings.
3. Critically analyze and solve complex managerial problems using core knowledge and empirical data to inform solutions and decision making in varied business disciplines and settings.
4. Demonstrate professional levels of analysis, interpretation, and originality in addressing complex managerial and business-related issues.
5. Demonstrate a professional level of written and oral communication skills, including the ability to present sound and coherent arguments for a range of audiences with different levels of knowledge or expertise in different business contexts.
6. Use a range of standard and specialized analytical tools and information technology applications to analyse and synthesize quantitative and qualitative data in business and management research projects.
7. Critically evaluate numerical and graphical data to address business performance that can be understood by a range of stakeholders

8. Operate at a professional level with substantial responsibility for individual and group work activities on complex and undefined problems in varied business and management scenarios.
9. Demonstrate a professional level of reflexivity, strategic decision making, and peer review during business and management projects.

### Program Structure

All candidates pursuing the MBA must complete a minimum of 33 credits with a cumulative GPA of 3.0 or higher. Specifically, the requirements are as follows:

- Up to two Foundation Courses with zero credits towards the degree (Foundation in Economics/ Foundation in Statistics, if applicable)
- A minimum of 18 credits of Major Requirements
- A minimum of 9 credits of Major Electives
- A minimum of 6 credits of MBA Thesis

### Core Courses (18 credits + 6 credits Thesis)

- BUSN 510 Intercultural Communication in Business (3 credits)
- BUSN 515 Introduction to Data Analysis for Decision-Making (3 credits)
- MGMT 513: Leadership Development and Team Building (3 credits)
- FINC 536: Corporate Finance for a Global Environment (3 credits)
- ECON 510: Managerial Economics and Business Analytics (3 credits)
- MGMT 520: Operations Management in Global Supply Chains (3 credits)
- BUSN 599: Final Thesis Project

### Major elective courses (9 credits)

Select three courses from the list below or any other graduate course(s) approved by the department):

- MGMT 530: People Analytics for Leaders (3 credits)
- MRKG 515: Marketing Management & Strategy (3 credits)
- BUSN 520 Business Data Mining and Predictive Analytics (3 credits)
- MGMT 532: Global Strategic Management and Innovation (3 credits)

\*Candidates who have not taken Economics and/or Statistics/Research Methods during their previous studies, might have to take one or more of the following foundation courses prior to their enrollment or while undertaking the MBA program:

- ECON 311 Foundation in Economics
- BUSN 411 Foundation in Research Methods
- MATH 311 Foundation in Business Statistics

## COLLEGE OF MEDIA AND DESIGN

### Mission and Objectives of the College of Media and Design

The mission of the College of Media and Design is to develop technically competent, aesthetically sensitive, and socially responsible professionals prepared for a changing, global society. In support of the mission of American University of Bahrain, the fundamental objectives of the College of Media and Design are as follows:

- Develop a broad-based, interdisciplinary foundation in the liberal arts, sciences, and humanities
- Develop the verbal, written, and visual skills necessary for the effective communication of ideas
- Develop individual design and media production abilities that effectively integrate technology, function, and aesthetics
- Develop an enlightened sense of design media production
- Develop a strong sense of professional ethics and beliefs
- Provide leadership service for a pluralistic society

### Bachelor of Arts in Multimedia Design

The Bachelor of Arts in Multimedia Design is a 4-year undergraduate curriculum that develops the knowledge and skills which provide students with qualifications to establish careers in a wide range of public- and private-sector industries, both in Bahrain and abroad. The possibilities include acquiring professional positions in media, advertising, business marketing and public relations, , film, television, entertainment and video gaming, and online, interactive training networks, to name just a few. The Bachelor of Arts in Multimedia Design gives students the opportunity to specialize in multimedia design, mass communication, production, or advertising. Each degree option develops a solid base of multimedia skills and knowledge, encompassing interface design, 2-D animation, video production, Web-based design, digital audio, and hands-on experience with real-world multimedia production. This knowledge is further enhanced by majors in a chosen field of specialization, selecting from subject areas such as film and television, journalism, communication, and advertising.

All students pursuing the Bachelor of Arts in Multimedia Design must complete a minimum of 125 credits with a cumulative GPA of 2.0 or better. Specifically, the requirements are as follows:

- A minimum of 38 credits of general education requirements
- A minimum of 51 credits of design core requirements
- A minimum of 18 credits of major requirements
- A minimum of 9 credits of major electives
- A minimum of 9 credits of professional elective options

General Education Requirements (38 credits)

<b><u>National Requirements*</u></b>		<b><u>(7 Credits)</u></b>
ARHG 101/104	Arabic for Non-Arabic/Arabic Speakers*	3 Credits
ARHG 106	Modern History of Bahrain *	2 Credits
ARHG 107	Human Rights*	2 Credits
<b><u>English Requirements</u></b>		<b><u>(6 Credits)</u></b>

ENGL 101	Composition I	3 Credits
ENGL 102	Composition II	3 Credits

**Social and Behavioral Science Requirements (3 Credits)**

Students may choose any course that satisfies Social Science Requirements approved by the Division of Art & Science. For example, Psychology, Sociology, Sustainability, Intercultural communication, etc.

**Mathematics Requirements (3 Credits)**

MATH 115	Introduction to Probability and Statistics	3 Credits
----------	--	-----------

**ICT Requirements (3 Credits)**

COSC 101	Introduction to Computing	3 Credits
----------	---------------------------	-----------

**Lifelong Learning Requirements (1 Credit)**

UNSS 101	University Skills	1 Credit
----------	-------------------	----------

**Natural Science Requirements (4 Credits)**

Students should complete a minimum of 4 credits, including at least 1 credit lab from the Natural Science list of the general Education. Examples of course subjects that satisfy the Natural Sciences Requirements include Biology, Chemistry, Geology, and Physics. Other courses may be considered if approved by the Division of Arts and Science.

**Arts and Humanities Requirements (3 Credits)**

Students may choose any course that satisfies the Art and Humanities Requirements approved by the Division of Art & Science. For example, world history, humanities, public speaking, and others.

**General Education Electives (8 Credits)**

A minimum of 8 credits can be taken from any of the general education courses (free general education electives).

---

**Core Requirements (51 credits)**

- DSGN 101 Visual Culture I (3 credits)
- DSGN 102 Visual Culture II (3 credits)
- DSGN 111 Basic Design I (3 credits)
- DSGN 112 Basic Design II (3 credits)
- DSGN 141 Computer Culture I (3 credits)
- DSGN 142 Computer Culture II (3 credits)
- DSGN 201 Typography (3 credits)
- DSGN 211 Photography Techniques (3 credits)
- DSGN 244 Digital Image Processing (3 credits)
- DSGN 261 Video Production I (3 credits)
- DSGN 321 Introduction to Multimedia (3 credits)
- DSGN 411 Physical Interaction Design (3 credits)
- DSGN 401 Capstone Project I (3 credits)
- DSGN 402 Capstone Project II (6 credits)
- DSGN 405 Multimedia Design Internship (6 credits)



### Major Requirements (18 credits)

- DSGN 232 Digital Vector Graphics (3 credits)
- DSGN 301 Web Design (3 credits)
- DSGN 302 Interactive Web Projects (3 credits)
- DSGN 331 Multimedia Design (3 credits)
- DSGN 332 Multimedia Production (3 credits)
- DSGN 341 3-D Computer Graphics (3 credits)

### Major Electives (9 Credits)

Students pursuing Bachelor of Arts in Multimedia Design must complete a minimum of nine elective credits in design (DSGN) coursework offered at or above the 200-level and which are not considered courses within the major requirements.

- DSGN 212 Photography Workshop (3 credits)
- DSGN 210 Digital Storytelling (3 credits)
- DSGN 241 Concept Development (3 credits)
- DSGN 223 Sound and Image (3 credits)
- DSGN 262 Video Production II (3 credits)
- DSGN 319 Composition and Digital Effects (3 credits)

### Professional Elective Options (9 Credits)

Students pursuing a Bachelor of Arts in Multimedia Design must complete a minimum of 9 elective credits. Elective credits can be earned via any courses offered at or above the 100-level.

### **Internship**

To qualify for the Bachelor of Arts in Multimedia Design, a student must fulfill the internship requirements prior to graduation. The purpose of the internship is to expose students to the profession and give them an opportunity to apply their academic knowledge in a practical setting. Internships are evaluated by the internship coordinator with a pass/fail grade.

The internship course has two options as shown below:

<b>Credit</b>	<b>Minimum Working Weeks*</b>	<b>Eligibility</b>
6 Credits	<b>Option 1:</b> Two internships, 5 weeks each (i.e. 3 credits each) DSGN 405 A DSGN 405 B	Min of 60 credits for the first internship and min of 90 credits for the second, with a CGPA of 2.00 for both internships
	<b>Option 2:</b> One internship, 9 weeks DSGN 405	Min of 90 credits and a CGPA of 2.00

\*A working week is equivalent to 5 days of work with 7-8 hours per day

## **COLLEGE OF ENGINEERING**

### **Bachelor of Science in Computer Engineering**

The Bachelor of Science in Computer Engineering is a 4-year undergraduate curriculum that aims at producing the best-skilled, hands-on, practicing computer engineer. More specifically, the objectives are: (1) to equip students with the technical knowledge and skills that will enable them to have a successful career in the computer engineering profession; (2) to provide students with a general education that will enable them to appreciate the social, ethical, economic, and environmental dimensions of problems they may face; (3) to develop students' communication skills and social skills that are necessary to work effectively with others; (4) to develop students' ability to solve problems by analyzing what is already known and then applying logic and creativity to find a solution; and (5) to equip students with the intellectual skills necessary to continue learning and to stay current with the profession as it changes.

#### **Why a student should take this program**

The Bachelor of Science in Computer Engineering combines, intensively, both sides of computer systems: software and hardware. This prepares the graduates for success in a broad range of jobs within the information and communication hyper-industry.

The program focusses on the integration of a strong mathematics, sciences, electronics, and computing preparation with a wide range of skills such as communicating effectively, functioning collaboratively on a team, and applying new knowledge, among others. Also, it emphasizes the development of ethical, socially responsible, and global attitudes. All this together brings our graduates a variety of career choices and job opportunities in today's high-tech society, an ever-expanding field.

#### **Program Learning Outcomes**

1. Identify, formulate and solve complex engineering problems by applying principles of knowledge of science, mathematics and electrical & computer engineering.
2. Ability to Apply engineering and IT design to design reliable systems, devices or processes from initial specifications to a deliverable system, that meet specified needs but always with care and consideration for public health, safety and welfare, as well as for global, cultural, social, environmental.
3. Communicate effectively with a range of audiences.
4. Recognize ethical and professional responsibilities in engineering and IT situations and make informed judgments, which must consider the impact of engineering and IT solutions to global, economic, environmental and societal contexts.
5. Function effectively as part of a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives.
6. Develop and conduct appropriate experimentation, analysis and interpretation of data, and use scientific judgment to draw conclusions.
7. Acquire and apply new knowledge as needed, using appropriate learning strategies.

#### **General Description of Graduate Profile**

Computer engineering graduates acquire a strong mathematical, sciences, electronics and computing basis. These graduates also develop skills at communicating effectively, functioning collaboratively on a team, adapting to change, evaluating own strengths and weaknesses, acting ethically, balancing

local and global perspectives, developing experimentation, applying new knowledge, monitoring economic impacts, analyzing, designing and making decisions with consideration of sustainability and solving complex engineering problems.

Computer engineers are able to tackle in depth both sides of computer systems (and devices): hardware and software. And they do it at different levels: test, development, optimization, implementation, maintenance, analysis and design.

### **Course List**

All students pursuing the Bachelor of Science in Computer Engineering must complete a minimum of 124 credits with a cumulative GPA of 2.0 or better. Specifically, the requirements are as follows:

- A minimum of 38 credits of general education requirements
- A minimum of 17 credits of engineering core requirements
- A minimum of 21 credits of lower-level major requirements
- A minimum of 36 credits of upper-level major requirements
- A minimum of 12 credits of professional electives

#### **National Requirements\* (7 Credits)**

ARHG 101/104	Arabic for Non-Arabic/Arabic Speakers*	3 Credits
ARHG 106	Modern History of Bahrain *	2 Credits
ARHG 107	Human Rights*	2 Credits

#### **English Requirements (6 Credits)**

ENGL 101	Composition I	3 Credits
ENGL 102	Composition II	3 Credits

#### **Mathematics Requirements (8 Credits)**

MATH 153	Calculus I	4 Credits
MATH 154	Calculus II	4 Credits

#### **ICT Requirements (3 Credits)**

COSC 101	Introduction to Computing	3 Credits
----------	---------------------------	-----------

#### **Lifelong Learning Requirements (1 Credit)**

UNSS 101	University Skills	1 Credit
----------	-------------------	----------

#### **Natural Science Requirements (7 Credits)**

Students should complete a minimum of 7 credits, including at least 1 credit lab from the Natural Science list of the general Education. Examples of course subjects that satisfy the Natural Sciences Requirements include Biology, Chemistry, Geology, and Physics. Other courses may be considered if approved by the Division of Arts and Science.

#### **Arts and Humanities Requirements (3 Credits)**

Students may choose any course that satisfies the Art and Humanities Requirements approved by the Division of Art & Science. For example, world history, humanities, public speaking, and others.

## **Social and Behavioral Science Requirements (3 Credits)**

Students may choose any course that satisfies the Social and Behavioral Science Requirements approved by the Division of Art & Science. For example, business communication, psychology, sociology, and others.

### Core Requirements (17 credits)

- CIVL 200 Engineering Mechanics - Statics (3 credits)
- CMPE 160 Introduction to Computer Programming and Applications (3 credits)
- ENGR 201 Methods of Analysis (3 credits)
- MATH 252 Calculus III (4 credits)
- PHYS 102 Principles of Physics II (3 credits)
- PHYS 102L Principles of Physics II Laboratory (1 credit)

### Major Lower-Level Requirements (21 credits)

- CMPE 270 Digital Systems (3 credits)
- CMPE 270L Digital Systems Laboratory (1 credit)
- CMPE 271 Computer Organization (3 credits)
- ELEC 210 Circuit Analysis I (3 credits)
- MATH 203 Discrete Mathematics (3 credits)
- MATH 254 Introduction to Linear Algebra (4 credits)
- MATH 260 Probability and Statistics (4 credits)

### Major Upper-Level Requirements (36 credits)

- CMPE 361 Windows Programming (3 credits)
- CMPE 375 Embedded Systems Programming (3 credits)
- CMPE 460 Software Design and Engineering (3 credits)
- CMPE 460L Software Design and Engineering Laboratory (1 credit)
- CMPE 470 Digital Circuits (3 credits)
- CMPE 470L Digital Logic Laboratory (1 credit)
- CMPE 475 Microprocessors (3 credits)
- CMPE 495A Engineering Design: Capstone Project I (3 credits)
- CMPE 495B Engineering Design: Capstone Project II (3 credits)
- ELEC 310 Circuit Analysis II (3 credits)
- ELEC 330 Fundamentals of Engineering Electronics (3 credits)
- ELEC 330L Engineering Electronics Laboratory (1 credit)
- CMPE 405 Computer Engineering Internship (6 credits)

### Professional Electives(12 credits)

Students pursuing the Bachelor of Science in Computer Engineering must complete a minimum of 12 elective credits per the following:

- One approved elective course in mathematics at 300 level or above (3 credits)
- Three engineering elective courses (9 credits)

Select:

**At least one course from the following list:**

COSC 448 Mobile Programming II  
COSC 442 Artificial Intelligence  
COSC 484/L Web Engineering and Laboratory  
COSC 412 Implementation of Database Systems  
COSC 463 Data Mining Techniques  
CMPE 560 Computer and Data Networks  
CMPE 561 Windows Database and Web Programming  
CMPE 565 Multimedia Communication Systems  
CMPE 571 Real-Time Operating Systems  
CMPE 572 VLSI Circuit Design  
ELEC 410 Signals and Systems  
ELEC 556 Digital Signal Processing

**At most two courses from the following list:**

CMPE 390 Introduction to Machine Learning and Data Analytics  
COSC 312 Design and Usage of Databases  
COSC 372/L Operating Systems and Laboratory  
COSC 348 Mobile Programming I  
COSC 371 Computer Organization II

**Total number of units: 124****Internship**

To qualify for the Bachelor of Science in Computer Engineering, a student must fulfill the internship requirements prior to graduation. The purpose of the internship is to expose students to the profession and give them an opportunity to apply their academic knowledge in a practical setting. The internship consists of a minimum of 280 work hours (8 weeks) for fourth-year students with an approved employer. Internships are evaluated by the internship coordinator with a pass/fail grade.

**Bachelor of Science in Computer Science**

The Bachelor of Science in Computer Science consists of a 4-year undergraduate curriculum that aims to produce practicing computer scientists with the highest level of skills in the industry. More specifically, the objectives of the program are (1) to provide students with the technical knowledge and skills which will enable them to have a successful career in the computer science profession; (2) to provide students with a general education that will enable them to appreciate the social, ethical, economic and environmental dimensions of problems they may be faced with; (3) to develop students' communication and social skills which are essential for working effectively in a group; (4) to develop students' ability to solve problems by applying logic and creativity to what they have learned in order to find a solution; and (5) to provide students with the intellectual skills necessary for continuous learning in order to keep up with the constantly evolving industry.

**Why a Student Should Take this Program**

The Bachelor of Science in Computer Science intensively combines both sides of computer systems: software and hardware. This prepares graduates for success in a broad range of jobs within the information and communication hyper-industry.

The department focuses on the integration of strong mathematics, sciences, electronics and computing preparation with a wide range of skills such as communicating effectively, functioning collaboratively in a team and applying new knowledge, among others. It also emphasizes the development of ethical, socially responsible and global attitudes. All these together bring to our graduates a variety of career choices and job opportunities in today's high-tech society, in an ever-expanding field.

### **Program Learning Outcomes**

1. The Program Learning Outcomes (PLOs) are those required by the Engineering Accreditation Commission of ABET in its Criterion 3. PLOs are outcomes (1) through (7).
2. Demonstrate critical knowledge and understanding of mathematics and current technical concepts and practices in the core of computing.
3. Critically analyze the complexity of real problems, identify, define the computing requirements appropriate to its solution, and evaluate the performance.
4. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline
5. Communicate effectively in a variety of professional contexts
6. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
7. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
8. Apply computer science theory and software development fundamentals to produce computing-based solutions.

### **Institutional Learning Outcomes**

The Institutional Learning Outcomes (ILOs) are those required by the American University of Bahrain to be acquired by all its graduates. Some of the ILOs are implicitly included in certain PLOs. The other ILOs are outcomes (1) through (4).

Regularly evaluate own strengths and weaknesses and pursues opportunities to develop in necessary areas

Accept and integrate new ideas and information on their merits, even if contrary to personal opinion or previous experiences.

Closely monitor economic, market and societal conditions and trends, and understand the direct and indirect impacts on the organization, customers or the public

Transcend local ideas and ways of thinking by routinely examining situations from the perspective of others from different backgrounds, correcting for own biases and balancing local and global perspectives

### **General Description of Graduate Profile**

Computer Science graduates acquire a strong mathematical, sciences, electronics and computing basis. These graduates also develop skills at communicating effectively, functioning collaboratively in a team, adapting to change, evaluating own strengths and weaknesses, acting ethically, balancing local and global perspectives, developing experimentation, applying new knowledge, monitoring economic impacts, analyzing, designing and making decisions with consideration of sustainability and solving complex IT problems. Computer scientists are able to tackle in depth both sides of computer systems (and devices): hardware and software. They do it at multiple levels: testing, development, optimization, implementation, maintenance, analysis and design.

### **Course List**

All students pursuing the Bachelor of Science in Computer Science must complete a minimum of 127 credits with a cumulative GPA of 2.0 or better. Specifically, the requirements are as follows:

- A minimum of 38 credits of General Education Requirements
- A minimum of 79 credits of Major Requirements
- A minimum of 6 credits of Major Elective Options

### **GENERAL EDUCATION REQUIREMENTS (38 credits)**

<b><u>National Requirements*</u></b>		<b>(7 Credits)</b>
ARHG 101/104	Arabic for Non-Arabic/Arabic Speakers*	3 Credits
ARHG 106	Modern History of Bahrain *	2 Credits
ARHG 107	Human Rights*	2 Credits
<b><u>English Requirements</u></b>		<b>(6 Credits)</b>
ENGL 101	Composition I	3 Credits
ENGL 102	Composition II	3 Credits
<b><u>Mathematics Requirements</u></b>		<b>(8 Credits)</b>
MATH 153	Calculus I	4 Credits
MATH 154	Calculus II	4 Credits
<b><u>ICT Requirements</u></b>		<b>(3 Credits)</b>
COSC 101	Introduction to Computing	3 Credits
<b><u>Lifelong Learning Requirements</u></b>		<b>(1 Credit)</b>
UNSS 101	University Skills	1 Credit

### **Natural Science Requirements (7 Credits)**

Students should complete a minimum of 7 credits, including at least 1 credit lab from the Natural Science list of the general Education. Examples of course subjects that satisfy the Natural Sciences Requirements include Biology, Chemistry, Geology, and Physics. Other courses may be considered if approved by the Division of Arts and Science.

### **Arts and Humanities Requirements (3 Credits)**

Students may choose any course that satisfies the Art and Humanities Requirements approved by the Division of Art & Science. For example, world history, humanities, public speaking, and others.

### **Social and Behavioral Science Requirements (3 Credits)**

Students may choose any course that satisfies the Social and Behavioral Science Requirements approved by the Division of Art & Science. For example, business communication, psychology, sociology, and others.

### **MAJOR REQUIREMENTS (79 credits)**

COSC 110	Introduction to Computer Science and Networks	(3 credits)
CMPE 160	Introduction to Computer Programming and Applications	(3 credits)
MATH 255	Introduction to Linear Algebra	(3 credits)
COSC 210	Management Information Systems	(3 credits)
MATH 203	Discrete Mathematics	(3 credits)
COSC 125	Data Structure and Programming Techniques	(3 credits)
CMPE 270	Digital Systems	(3 credits)
CMPE 271	Computer Organization 1	(3 credits)
MATH 260	Probability and Statistics	(4 credits)
CMPE 361	Windows Programming	(3 credits)
COSC 215	Communication Networks	(3 credits)
COSC 248	Algorithms and Complexity	(3 credits)
COSC 262	Operations Research	(3 credits)
COSC 312	Design and Usage of Database	(3 credits)
COSC 372	Operating Systems	(3 credits)
COSC 372L	Operating System lab	(1 credit)
COSC 379	Numerical Analysis	(3 credits)
COSC 490	Senior Design project	(3 credits)
COSC 490L	Senior Design project Lab	(1 credit)
COSC 412	Implementation of Database Systems	(3 credits)
COSC 413	Protection and Security of Information Systems	(3 credits)
CMPE 390	Introduction to Machine Learning and Data Analytics	(3 credits)
CMPE 460	Software Design and Engineering	(4 credits)
COSC 442	Artificial Intelligence	(3 credits)
COSC 467	Network Management	(3 credits)
COSC 484	Web Engineering	(3 credits)
COSC 484L	Web Engineering Lab	(1 credit)
COSC 405	Computer Science Internship	(3 credits)



COSC 491L Senior Project Lab

(1 credit)

**MAJOR ELECTIVES (6 credits)**

Students pursuing the Bachelor of Science in Computer Science must complete a minimum of 6 elective credits from the following or any other courses indicated by the department:

COSC 348	Mobile Programming I	(3 credits)
COSC 448	Mobile Programming II	(3 credits)
COSC 371	Computer Organization II	(3 credits)
COSC 463	Data Mining Techniques	(3 credits)
COSC 472	Cryptography	(3 credits)
CMPE 375	Embedded Systems Programming	(3 credits)

## **Bachelor of Science in Industrial Engineering**

The Bachelor of Science in Industrial Engineering is a 4-year undergraduate curriculum that ensures the students' academic success and preparation for a productive industrial engineering career. The objective of the Bachelor of Science in Industrial Engineering is to foster a world-class industrial engineering education in collaboration with industry. The department is committed to graduate competent industrial engineers equipped with the proficiency to adapt to technological and societal changes, and who are poised to excel in the field. The educational objectives are (1) to impart a basic understanding of industrial engineering principles, including analytical and systems thinking and problem solving; (2) to provide the proficiency to analyze, design, develop, implement, and improve systems in production and service organizations; (3) to build a strong foundation in research skills to enable graduates to contribute to knowledge expansion by carrying out scholarly research for the advancement of the profession; and (4) to foster intellectual maturity by emphasizing professional and ethical responsibility as well as lifelong learning and communication skills. The Bachelor of Science in Industrial Engineering integrates technical aspects with studies in the social sciences to ensure appropriate sensitivity to socially related problems.

### **Why a student should take this program**

This Bachelor of Science in Industrial Engineering combines technical and management skills making graduates the most flexible and versatile engineers. The department focusses on the integration of a strong mathematics, sciences and computing preparation with a wide range of business applications, and the development of ethical, socially responsible and global attitudes. All this together brings our graduates a variety of career choices and job opportunities in any sector.

### **Program Learning Outcomes**

1. Identify, formulate and solve complex engineering problems by applying principles of knowledge of science, mathematics and electrical & computer engineering.
2. Ability to Apply engineering and IT design to design reliable systems, devices or processes from initial specifications to a deliverable system, that meet specified needs but always with care and consideration for public health, safety and welfare, as well as for global, cultural, social, environmental.
3. Communicate effectively with a range of audiences.
4. Recognize ethical and professional responsibilities in engineering and IT situations and make informed judgments, which must consider the impact of engineering and IT solutions to global, economic, environmental and societal contexts.
5. Function effectively as part of a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives.
6. Develop and conduct appropriate experimentation, analysis and interpretation of data, and use scientific judgment to draw conclusions.
7. Acquire and apply new knowledge as needed, using appropriate learning strategies.

### **General Description of Graduate Profile**

Industrial engineering is concerned with the design, improvement, and installation of integrated systems of people, materials, information, equipment and energy. Graduates will design and manage

processes, systems and organizations to make the best use of industrial resources such as workers, materials, equipment, and information. They combine technical and management skills to optimize processes and bring change through strategies such as cost reduction, time saving or productivity increasing, in any sector. Our graduates are ready to compete in a dynamic environment by being socially responsible, ethically focused, and globally oriented.

### Course List

All students pursuing the Bachelor of Science in Industrial Engineering must complete a minimum of 125 credits with a cumulative GPA of 2.0 or better. Specifically, the requirements are as follows:

- A minimum of 38 credits of general education requirements
- A minimum of 17 credits of engineering core requirements
- A minimum of 17 credits of lower-level major requirements
- A minimum of 44 credits of upper-level major requirements
- A minimum of 9 credits of professional elective options

All students pursuing the Bachelor of Science in Industrial Engineering must complete a minimum of:

General Education Requirements (38 credits)

#### English Requirements (9 credits)

ENGL 101	Composition I	(3 credits)
ENGL 102	Composition II	(3 credits)
ENGL 205	Business Communication	(3 credits)

#### Arab Heritage Requirements (6 credits)

ARHG 101	Arabic for non-Arabic speakers	(3 credits) or
ARHG 104	Arabic for Arabic speakers	(3 credits)
ARHG 102	Modern History of Bahrain	(3 credits)

#### Mathematics Requirements (6 credits)

MATH 151	Calculus I	(3 credits)
MATH 152	Calculus II	(3 credits)

#### Natural Sciences Requirements (8 credits)

CHEM 101	Introductory Chemistry	(3 credits)
CHEM 101L	Introductory Chemistry Laboratory	(1 credit)
PHYS 101	Principles of Physics I	(3 credits)
PHYS 101L	Principles of Physics I Laboratory	(1 credits)

#### Social Sciences Requirements (9 credits)

ARHG 103	Human Rights	(3 credits)
PSYC 101	Introduction to Psychology	(3 credits)
SOCS 101	Introduction to Sociology	(3 credits)

#### Core Requirements (17 credits)

CIVL 200 Engineering Mechanics - Statics	(3 credits)
CMPE 160 Introduction to Computer Programming and Applications	(3 credits)
ENGR 201 Methods of Analysis	(3 credits)
MATH 252 Calculus III	(4 credits)
PHYS 102 Principles of Physics II	(3 credits)
PHYS 102L Principles of Physics II Laboratory	(1 credit)

Major Lower-Level Requirements (17 credits )

ELEC 204 Principles of Electrical Engineering	(3 credits)
MATH 260 Probability and Statistics	(4 credits)
MECH 101 Solid Modeling I	(3 credits)
MECH 210 Materials Science	(3 credits)
NDSE 120 Introduction to Industrial Engineering	(1 credit)
NDSE 202 Operations Research I: Linear Models	(3 credits)

Major Upper-Level Requirements (44 credits)

CMPE 390 Introduction to Machine Learning and Data Analytics	(3 credits)
ECON 341 Engineering Economic Analysis	(3 credits)
MGMT 404 Technology Entrepreneurship	(3 credits)
NDSE 303 Operations Research II: Nonlinear Models	(3 credits)
NDSE 304 Operations Research III: Stochastic Models	(4 credits)
NDSE 306 Systems Simulation	(3 credits)
NDSE 312 Facilities Design and Planning	(3 credits)
NDSE 381 Safety Engineering	(3 credits)
NDSE 413 Supply Chain Management	(4 credits)
NDSE 423 Quality Engineering	(3 credits)
NDSE 495A Engineering Design: Capstone Project I	(3 credits)
NDSE 495B Engineering Design: Capstone Project II	(3 credits)
NDSE 405 Industrial Engineering Internship	(6 credits)

Professional Electives(9 credits)

Students pursuing the Bachelor of Science in Industrial Engineering must complete a minimum of 9 elective credits of industrial engineering (NDSE) courses offered at or above the 400 level and/or 300 level or above from the approved list of courses from other programs.

**At least one course from the following list:**

- COSC 442 Artificial Intelligence
- COSC 463 Data Mining Techniques
- MGMT 410 Business Policy and Strategic Management
- MGMT 380 Project Management

**At most two courses from the following list:**

- MGMT 301 Operation Management
- MGMT 302 Managing Human Resources
- MGMT 303 Management and Leadership Development
- MGMT 305 International Business
- MGMT 306 Cross-Cultural Management

MGMT 350 Business Ethics  
CIVL 355 Environmental Engineering

**Total number of units: 125**

**Internship**

To qualify for the Bachelor of Science in Industrial Engineering, a student must fulfill the internship requirements prior to graduation. The purpose of the internship is to expose students to the profession and give them an opportunity to apply their academic knowledge in a practical setting. The internship consists of a minimum of 280 work hours (8 weeks) for fourth-year students with an approved employer. Internships are evaluated by the internship coordinator with a pass/fail grade.

## Bachelor of Science in Civil Engineering

### Objectives of the Program

The Bachelor of Science in Civil Engineering is a 4-year undergraduate curriculum that ensures academic success and preparation for a productive career in engineering. The objective of the Bachelor of Science in Civil Engineering is to give the student a basic knowledge of civil, construction and environmental engineering, as well as the interdisciplinary background and skills to meaningfully participate in and contribute to technical advances towards this profession. The Bachelor of Science in Civil Engineering integrates technical aspects with studies in the social sciences to ensure appropriate sensitivity to socially related issues.

### Why a student should take this program

This Bachelor of Science in Civil Engineering combines technical and management skills making graduates the most flexible and versatile engineers. The department focuses on the integration of strong mathematics, sciences, and computing preparation with a wide range of business applications, and the development of ethical, socially responsible and global attitudes. The combination of aforementioned skills brings our graduates a variety of career choices and job opportunities in various sectors.

### Program Learning Outcomes

The Program Learning Outcomes (PLOs) are those required by the Engineering Accreditation Commission of ABET in its Criterion 3. PLOs are outcomes (1) through (7).

1. Identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics
2. Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare, as well as global, cultural, social, environmental and economic factors
3. Communicate effectively with a range of audiences
4. Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which consider the impact of engineering solutions in global, economic, environmental and societal contexts
5. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives
6. Develop and conduct appropriate experimentation, analysis and data interpretation, and use engineering judgment to draw conclusions
7. Acquire and apply new knowledge as needed, using appropriate learning strategies

### Institutional Learning Outcomes

The Institutional Learning Outcomes (ILOs) are those required by the American University of Bahrain to be acquired by all its graduates. Some of the ILOs are implicitly included in certain PLOs. The other ILOs are outcomes (1) through (4).

1. Regularly evaluate own strengths and weaknesses and pursue opportunities to develop in necessary areas

2. Accept and integrate new ideas and information on their merits, even if contrary to personal opinion or previous experiences
3. Closely monitor economic, market, societal conditions and trends, and understand the direct and indirect impacts on the organization, customers or the public
4. Transcend local ideas and ways of thinking by routinely examining situations from the perspective of others from different backgrounds, correcting for own biases and balancing local and global perspectives

### **General Description of Graduate Profile**

Civil Engineering is concerned with the design, improvement and installation of integrated systems of people, materials, information, equipment and energy. Graduates will design and manage processes, systems and organizations to make the best use of industrial resources such as workers, materials, equipment and information. They combine technical and management skills to optimize processes and bring change through strategies such as cost reduction, time saving or productivity increasing, in any sector. Our graduates are ready to compete in a dynamic environment by being socially responsible, ethically focused and globally oriented.

### **Program Structure**

All students pursuing the Bachelor of Science in Civil Engineering must complete a minimum of 130 credits with a cumulative GPA of 2.0 or better. Specifically, the requirements are as follows:

- A minimum of 38 credits of General Education Requirements
- A minimum of 17 credits of Engineering Core Requirements
- A minimum of 63 credits of Major Requirements
- A minimum of 12 credits of Professional Elective Options

### **GENERAL EDUCATION REQUIREMENTS (38 credits)**

<b><u>National Requirements*</u></b>		<b>(7 Credits)</b>
ARHG 101/104	Arabic for Non-Arabic/Arabic Speakers*	3 Credits
ARHG 106	Modern History of Bahrain *	2 Credits
ARHG 107	Human Rights*	2 Credits
<b><u>English Requirements</u></b>		<b>(6 Credits)</b>
ENGL 101	Composition I	3 Credits
ENGL 102	Composition II	3 Credits
<b><u>Mathematics Requirements</u></b>		<b>(8 Credits)</b>
MATH 153	Calculus I	4 Credits
MATH 154	Calculus II	4 Credits
<b><u>ICT Requirements</u></b>		<b>(3 Credits)</b>

COSC 101 Introduction to Computing 3 Credits  
**Lifelong Learning Requirements (1 Credit)**

UNSS 101 University Skills 1 Credit

**Natural Science Requirements (7 Credits)**

Students should complete a minimum of 7 credits, including at least 1 credit lab from the Natural Science list of the general Education. Examples of course subjects that satisfy the Natural Sciences Requirements include Biology, Chemistry, Geology, and Physics. Other courses may be considered if approved by the Division of Arts and Science.

**Arts and Humanities Requirements (3 Credits)**

Students may choose any course that satisfies the Art and Humanities Requirements approved by the Division of Art & Science. For example, world history, humanities, public speaking, and others.

**Social and Behavioral Science Requirements (3 Credits)**

Students may choose any course that satisfies the Social and Behavioral Science Requirements approved by the Division of Art & Science. For example, business communication, psychology, sociology, and others.

**ENGINEERING CORE REQUIREMENTS (17 credits)**

The following courses constitute the Engineering Core Requirements for the Bachelor of Science in Civil Engineering:

CIVL 200 Engineering Mechanics - Statics	(3 credits)
CMPE 160 Introduction to Computer Programming and Applications	(3 credits)
ENGR 201 Methods of Analysis	(3 credits)
MATH 252 Calculus III	(4 credits)
PHYS 102 Principles of Physics II	(3 credits)
PHYS 102L Principles of Physics II Laboratory	(1 credit)

**MAJOR REQUIREMENTS (63 credits)**

The following courses constitute the requirements for the Bachelor of Science in Civil Engineering:

CIVL 100 Introduction to Civil Engineering	(1 credit)
CIVL 120 Computer Applications in Civil Engineering	(3 credits)
CIVL 121 Computer Graphics for the Built Environment	(3 credits)
CIVL 160 Statistical Methods for the Built Environment	(3 credits)
CIVL 218 Surveying for Civil Engineering and Construction	(3 credits)
CIVL 220 Civil and Environmental Engineering Computer Applications	(3 credits)
ELEC 204 Principles of Electrical Engineering	(3 credits)
MECH 240 Introduction to Engineering Materials	(3 credits)
MECH 240L Materials Laboratory	(1 credit)
CIVL 301 Introduction to Solid Mechanics	(3 credits)



CIVL 301L Solid Mechanics Laboratory	(1 credit)
CIVL 321 Structural Analysis I	(3 credits)
CIVL 355 Environmental Engineering	(3 credits)
CIVL 401 Civil Engineering and Society	(1 credit)
CIVL 444 Applied Hydraulics	(3 credits)
CIVL 462 Geotechnical Engineering	(3 credits)
CIVL 462L Geotechnical Engineering Lab	(1 credit)
CIVL 481 Transportation Engineering	(3 credits)
CIVL 495A Engineering Design: Capstone Project I	(3 credits)
CIVL 495B Engineering Design: Capstone Project II	(3 credits)
ECON 341 Engineering Economic Analysis	(3 credits)
MECH 360 Fluid Mechanics	(3 credits)
MECH 360L Fluid Mechanics Laboratory	(1 credit)
CIVL 405 Civil Engineering Internship	(6 credits)

### **PROFESSIONAL ELECTIVE OPTIONS (12 credits)**

Students pursuing the Bachelor of Science in Civil Engineering must complete a minimum of 12 elective credits from six specialization options with a maximum of not more than six credits from any one specialization.

CIVL 421 Reinforced Concrete Design	(3 credits)
CIVL 445 Applied Hydrology	(3 credits)
CIVL 465 Foundation Engineering and Earth Retaining Structures	(3 credits)
CIVL 482 Highway Engineering	(3 credits)
CIVL 491 Construction Methods	(3 credits)
CIVL 492 Construction Engineering	(3 credits)
CIVL 521 Structural Analysis II	(3 credits)
CIVL 525 Design of Steel Structures	(3 credits)
CIVL 528 Masonry Structures Design	(3 credits)
CIVL 530 Open Channel Hydraulics	(3 credits)
CIVL 580 Traffic Engineering Design	(3 credits)

### **Civil Engineering Internship**

To qualify for the Bachelor of Science in Civil Engineering a student must fulfill the internship requirements prior to graduation. The purpose of the internship is to expose students to the profession and give them an opportunity to apply their academic knowledge in a practical setting. The internship consists of a minimum of 240 work hours (6 weeks) for third-year students and 320 work hours (8 weeks) for fourth-year students with an approved employer. Internships are evaluated by the internship coordinator with a pass/fail grade.

## **Bachelor of Science in Mechanical Engineering**

The Bachelor of Science in Mechanical Engineering consists of a 4-year undergraduate curriculum that prepares students for a wide range of careers and new technologies, as well as for advanced study. Mechanical engineers work on diverse, challenging problems that require the integration of science, engineering, and socio-economic knowledge. Mechanical engineering covers the design and analysis of all kinds of systems and technologies with mechanical components, with applications in energy production, robotics, environmental systems, materials, composites, transportation, manufacturing, machine design and many more areas.

### **Why a student should take this program**

This Bachelor of Science in Mechanical Engineering combines technical and management skills, making graduates the most flexible and versatile engineers. The program focuses on the integration of strong mathematics, sciences and computing preparation with a wide range of business applications, and the development of ethical, socially responsible and global attitudes. The combination of aforementioned skills brings our graduates a wide range of career choices and job opportunities in various sectors.

### **Program Learning Outcomes**

The Program Learning Outcomes (PLOs) are those required by the Engineering Accreditation Commission of ABET in its Criterion 3. PLOs are outcomes (1) through (7).

1. Identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics
2. Apply engineering design to produce solutions that meet specified needs, with consideration of public health, safety and welfare, as well as global, cultural, social, environmental and economic factors
3. Communicate effectively with a range of audiences
4. Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which take into consideration the impact of engineering solutions in global, economic, environmental and societal contexts
5. Function effectively in a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives
6. Develop and conduct appropriate experimentation, analysis and data interpretation, and use engineering judgment to draw conclusions
7. Acquire and apply new knowledge, using appropriate learning strategies

### **General Description of Graduate Profile**

Mechanical engineering involves the design, improvement and installation of integrated systems of people, materials, information, equipment and energy. Graduates design and manage processes, systems and organizations to make the best use of industrial resources such as workers, materials,

equipment and information. They combine technical and management skills to optimize processes and bring change through strategies such as cost reduction, time saving or productivity increasing, in any sector. Our graduates are ready to compete in a dynamic environment by being socially responsible, ethically focused and globally oriented.

## Course List

All students pursuing the Bachelor of Science in Mechanical Engineering must complete a minimum of 132 credits with a cumulative GPA of 2.0 or better. Specifically, the requirements are as follows:

- A minimum of 38 credits of General Education Requirements
- A minimum of 17 credits of Engineering Core Requirements
- A minimum of 68 credits of Major Requirements
- A minimum of 9 credits of Major Elective Options

### **GENERAL EDUCATION REQUIREMENTS (38 credits)**

#### **National Requirements\* (7 Credits)**

ARHG 101/104	Arabic for Non-Arabic/Arabic Speakers*	3 Credits
ARHG 106	Modern History of Bahrain *	2 Credits
ARHG 107	Human Rights*	2 Credits

#### **English Requirements (6 Credits)**

ENGL 101	Composition I	3 Credits
ENGL 102	Composition II	3 Credits

#### **Mathematics Requirements (8 Credits)**

MATH 153	Calculus I	4 Credits
MATH 154	Calculus II	4 Credits

#### **ICT Requirements (3 Credits)**

COSC 101	Introduction to Computing	3 Credits
----------	---------------------------	-----------

#### **Lifelong Learning Requirements (1 Credit)**

UNSS 101	University Skills	1 Credit
----------	-------------------	----------

#### **Natural Science Requirements (7 Credits)**

Students should complete a minimum of 7 credits, including at least 1 credit lab from the Natural Science list of the general Education. Examples of course subjects that satisfy the Natural Sciences Requirements include Biology, Chemistry, Geology, and Physics. Other courses may be considered if approved by the Division of Arts and Science.

### **Arts and Humanities Requirements (3 Credits)**

Students may choose any course that satisfies the Art and Humanities Requirements approved by the Division of Art & Science. For example, world history, humanities, public speaking, and others.

### **Social and Behavioral Science Requirements (3 Credits)**

Students may choose any course that satisfies the Social and Behavioral Science Requirements approved by the Division of Art & Science. For example, business communication, psychology, sociology, and others.

### **ENGINEERING CORE REQUIREMENTS (17 credits)**

CIVL 200	Engineering Mechanics - Statics (3 credits)
CMPE 160	Introduction to Computer Programming and Applications (3 credits)
ENGR 201	Methods of Analysis (3 credits)
MATH 252	Calculus III (4 credits)
PHYS 102	Principles of Physics II (3 credits)
PHYS 102L	Principles of Physics II Laboratory (1 credit)

### **MAJOR REQUIREMENTS (68 credits)**

PHYS 105	Principles of Physics III (3 credits)
PHYS 105L	Principles of Physics III Laboratory (1 credit)
ELEC 204	Principles of Electrical Engineering (3 credits)
MECH 101	Solid Modeling I (3 credits)
MECH 102	Solid Modeling II (3 credits)
MECH 220	Engineering Mechanics - Dynamics (3 credits)
MECH 240	Introduction to Engineering Materials (3 credits)
MECH 240L	Introduction to Engineering Materials Laboratory (1 credit)
CIVL 301	Introduction to Solid Mechanics (3 credits)
MECH 310	Introduction to Engineering Design (3 credits)
MECH 312	Simulation of Engineering Systems (3 credits)
MECH 314	Engineering Design: Mechanical Components (3 credits)
MECH 330L	Control Systems Laboratory (1 credit)
MECH 340	Materials, Manufacturing, and Design (3 credits)
MECH 350	Thermodynamics (3 credits)
MECH 351	Engineering Thermodynamics (3 credits)
MECH 360	Fluid Mechanics (3 credits)
MECH 360L	Fluid Mechanics Laboratory (1 credit)
MECH 405	Mechanical Engineering Internship (6 credits)
MECH 452	Principles of Heat Transfer (3 credits)
MECH 490L	Mechanical and Thermal Systems Laboratory (1 credit)
MECH 495A	Engineering Design: Capstone Project I (3 credits)
MECH 495B	Engineering Design: Capstone Project II (3 credits)
MECH 496	Advanced Machine Design (3 credits)
MECH 498	Thermal Systems Analysis and Design (3 credits)

## **MAJOR ELECTIVES(9 credits)**

Students pursuing the Bachelor of Science in Mechanical Engineering must complete a minimum of three elective courses in mechanical engineering courses or approved courses from other programs.

MECH 210 Materials Science (3 credits)

MECH 355 Continuum Mechanics (3 credits)

MECH 357 Introduction to Mechanical Vibrations (3 credits)

MECH 358 Automatic Control Systems (3 credits)

MECH 365 Nonmetallic Materials (3 credits)

MECH 368 Powder-Based Manufacturing (3 credits)

MECH 408 Computer-Aided Manufacturing (3 credits)

MECH 410 Heating, Ventilating and Air-Conditioning (3 credits)

MECH 415 Solar Energy Conversion (3 credits)

MECH 420 Biomechanics (3 credits)

MECH 425 Micro-Electro-Mechanical Systems (3 credits)

## **Internship**

To qualify for the Bachelor of Science in Mechanical Engineering, a student must fulfill the internship requirements prior to graduation. The purpose of the internship is to expose students to the profession and give them an opportunity to apply their academic knowledge in a practical setting. The internship consists of a minimum of 280 work hours (8 weeks) for fourth-year students with an approved employer. Internships are evaluated by the internship coordinator with a pass/fail grade.

**Total number of units: 132**

## **Bachelor of Science in Cybersecurity**

### **Objectives of the Program**

The Bachelor of Science in Cybersecurity is a 4-year undergraduate curriculum that ensures academic success and preparation for a productive career in cybersecurity. The program aims to equip students with the skills and knowledge necessary to secure computer systems, networks, and data from various cyber threats.

The objectives of the program are:

1. To provide students with a solid foundation in computer science principles and practices, as well as specialized knowledge in the field of cybersecurity.
2. To equip students with the knowledge and skills necessary to identify, assess, and mitigate cybersecurity risks and threats.
3. To train students in the design, implementation, and management of secure computer systems and networks.
4. To educate students on legal, ethical, social, and economic issues related to cybersecurity, including privacy, data protection, and cybercrime.
5. To provide students with the intellectual skills necessary for continuous learning in order to keep up with the constantly evolving industry.
6. To prepare students for a successful career in the field of cybersecurity and for advanced study in computer science and cybersecurity at the graduate level.

## **Why a student should take this program**

This Bachelor of Science in Cybersecurity typically covers topics such as computer programming, algorithms, database systems, operating systems, computer networks, network security, risk management, cybercrimes, cryptography, and cybersecurity technologies and techniques. Students will also learn about legal, ethical, and social issues related to cybersecurity.

There are several compelling reasons why a student should consider taking this program:

1. **High Demand for Cybersecurity Professionals:** There is a growing demand for cybersecurity professionals in virtually every industry. As more organizations adopt digital technologies, the need for cybersecurity experts to secure their networks and data becomes increasingly critical.
2. **Career Opportunities:** The program prepares graduates for a wide range of careers in the cybersecurity industry, including roles such as cybersecurity analyst, network security specialist, digital forensics investigator, information security manager, and cybersecurity consultant.
3. **High Earning Potential:** Cybersecurity professionals typically earn high salaries due to the high demand for their skills and expertise.
4. **Challenging and Dynamic Field:** Cybersecurity is a constantly evolving field, with new threats and technologies emerging all the time. Students who enjoy problem-solving and working in a dynamic environment will find this program engaging and rewarding.
5. **Contribution to Society:** Cybersecurity professionals play an essential role in protecting organizations and individuals from cyber threats. By taking this program, students have the opportunity to make a significant contribution to society by helping to keep people and their data safe.

### **Program Learning Outcomes**

The Program Learning Outcomes (PLOs) are:

1. Demonstrate critical knowledge and understanding of mathematics and current technical concepts and practices in the core of computing and cybersecurity.
2. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
3. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
4. Communicate effectively in a variety of professional contexts.
5. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
6. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
7. Apply security principles and practices to maintain operations in the presence of risks and threats. [CY]

### **General Description of Graduate Profile**

Graduates of the Bachelor of Science in Cybersecurity acquire a strong foundation in computer science principles and practices, including a comprehensive understanding of mathematical, science, electronics, and computing. In addition to their computer science knowledge, graduates gain specialized skills in cybersecurity technologies and techniques, risk management, threat analysis, and incident response. They also develop critical skills such as effective communication, collaboration, adaptability, ethical decision-making, sustainability, and the ability to analyze, design, and solve complex IT problems.

Upon completion of the program, graduates should be able to design and implement secure computer systems, evaluate and mitigate cybersecurity risks, perform forensic investigations, and apply ethical principles to cybersecurity practices. Graduates of the program can pursue careers in various fields such as cybersecurity analyst, network security specialist, digital forensics investigator, information security manager, and cybersecurity consultant.

### **Course List**

All students pursuing the Bachelor of Science in Cybersecurity must complete a minimum of 130 credits with a cumulative GPA of 2.0 or better. Specifically, the requirements are as follows:

1. National Requirements (7) credits
2. A minimum of (32) credits of General Education Requirements
3. A minimum of (6) credits of Professional Elective Options
4. A minimum of (76) credits of Major Requirements
5. A minimum of (9) credits of Major Electives
6. Graduate Portfolio

#### **National Requirements\* (7 Credits)**

ARHG 101/104	Arabic for Non-Arabic/Arabic Speakers*	3 Credits
ARHG 106	Modern History of Bahrain *	2 Credits
ARHG 107	Human Rights*	2 Credits

#### **English Requirements (6 Credits)**

ENGL 101	Composition I	3 Credits
ENGL 102	Composition II	3 Credits

#### **Mathematics Requirements (8 Credits)**

MATH 153	Calculus I	4 Credits
MATH 154	Calculus II	4 Credits

#### **ICT Requirements (3 Credits)**

COSC 101	Introduction to Computing	3 Credits
----------	---------------------------	-----------

#### **Lifelong Learning Requirements (1 Credit)**

UNSS 101	University Skills	1 Credit
----------	-------------------	----------

#### **Natural Science Requirements (7 Credits)**

Students should complete a minimum of 7 credits, including at least 1 credit lab from the Natural Science list of the general Education. Examples of course subjects that satisfy the Natural Sciences Requirements include Biology, Chemistry, Geology, and Physics. Other courses may be considered if approved by the Division of Arts and Science.

#### **Arts and Humanities Requirements (3 Credits)**

Students may choose any course that satisfies the Art and Humanities Requirements approved by the Division of Art & Science. For example, world history, humanities, public speaking, and others.

## **Social and Behavioral Science Requirements (3 Credits)**

Students may choose any course that satisfies the Social and Behavioral Science Requirements approved by the Division of Art & Science. For example, business communication, psychology, sociology, and others.

### **MAJOR REQUIREMENTS (76 credits)**

The following courses constitute the Major Requirements for the Bachelor of Science in Cybersecurity:

COSC 102 Object Oriented Programming (3 credits)  
COSC 125 Data Structure and Programming Techniques (3 credits)  
MATH 203 Discrete Mathematics (3 credits)  
CMPE 215 Communication Networks (3 credits)  
ENGR 205 Multidisciplinary Research Methods (2 credits)  
MATH 255 Introduction to Linear Algebra (3 credits)  
COSC 248 Algorithms and Complexity (3 credits)  
MATH 260 Probability and Statistics (4 credits)  
CMPE 270 Digital Systems (3 credits)  
CMPE 270L Digital Systems Laboratory (1 credit)  
CMPE 271 Computer Organization (3 credits)  
COSC 312 Design and Usage of Database (3 credits)  
COSC 372 Operating Systems (3 credits)  
COSC 372L Operating Systems Laboratory (1 credit)  
CYBR 310 Introduction to Cybersecurity (3 credits)  
SWEN 360 Software Design and Engineering (3 credits)  
SWEN 360L Software Design and Engineering Laboratory (1 credit)  
ENGR 401 Entrepreneurship for Engineers (2 credits)  
CYBR 362 Security Vulnerabilities and Threats (3 credits)  
CYBR 460 Secure Software Design and Engineering (3 credits)  
CYBR 315 Network Security and Forensics Analysis (3 credits)  
CYBR 375 Cybercrime (3 credits)  
CYBR 462 Information System Risk Management (3 credits)  
CYBR 470 Cryptography (3 credits)  
CYBR 480 Security Standards and Audits (3 credits)  
CYBR 410L Cybersecurity Professional Certificate (1 credit)  
CYBR 405 Cybersecurity Internship (3 credits)  
CYBR 495A Cybersecurity Design Project A (1 credit)  
CYBR 495B Cybersecurity Design Project B (3 credits)

### **MAJOR ELECTIVES (9 credits)**

Students pursuing the Bachelor of Science in Cybersecurity must complete a minimum of 9 elective credits from the following list or any other course approved by the College of Engineering:



CYBR 415 Cloud Security and Privacy (3 credits)  
CYBR 465 Web application Security (3 credits)  
CYBR 467 Ethical Hacking (3 credits)  
CYBR 482 Information Technology Audit and Control (3 credits)  
CYBR 487 Cybersecurity Framework and Management (3 credits)  
CYBR 475 Cyber Incident Handling and Response (3 credits)

### **PROFESSIONAL ELECTIVE OPTIONS (6 credits)**

Students pursuing the Bachelor of Science in Cybersecurity must complete a minimum of 6 elective credits from general education course or any other programs.

### **INTERNSHIP (3 credits)**

To qualify for the Bachelor of Science in Cybersecurity a student must fulfill the internship requirements prior to graduation. The purpose of the internship is to expose students to the profession and give them an opportunity to apply their academic knowledge in a practical setting. The internship consists of a minimum of 240 work hours (6 weeks) with an approved employer. Internships are evaluated by the internship coordinator with a pass/fail grade.

### **GRADUATE PORTFOLIO**

The American University of Bahrain recognizes the importance of curricular and non-curricular activities in developing graduate attributes. Hence, students are required to compile a portfolio of evidence showing their development throughout their educational journey. The portfolio is expected to include just a sample of activities that the student considers significant to his/her learning. The graduation portfolio aims to:

- Provide an insight into the student's personality and areas of interest
- Showcase the student's work and development over time
- Encourage students to engage in their wider academic and social context
- Encourage students to reflect on their own learning and development
- Promote AUBH graduates to employers

**Total number of units: 130**

## **Master of Science in Engineering Management**

**The Master of Science in Engineering Management at the American University of Bahrain** is a graduate degree program designed to expose students to the theories and practices of the modern engineering management environment. The program is designed to prepare students for positions

of leadership as well as to provide students with a broad comprehensive view of advanced studies in Engineering Management.

The program aims to improve the decision-making capabilities of students by providing them with functional business fundamentals and managerial capabilities, whilst enhancing their analytical, communicational and technological skills. The program will enable students to contribute intellectually to the engineering management profession.

### **Why a student should take this program**

This program provides an in-depth understanding of the importance of linking technology to corporate strategy, and of the tools and techniques that will enable middle and senior managers to develop, implement and manage technology strategy and innovation at business and corporate levels. This program aims to provide students with the fundamentals to meet the new competitive challenges of the knowledge-driven global economy. With advanced technology and rapid growth in the engineering industry, students with specific qualifications and credentials will have a wide range of great career opportunities.

Graduates who choose to pursue a career in Engineering Management will be prepared to plan, organize, lead, control and evaluate quality improvement initiatives in various types of organizations, both public and private. The program is designed to expand students' careers opportunities and strengthen their credentials as managers, administrators and consultants.

### **Program Learning Outcomes**

On successful completion of the program a graduate will be able to:

1. Develop an understanding of engineering management theories, methods, practices, and strategies.
2. Gain an in-depth understanding of management practices, organizational behavior, and business improvement methods
3. Manage resources, apply analytical thought to effectively managing people, finance, and enterprises as an integrated system.
4. Manage across boundaries and evaluate how products can best be designed, configured, and produced.
5. Understand and appreciate the role of engineering on people, the environment, and the generation of wealth.
6. Develop leadership skills, competencies, and knowledge to succeed as a professional engineering manager.

### **Program Structure**

All students pursuing the Master of Science in Engineering Management must complete a minimum of 33 credits with a cumulative GPA of 2.0 or higher. Specifically, the requirements are as follows:

- A minimum of 21 credits of Major Requirements
- A minimum of 6 credits of Major Electives
- A minimum of 6 credits of Master Theses

**Foundation Courses:**

1. ENGM 411: Foundation in Research Methods (0 credit)

**Required Course(s)**

ENGM 511: Financial and Cost Accounting (3 credits)

ENGM 512: Project Management (3 credits)

ENGM 513: Managing People and Organizations (3 credits)

ENGM 514: Technology Management (3 credits)

ENGM 525: Concept to Commercialization (3 credits)

MGMT 520 Operations Management in Global Supply Chains (3 credits)

ENGM 535: Analytics for Engineering Managers (3 credits)

ENGM 599: Master Thesis (6 credits)

**Elective Course(s)** (select two courses from the list below or any other graduate course(s) approved by the department)

ENGM 528: Engineering and Sustainable Development (3 credits)

ENGM 529: Environmental, Social and Governance (ESG) (3 credits)

ENGM 532: Product Design and Innovation (3 credits)

ENGM 536: Financial Management (3 credits)

MGMT 513: Leadership Development and Team Building (3 credits)

MGMT 530: People Analytics for Leaders (3 credits)

BUSN 520 Business Data Mining and Predictive Analytics (3 credits)

## **COURSE DESCRIPTIONS**

### **ACCT 101 Introduction to Financial Accounting (3 credits)**

This course is an introduction to accounting and is required of all business majors. Its primary purpose is to give you an understanding of how and why accounting information is used from an external (financial reporting) and to some extent, internal (managerial reporting) perspective. Although the process of preparing accounting reports will be discussed, it is not the primary focus of this course. Instead, the focus will be on how accounting reports can facilitate decision making for a wide variety of individuals who are interested in and affected by the activities of a business . *Prerequisites: None*

### **ACCT 102 Introduction to Managerial Accounting (3 credits)**

This introductory accounting course provides students with the knowledge of managerial accounting and its application in making economic decisions in a business entity. Topics covered will enable students to analyze and interpret both historical and estimated data by management to conduct daily operations, plan future operations and develop overall business strategies. As such, the emphasis will be on the use of accounting information for management purposes. Further developing analytical skills through problem solving and thoughtful participation in class as part of the preparation for a professional career is a major objective of this course *Prerequisite: ACCT 101*

### **ANTH 152 Introduction to Cultural Anthropology (3 credits)**

Study of the variety of cultural patterns that human societies use to adapt to the environment, guide social interaction and understand the human condition. Introduces the ideas and methods anthropologists use to develop a scientific and humanistic understanding of the world's cultures. *Prerequisites: None*

### **ARHG 101 Arabic for non-Arabic speakers (3 credits)**

This course develops reading and writing skills in Modern Standard Arabic with active speaking and listening skills in both formal Arabic and various Arabic dialects. Authentic materials from the Arabic media will be used in addition to text-related video and audio materials. *Prerequisites: None*

### **ARHG 102 Modern History of Bahrain (3 credits)**

This course covers the modern history of Bahrain. It contains introduction and geography of Bahrain, short history of Bahrain until the beginning of sixteenth century, Bahrain between European and regional ambitions, Utub tribes and establishment of political entities in the Arabian Gulf, Bahrain and British protection and Bahrain after independence. *Prerequisites: None*

### **ARHG 103 Human Rights (3 credits)**

This course covers human rights historical development, major human rights laws, treaties and conventions. To learn obligations as citizens and residents of Bahrain as well as a member of the international community and to understand Human Rights Enforcement Mechanisms in Bahrain. *Prerequisites: None*

### **ARHG 104 Arabic for Arabic Speakers (3 credits)**

A practical language course which aims at developing the language skills of native speakers of Arabic. This course provides the students with a comprehensive knowledge of the linguistic system. It is intended to help learners reach a superior level of proficiency by expanding vocabulary and providing

paragraph-level activities in reading, writing, and speaking; through a selection texts by writers from across the Arab world address literary themes and represent a range of genres, styles, and periods, where each text is followed by exercises that measure understanding and comprehension, vocabulary and language applications, including grammar, morphology, spelling, stylistic applications and composition. *Prerequisites: None*

### **ARHG 106 Modern History of Bahrain (2 credits)**

The course covers the Modern History of Bahrain since 1500 till 2002. It contains: Chapter I: Introduction geography. Chapter II: A Short History of Bahrain until the beginning of the sixteenth century. Chapter III: Bahrain between European and regional ambitions. Chapter IV: Utub tribe and the establishment of political entities in the Arabian Gulf. Chapter V of Bahrain and British protection. Chapter VI: Bahrain after independence. *Prerequisites: None*

### **ARHG 107 Human Rights (2 credits)**

This course covers human rights historical development, major human rights laws, treaties, and conventions. To learn obligations as citizens and residents of Bahrain as well as a member of the international community and to understand Human Rights Enforcement Mechanisms in Bahrain. *Prerequisites: None*

### **ASTR 352 Current Developments in Astronomy (3 credits)**

In-depth examination and interpretation of astronomical discoveries occurring at the time the course is taught. Reading includes both background material and current periodicals accessible to General Education students. Likely areas of discussion include spacecraft exploration of the solar system, satellite observations of high-energy radiation from space, exotic astronomical objects (e.g., double quasars, black hole candidates), and new cosmological data. *Co-requisite: ENGL 102*

### **ASTR 352L Current Developments in Astronomy Lab (1 credit)**

ASTR 352L is designed to reinforce topics presented in ASTR 352 lectures. Through scientific experimentation, students will improve their understanding of basic concepts in astronomy while becoming trained on experimental techniques used in astronomy and increasing their insight on the foundations of the scientific process. Likely topics covered are the exploration of the sky, angular size, the spectrum, the Doppler effect, eclipses, moon phases, transits, day and night, the seasons, our Sun, the search of exoplanets, the state of the universe, and the age of the universe. *Pre-co-requisites: ASTR 352*

### **BIOL 101 Principles of Biology I (3 credits)**

This course provides students with an introduction to the fundamental principles of biology. Topics covered include: cells and macromolecules; genetics and inheritance; evolution and biodiversity; and ecology. Through this course, students will have the opportunity to increase their understanding of biology as it applies to society and everyday life. *Prerequisites: None*

### **BIOL 101L Principles of Biology I Laboratory (1 credit)**

This course is designed to reinforce topics presented in BIOL 101 lectures. Through hands-on, scientific experimentation, students will improve their understanding of basic concepts in biology: cells, genetics and inheritance, evolution and biodiversity, and ecology. Students will also participate in a field visit to a local mangrove forest. *Pre-requisite/Co-requisite: BIOL 101*

**BUSN 101 Introduction to Business (3 credits)**

This course introduces the fundamental principles of business organization, ownership, operation, and control. *Prerequisites: None*

**BUSN 301 Business Law (3 credits)**

This course is designed to provide learners with a study of the law governing the business environment, including the study of common law, statutory law and the role of legal institutions in regulating business activities. The course covers the topics of the American legal system, including civil litigation, intentional and unintentional torts, and the law of contracts. The course includes a general discussion of the legal system of Bahrain, in line with the course content. *Prerequisites: Minimum 60 credits*

**BUSN 401: Business Research Methods (3 credits)**

This course is designed to provide students with the necessary skills and knowledge to determine the information necessary to address an identified research problem (basic or applied) and, using this understanding, develop and use an actionable research proposal. In this process, the students will gain an understanding of relevant approaches and elements of undertaking a research enquiry specifically to provide insights to solving a relevant problem. They will develop critical core competencies and skills required to carry out such an enquiry. These competencies and skills include: defining research questions; setting appropriate research objectives; study design that incorporates research objectives; secondary and primary data collection and instruments; sampling and analysis methods; and effective reporting of results; as well as the importance of ethical conduct in conducting research in both a domestic and in international business contexts. *Pre-requisites: MATH 115, Min 70 credits*

**BUSN 402 Case Study, Project or Dissertation (6 credits)**

The capstone course is a method of summative evaluation in which the student is given an opportunity to demonstrate integrated knowledge and growth in the major. The course consequently builds on the knowledge gathered during years as a Business student. It gives them the ability to work on an extended business project under the guidance of a supervisor while gathering very practical experience. Students will be required to work on a complex and real-life problem related to Business studies. In doing so, the Capstone makes the link between the academic discourse and the world thereafter. *Prerequisites: BUSN 401, Minimum 90 credits*

**BUSN 410 Artificial Intelligence for Business (3 credits)**

This course aims to provide students with critical knowledge and experience to identify opportunities in proposing and deploying AI solutions to real business scenarios. Having successfully completed the course, students will be able to describe AI and the role it can play to deliver benefits for businesses, identify potential applications of AI in practice, and assess the main capabilities of AI and the core technologies that help deliver them. *Prerequisites: MATH 115, MSYS 101, ENGL 205, minimum 90 credits*

**BUSN 411 Foundation in Research Methods (0 credits)**

This course is designed to provide students with the necessary skills and knowledge to determine the information necessary to address an identified research problem (basic or applied). In this process, the students will gain an understanding of relevant approaches and elements of undertaking a research enquiry specifically to provide insights to solving a relevant problem. They will develop

critical core competencies and skills required to carry out such an enquiry. These competencies and skills include: defining research questions; setting appropriate research objectives; study design that incorporates research objectives; secondary and primary data collection and instruments; sampling and analysis methods; and effective reporting of results; as well as the importance of ethical conduct in conducting research in both a domestic and in international business contexts. *Prerequisites: None*

### **BUSN 510 Intercultural Communication in Business (3 credits)**

The course focuses on ways of promoting mutual understanding in contemporary cross-cultural and international settings. Specific objectives are to examine ways in which people's underlying assumptions differ between cultures and how a lack of appreciation of this could negatively impact an organization. *Prerequisites: None*

### **BUSN 515 Introduction to Data Analysis for Decision-Making (3 credits)**

This course introduces the methods and tools which help to systematically extract not only information but also insights from the data in various business functions, such as operations, supply chain, marketing, and finance. The course first covers the foundations of business analytics: decision making, definition and categories of business analytics, big data. Candidates will get hands-on experience by ethically analyzing real world business data using a state-of-the-art business analytics software. The course puts an emphasis on how to effectively communicate findings with business managers and other interested parties. *Prerequisites: None*

### **BUSN 520 Business Data Mining and Predictive Analytics (3 credits)**

This course provides a comprehensive coverage of the most widely supervised and unsupervised methods such as logistic regression, k-nearest neighbor, naïve bayes, clustering, neural network, regularization, etc. This course also provides a strong theoretical foundation of predictive analytics and machine learning models in making both classifications and predictions based on big data. Using real world case studies, candidates learn how to ethically apply and implement the suitable techniques using state of the art business analytics software and present the findings effectively. *Prerequisites: None*

### **BUSN 599 Final Thesis Project (6 credits)**

The project is an independent research work that aims to apply the knowledge and skills candidates have learned in the classroom to help a client during the Business Consulting Project. Candidates need to contact a client (in Bahrain or any other GCC country) and a supervisor and manage the whole relationship with them. The project topics may vary but they should involve a description of the real-life problem, review of the literature, and appropriately analyzing and modeling data to develop findings and recommendations. *Prerequisites: None*

### **CHEM 101 Introductory Chemistry (3 credits)**

This course will provide students with a comprehensive overview of the major areas of chemistry. Chemical principles for each topic under discussion are presented together with their foundation in atomic and molecular structure. Topics covered range from atomic theory to the descriptions of chemical reactivity and reactions, quantitative methods in chemistry, reactions in aqueous media and chemical kinetics and chemical equilibrium. Applications of chemistry are discussed throughout the lectures. *Prerequisites: None*

**CHEM 101L Introductory Chemistry Laboratory (1 credit)**

This course is an application of the general chemistry concepts studied in CHEM 101. The student carries out experiments including density, chemical equilibria, solutions, titrations, and standardizing solutions. Upon completion of the course the student will have gained a strong foundation for the further study of chemistry, and for the application of chemical principles in a variety of other fields.

*Pre/Co-requisites: CHEM 101*

**CHEM 103 General Chemistry (3credits)**

This course will provide students with a comprehensive overview of the major areas of chemistry. Chemical principles for each topic under discussion are presented together with their foundation in atomic and molecular structure. Topics covered range from atomic theory to the descriptions of chemical reactivity and reactions, heat transfer concepts, enthalpy and quantitative methods in chemistry, reactions in aqueous media and chemical bonding to chemical models on molecular structures. Applications of chemistry, "the central science" are discussed throughout the lectures.

*Prerequisites: None*

**CHEM 103L - General Chemistry Lab (1 credit)**

This course is an application of the general chemistry concepts studied in CHEM 103. The student carries out experiments including calculating enthalpy, nomenclature, solutions, and finding limiting reagent experiments. Upon completion of the course the student will have gained an overall foundation for the application of chemical principles in a variety of other fields. *Pre/Co-requisite: CHEM 103*

**CIVL 100: Introduction to Civil Engineering (1 credit)**

This course is an introduction to the diverse field of civil and environmental engineering. The topics covered include structural, geotechnical, water resources, transportation, construction engineering and management and environmental engineering. Legal, ethical and international dimensions of the profession are also discussed. *Prerequisites: None*

**CIVL 120: Digital Applications in Civil Engineering (3 credits)**

This course is the application of computing tools for Civil Engineering. Content also focuses on the use of spreadsheets, programming, mathematical analysis programs, presentation and graphics programs. *Prerequisite/Co-requisite: MATH 152*

**CIVL 121: Computer-aided Design for the Built Environment (3 credits)**

The building industry is increasingly reliant upon information systems to manage, implement, and operate interdisciplinary projects. Learn the fundamentals of current and future means of using computer-aided design systems to analyze, collaborate, develop, and communicate solutions to civil engineering projects. *Prerequisite: CMPE 160*

**CIVL 160: Statistical Methods for the Built Environment (3 credits)**

This course consists of the application of statistical methods to civil and environmental engineering problems in construction, hydrology, water quality, air pollution, and other related areas.

*Prerequisite: MATH 152*



**CIVL 200 Engineering Mechanics – Statics (3 credits)**

A vector treatment of the concepts and characteristics of forces and couples. Distributed forces. Center of mass; centroid of area. Equilibrium of particles and rigid bodies. Trusses and frames. Internal forces. Shear and moment distribution in beams. Area moment of inertia. The main purpose of this course is to develop the engineering student's ability to analyse static equilibrium problems in a logical manner. Emphasis is placed on an understanding of principles employed in the solution of problems rather than reliance on a rote process of substitution in numerous formulas..

*Prerequisite: PHYS 101*

**CIVL 218: Surveying for Civil Engineering and Construction (3 credits)**

This course is an introduction to the principles of plane surveying. Topics include measurement of horizontal distance, difference in elevation and angles; traverse surveys and computations; horizontal and vertical curves; principles of stadia; topographic surveys; and earthwork.

*Prerequisites: CIVL 160 and MATH 152*

**CIVL 220: Civil and Environmental Engineering Computer Applications (3 credits)**

This course focuses on graphical information systems (GIS), specialized civil engineering software and advanced problem solving. *Prerequisite: CIVL 121*

**CIVL 301: Introduction to Solid Mechanics (3 credits)**

Concepts of stress, strain, deflection; axial force, torsion, bending, combined stress, Mohr's circle, failure theories; design concepts, application to machines and vehicles . *Prerequisite: CIVL 200*

**CIVL 301L: Solid Mechanics Laboratory (1 credit)**

This course provides students an introduction to solid mechanics and laboratory procedure. More specifically the course involves studies in solid mechanics, experimental stress analysis and experimental confirmation of theory. *Prerequisite/Co-requisite: CIVL 301*

**CIVL 321: Structural Analysis I (3 credits)**

This course is an analysis of beams, frames, trusses and three-dimensional frameworks. Topics also include influence lines, deflections, introduction to statically indeterminate structures and moment distribution. *Prerequisites: CIVL 301 and CIVL 301L*

**CIVL 355: Environmental Engineering (3 credits)**

This course provides students with a background in the fundamental science and engineering principles of environmental engineering. A broad range of topics will be covered: water quality and treatment, atmospheric pollution, solid and hazardous waste management, noise pollution, soil contamination, climate change and clean energy, and green building design. *Prerequisite: CHEM 101*

**CIVL 360: Introduction to Fluid Mechanics (3 credits)**

This course is designed as an entry-level program that focuses on the characteristics and behavior of fluids within typical applications in civil and environmental engineering. It introduces and applies the fundamental principles of continuity, energy, and momentum to various practical scenarios, including fluid statics, fluid dynamics, pipe flows, external Flows, Open channel flow, fluid loading, and unsteady flows. By studying this course, students gain essential knowledge for understanding the natural flow phenomena observed in rivers, estuaries, oceans, and the atmosphere. Moreover,

it equips them with the foundational theory necessary for designing hydraulic structures like culverts, spillways, energy dissipators, and pipe networks. *Prerequisite:* PHYS 102 , MATH 152

**CIVL 360L: Introduction to Fluid Mechanics Laboratory (1 credit)**

Introduction to fluid mechanics laboratory and design of experiments, including experiments on Redwood Viscometer, Bernoulli's Theorem, Minor Losses, Orifice meter and Venturi meter and V-notch. Students will also learn technical report writing and work in teams. *Co-requisite:* CIVL 360

**CIVL 401: Civil Engineering and Society (1 credit)**

This course explores the role of civil engineering in society and explores historical, political, esthetic and philosophical perspectives on civil engineering. Contemporary issues involving civil engineering are also presented and discussed. *Prerequisite:* Senior standing in civil engineering

**CIVL 421: Reinforced Concrete Design (3 credits)**

This course explores the properties and characteristics of reinforced concrete, the design of structural components, plastic theory and limit design. *Prerequisite:* CIVL 321

**CIVL 445: Applied Hydrology (3 credits)**

This course focuses on basic hydrologic principles, hydrologic measurements, small and midsize catchment hydrology, frequency analysis, regional analysis, reservoir, stream channel and catchment routing, and hydrologic design. *Prerequisite:* CIVL 444

**CIVL 405: Civil Engineering Internship (6 credits)**

This course provides students with the opportunity to practice on the job at an accounting department of a business organization or at an audit firm for a period of six to seven weeks, thereby transferring and developing industry-specific, civil engineering, construction and other skills acquired from prior study. *Prerequisite:* Senior standing (completing 90 credits) and CGPA 2.0

**CIVL 444: Applied Hydraulics (3 credits)**

This course presents the basic laws of fluid mechanics to hydraulic problems by focusing on open channel and pressure conduit flow, pumps and turbines, hydroelectric power, flood control and water law. *Prerequisite:* CIVL 360

**CIVL 462: Geotechnical Engineering (3 credits)**

This course focuses on the mechanics of soil as applicable to engineering problems, soil classification, compaction, swelling, consolidation, strength and permeability. Applications to geotechnical and environmental engineering problems are also discussed. *Prerequisite:* CIVL 301 or CIVL 360

**CIVL 462L: Geotechnical Engineering Laboratory (1 credit)**

This course is a laboratory experience that focuses on procedures of soil testing for geotechnical and environmental engineering problems. *Co-requisite:* CIVL 462

**CIVL 465: Foundation Engineering and Earth Retaining Structures (3 credits)**

This course focuses on soil mechanic theories applied to design of shallow and deep foundations, as well as lateral pressure of soil and design of retaining walls. *Prerequisites:* CIVL 462 and CIVL 462L

**CIVL 481: Transportation Engineering (3 credits)**

This course focuses on the physical design of transportation facilities, traffic analysis and control for different modes, planning and demand analysis, environmental impacts of transportation systems and intelligent transportation systems. *Prerequisite: CIVL 218*

**CIVL 482: Highway Engineering (3 credits)**

This course focuses on highway design, facility sizing, geometric design, drainage, earthwork, pavement design, traffic control devices, safety and environmental considerations. *Prerequisite: CIVL 481*

**CIVL 491: Construction Methods (3 credits)**

This course focuses on the components and methods of construction, including earthwork, foundations, wood, steel and concrete construction, roofing and cladding as well as interior construction. *Prerequisite: CIVL 321*

**CIVL 492: Construction Engineering (3 credits)**

The specific course is project-oriented with a focus on cost estimation, alternative cost-saving changes and critical path scheduling. *Prerequisites: CIVL 491*

**CIVL 495A: Civil Engineering Design: Capstone Project I (3 Credits) and****CIVL 495B: Civil Engineering Design: Capstone Project II (3 Credits)**

This course provides students with the opportunity to practice and develop their engineering skills by placing them on an engineering firm/department for a period of nine weeks. During internship, students will have a hand-on experience in the industry by utilizing their engineering and professional skills and knowledge.. *Prerequisites/Co-requisite for CIVL 495A: 90 credits and above, completing the internship and CGPA 2.; Prerequisite for CIVL 495B: CIVL 495A*

**CIVL 521: Structural Analysis II (3 credits)**

This course explores statically indeterminate structures by virtual work. Topics also include advanced treatment of slope deflection, moment distribution, arch analysis, secondary stresses in trusses, advanced treatment of influence lines, and matrix analysis of structures. *Prerequisite: CIVL 321*

**CIVL 525: Design of Steel Structures (3 credits)**

This course focuses on the mechanical behavior of structural steel, the design of steel beams, girders, columns and members subjected to combined stresses; as well as the design of various types of connections of steel structures, plate girders, continuous beams, and rigid frames. *Prerequisite: CIVL 321*

**CIVL 528: Masonry Structures Design (3 credits)**

This course focuses on the analysis and design of masonry beams, retaining walls, shear walls, bearing walls and columns. Topics also include use of allowable stress and strength design methods, structural system analysis and lateral design of masonry buildings. *Prerequisites: CIVL 301 and CIVL 321*

**CIVL 530: Open Channel Hydraulics (3 credits)**

This course focuses on the principles of open channel flow, computer simulations and applications, design and environmental problems, culvert hydraulics, as well as on the analysis of critical, uniform, gradually-varied and rapidly-varied flows. *Prerequisite: CIVL 444*

**CIVL 580: Traffic Engineering Design (3 credits)**

This course focuses on sizing and configuration of highway facilities based on capacity analysis. Topics covered also include traffic signal design, impact and mitigation studies, parking and safety design. *Prerequisite: CIVL 481*

**CMPE 160 Introduction to Computer Programming and Applications (3 credits)**

This course provides students with an overview of programming, problem-solving, testing and debugging. It explores many fundamental programming concepts with emphasis on applying theoretical knowledge to a practical situation. It introduces the fundamental concepts of a computer system, programming languages, and provides a comprehensive introduction to programming for engineering and computer science students. It is designed as an introduction to programming and programming language (Java) for students who have no or very little programming knowledge and experience. *Prerequisite: Passing the Math Placement Test or MATH 099*

**CMPE 215: Communication Networks (3 credits)**

The aim of the course is to understand the principles of operation and design choices of communication networks, as well as to learn the basic characteristics of the prevailing network technologies. The focus of the course is the Internet, covering issues related to the planning, implementation and operation of communication networks with emphasis on fundamental concepts and principles.

*(Prerequisite: COSC 125)*

**CMPE 270 Digital Systems (3 credits)**

This course gives an overview of circuitry, logic, and system design for understanding the impact of electrical and computer engineering solutions in a global, economic, and societal context. It focuses on modeling, analysis, and design of digital systems, primarily at the logic design level. Also, this course introduces internal organization of a computer, instructions and operations, and assembly language. *Prerequisite: MATH 151 or MATH 153*

**CMPE 270L Digital Systems Laboratory (1 credit)**

This course focuses on practical modelling, analysis, and design of digital systems, primarily at the logic design level. Digital electronic topics include: the basic logic gates, Boolean algebra, number systems, digital arithmetic, combinational logic circuits, multiplexers, decoders and flip-flops, counters, and registers. Also, this course introduces internal organization of a computer, instructions and operations, and assembly language. *Corequisite: CMPE 270*

**CMPE 271 Computer Organization (3 credits)**

This course examines in-depth the inner-workings of modern digital computer systems and the tradeoffs present at the hardware-software interface. It provides insights in the design process of complex hardware systems. *Prerequisites: (CMPE 160 OR COSC 102) and CMPE 270*

**CMPE 361 Windows Programming (3 credits)**

This course focuses on the graphical user interface (GUI) programming in Java, including dialog boxes, menus, toolbars, status bars, fonts, icons and multimedia. The course covers the concepts of object-oriented programming, event-driven programming, the Model-Views-Controller pattern, and principles of human-computer interaction design. *Prerequisites: CMPE 160 and CMPE 271*

**CMPE 375 Embedded Systems Programming (3 credits)**

This course focuses on embedded system architecture. Topics include IO programming using parallel ports, serial ports, timers, and D/A and A/D converters, as well as interrupts and real-time programming, program development and debugging tools and C language and assembler. *Prerequisites: CMPE 271*

**CMPE 390 Introduction to Machine Learning and Data Analytics (3 credits)**

Machine learning is the science of getting computers to act without being explicitly programmed. In the past decade, machine learning has given us self-driving cars, practical speech recognition, effective web search, a vastly improved understanding of the human genome, and progress towards human-level AI. Topics include effective machine learning techniques and techniques for implementation. *Prerequisites: MATH 260, CMPE 160*

**CMPE 405 Computer Engineering Internship (6 credits)**

To qualify for the Bachelor of Science in Computer Engineering, a student must fulfill the internship requirements prior to graduation. The purpose of the internship is to expose students to the profession and give them an opportunity to apply their academic knowledge in a practical setting. *Prerequisites: Senior standing (completing 90 credits), CGPA of 2.00.*

**CMPE 405A: Computer Engineering Internship Part A (3 credits)**

This course provides students with the opportunity to practice on the job at an engineering firm or department of an organization directly related to their program of study, thereby transferring and developing industry-specific skills in the appropriate engineering area of study and other skills acquired from prior study.

The internship period is four weeks, on the basis of 5 days/week and 7 hours/day. *Pre-requisite: completing 60 credits, CGPA of 2.00.*

**CMPE 405B: Computer Engineering Internship Part B (3 credits)**

This course provides students with the opportunity to practice on the job at an engineering firm or department of an organization directly related to their program of study, thereby transferring and developing industry-specific skills in the appropriate engineering area of study and other skills acquired from prior study.

The internship period is five weeks, on the basis of 5 days/week and 7 hours/day. *Pre-requisite: CMPE 405A, CGPA of 2.00.*

**CMPE 460 Software Design and Engineering (3 credits)**

This course provides students with an overview of Software Engineering, introducing theory and practical exercises with main focus on practical work in teams and individually. Concepts and techniques for systems engineering, requirements analysis, design, implementation and testing of computer systems. Principles of software engineering for production of reliable, maintainable and portable software products. *Prerequisites: CMPE 160 and CMPE 361*

**CMPE 460L Software Design and Engineering Laboratory (1 credit)**

This course provides students with an overview of Software engineering, introducing theory and practical exercises with main focus on practical work in teams and individually. *Corequisites: CMPE 460*

**CMPE 470 Digital Circuits (3 credits)**

This course focuses on the design of digital electronic systems using commercially available high-speed digital devices and circuits. Topics include: Hardware Description Languages (HDL) Models of Combinational Circuits, Synthesizable HDL Models of Sequential Circuits, HDL Models of Arithmetic Units, Memory and Programmable Logic. *Prerequisite: CMPE 375*

**CMPE 470L Digital Logic Laboratory (1 credit)**

This course provides a hands-on experience in the design of digital systems using Hardware Description Language. Students use modern industrial EDA tools for FPGA synthesis and simulation. *Co-requisite: CMPE 470*

**CMPE 475 Microprocessors (3 credits)**

This course emphasizes on bus design, memory design, interrupt structure and input/output for microprocessor-based systems. Topics include memory map and addresses, low-level/assembly language programming, bus architecture, input/output systems, interrupts, and other related topics. Upon completion, students should be able to interpret, analyze, verify, and troubleshoot fundamental microprocessor circuits and programs using appropriate techniques and test equipment. *Prerequisites: CMPE 375*

**CMPE 495A Engineering Design: Capstone Project I (3 credits)**

This course is provided along with CMPE 495B in sequence. Both courses involve the application of computer engineering principles and design techniques to the design, build, and testing of an engineering system. Issues related to ethics and engineering practice are also discussed. A single project is completed in this two-course sequence and is judged completed upon presentation of an oral and a written report. *Prerequisite: Senior Standing (90 credits), CMPE 460, and CMPE 470/L.*

**CMPE 495B Engineering Design: Capstone Project II (3 credits)**

This course is provided along with CMPE 495A in sequence. Both courses involve the application of computer engineering principles and design techniques to the design, build, and testing of an engineering system. Issues related to ethics and engineering practice are also discussed. A single project is completed in this two-course sequence and is judged completed upon presentation of an oral and a written report. *Prerequisite: CMPE 495A*

**COMS 356 Intercultural Communication (3 credits)**

This course deals with cultural factors in interpersonal communication such as perception, roles, language codes and nonverbal communication. Students will apply and evaluate theories of intercultural communication. *Prerequisites: None*

**COSC 101: Introduction to Computing (3 credits)**

This course is designed to provide students with the core competencies of computing literacy and computational thinking, which are essential skills in the digital information age. The course provides an overview of computer systems—hardware, software and networks. Students will practice using essential computing programs, and will develop computational solutions to basic problems. The course also covers social and ethical issues related to computing. *Prerequisites: None*

**COSC 102: Object-Oriented Programming (3 credits)**

This course introduces the fundamental concepts of Object-Oriented Programming (OOP). Students will learn how to design, implement, and test software using the OOP paradigm. The course covers topics such as encapsulation, inheritance, polymorphism, abstraction, and object-oriented design patterns. The course will be taught using a programming language. (*Prerequisite: COSC 101*)

**COSC 110 Introduction to Computer Science and Networks (3 credits)**

This introductory course serves as a guide to new students in finding their way through the multi-faceted and vast area of Computer Science and Networks. Its main objectives include teaching students about the function of the basic components and peripherals of a computer, its uses in the real world, data conversion techniques and the importance of binary coding, as well as the basic components of computer networks and their uses in the modern world. *Prerequisites: None*

**COSC 125 Data Structure and Programming Techniques (3 credits)**

Data structures are essential building blocks for designing efficient algorithms. This course will introduce the fundamentals of data structures and will provide a thorough understanding of how to systematically organize data in a computer system. In addition, this course will introduce students to analytical tools for comparing data structures in terms of their time and space complexities. Students will appreciate the importance of programming structures, abstractions, and algorithms for improving the efficiency of computer programs. Topics include linked lists, stacks, trees, queues, graphs and analysis of efficiency. The course also covers searching, sorting, and hashing techniques. *Prerequisite: CMPE 160 or COSC 102*

**COSC 210 Management Information Systems (3 credits)**

The main objective of this course is the investigation of the role and impact of information systems used in today's business environment. The course highlights the role of information systems in organizations using computer tools and technology in solving business problems. Topics include information technology hardware, software, networks, security, and ethics. The course uses a conceptual approach through case studies of a series of information systems such as Enterprise Resource Planning Systems (ERP), Customer Relationship Management Systems (CRM), Supply Chain

Management Systems (SCM) and Decision Support Systems. Students will also engage in computing exercises using common business information system tools. *Pre-requisite: COSC 110*

### **COSC 215 Communication Networks (3 credits)**

The aim of the course is to understand the principles of operation and design choices of communication networks, as well as to learn the basic characteristics of the prevailing network technologies. The focus of the course is the Internet, covering issues related to the planning, implementation and operation of communication networks with emphasis on fundamental concepts and principles. *Pre-requisite: COSC 125*

### **CMPE 215 Communication Networks (3 credits)**

The aim of the course is to understand the principles of operation and design choices of communication networks, as well as to learn the basic characteristics of the prevailing network technologies. The focus of the course is the Internet, covering issues related to the planning, implementation and operation of communication networks with emphasis on fundamental concepts and principles. *Pre-requisite: COSC 125*

### **COSC 248 Algorithms and Complexity (3 credits)**

The course covers topics on technical analysis and runtime algorithms, asymptotic notation, some data structures such as graphs, sorting and searching algorithms and algorithm design techniques. The course covers the application of standard algorithmic approaches, including greedy, divide and conquer, and dynamic programming. Students will also learn about basic graph algorithms and NP-completeness. *Prerequisite: MATH 203, COSC 125*

### **COSC 262 Operations Research (3 credits)**

The course aims to introduce a scientific approach to decision making in operations management employing the principles of linear programming. This course focuses on modelling concepts, linear programming, problem formulation, simplex and dual-simplex methods, duality and sensitivity analysis, transportation, trans-shipment and assignment problems and project scheduling and management. *Prerequisites: MATH 152*

### **COSC 312 Design and Usage of Databases (3 credits)**

This course introduces the fundamental concepts necessary for designing, using, and implementing database systems and database applications. It will teach students about data modeling techniques, relational database design, use of normalization to design normalized relational databases, Structured Query Language's (SQL), data definition (DDL), data manipulation (DML), and web database development. *Prerequisite: MATH 203 and COSC 125*

### **COSC 348 Mobile Programming I (3 credits)**

This course introduces fundamental specialized programming concepts for the iOS mobile platform. It provides students with an opportunity to apply the Design Research principles to design an app that meets business requirements with a user-centered focus. Students will have the opportunity to learn SWIFT concepts in Playground activities, develop an app using simple UIKit elements and iOS workflows. *Prerequisite: CMPE160 and CMPE 271*



### **COSC 371 Computer Organization II (3 credits)**

This course consists of lectures as well as laboratory exercises. Starting from the basic background of the organization and architecture of computers that students have learned during the Computer Architecture I course, this course aims to build on that knowledge to provide students with tools and skills regarding basic techniques that enhance computer performance. More specifically, the parallelism level command, the caches and the system input and output. *Prerequisite: CMPE 271*

### **COSC 372 Operating Systems (3 credits)**

This course covers the concepts and principles that underlie modern operating systems including Operating System Structures, Processes, Threads, CPU Scheduling, Process Synchronization, Deadlock, Memory Management, Virtual Memory, Mass Storage Management and the File System. *Prerequisite: CMPE 271*

### **COSC 372L Operating Systems Laboratory (1 credit)**

This course covers the Unix system administration and practical concepts and principles that underlie modern operating systems including Processes, Threads, Synchronization, Inter-Process Communication, Deadlock and Disk Scheduling.  
Co-requisite: COSC 372

### **COSC 405 Computer Science Internship (3 credits)**

This course provides practical experience for students in the field of computer science, bridging the gap between classroom learning and real-world application. Students work in a professional setting related to their field of study, applying their knowledge to solve real-world problems, and gaining industry experience. The course focuses on developing technical skills, project management, teamwork, and communication. Students work closely with supervisors, following guidelines and best practices. *Prerequisites: Senior standing (completing 90 credits), CGPA 2.0*

### **COSC 412 Implementation of Database Systems (3 credits)**

The course covers some key issues related to the organization and storage of data to external storage. The specific topics discussed include the concept of file storage peripherals and physical characteristics, layout and sort files located on disks, primary file organization, secondary file organization, static and dynamic data structures, Indexed Sequential Access Method (ISAM), static and dynamic fragmentation, B+ trees and multidimensional data structures. *Prerequisite: COSC 312*

### **COSC 413 Protection and Security of Information Systems (3 credits)**

The course aims to provide students with deep knowledge on various concepts of classical computer and network security paradigms and also enable them to evaluate contemporary security policies and security mechanisms within organizations and assess the balance of the managerial and technical aspects of network security. *Prerequisite: COSC 372, (COSC 215 or CMPE 215)*

### **COSC 442 Artificial Intelligence (3 credits)**

The main objective of this course is to introduce the theory and practice of Artificial Intelligence (AI). This course is designed to develop an understanding of the fundamental issues associated with the

field such as problems and search, knowledge representation and reasoning, game playing and rule-based systems. Advanced topic areas such as probabilistic reasoning and Bayesian networks are also introduced. *Prerequisite: CMPE 390*

### **COSC 448: Mobile Programming II (3 credits)**

This intermediate level course in Mobile Programming introduces fundamental specialized programming concepts for the iOS mobile platform. It provides students with an opportunity to apply the Design Research principles to design an app that meets business requirements with a user-centered focus. Students will have the opportunity to learn advanced SWIFT concepts, develop an app using advanced UIKit elements and apply UI and UX design principles. *Prerequisites: COSC 348, COSC 312*

### **COSC 463 Data Mining Techniques (3 credits)**

Our ability to generate and collect data over the years has been increasing rapidly. The widespread use of information technology in our lives has flooded us with a tremendous amount of data. This explosive growth of stored and transient data has generated an urgent need for new techniques and automated tools that can assist us in transforming this data into useful information and knowledge. Data Mining has emerged as a multidisciplinary field that addresses this issue. *Prerequisite: COSC 412.*

### **COSC 467: Network Management (3 credits)**

This course covers the concepts and principles related to network management including network operation, security, and troubleshooting. The aim of the course is to give the students the knowledge needed to securely establish, maintain and troubleshoot the essential networks that businesses rely on. *Prerequisite: (COSC 215 or CMPE 215).*

### **COSC 472 Cryptography (3 credits)**

In this course students are taught about network security and access security models in relation to security attacks, mechanisms and services. An overview of secret-key and public-key cryptography is covered. The course includes authentication protocols and key management, network security practice, email security, IP security and web security, intrusion detection and prevention systems, firewalls and virtual private networks as well as wireless network security. *Prerequisite: COSC 248*

### **COSC 484 Web Engineering (2 credits)**

Web Engineering introduces a structured methodology utilized in software engineering to Web development projects. The course addresses the concepts, methods, technologies, and techniques of developing Web sites that collect, organize and expose information resources. Topics covered include requirements engineering for Web applications, design methods and technologies, interface design, usability of web applications, accessibility, testing, metrics, operation and maintenance of Web applications, security, and project management. *Prerequisite: COSC 312*

### **COSC 484L Web Engineering Laboratory (1 credit)**

This course draws upon previous programming and computing experience to develop practical web development and maintenance skills. Specific technologies covered in this course include client-side (HTML, JavaScript, and CSS) and server-side (PHP/ASP.NET). *Corequisite: COSC 484*

### **COSC 490 Senior Design Project (3 credits)**

Project-oriented course to allow students to apply their knowledge of software engineering to the design and implementation of a system to solve a real-world problem. Students select and specify a suitable problem, investigate design alternatives and select an appropriate one, implement a solution and verify and validate the result, all as part of a team effort. The role of digital computers in modern society are investigated, including the dangers of computer misuse, as well as the proper and intelligent use of computers. Ethical concerns of software professionals are studied. Prerequisite: CMPE 460, Pass 90 credits, GPA greater than or equal to 2.0

### **COSC 490L Senior Design Project Laboratory (1 credit)**

Project-oriented lab to allow students to investigate similar solutions, gather data and requirements, complete required designs and prototypes of the project. Corequisite: COSC 490

### **COSC 491L Senior Project Laboratory (1 credit)**

Project-oriented lab to allow students to complete the design, implementation and testing of the team-based software engineering project started in COSC 490/L. (Prerequisite: COSC 490 and COSC 490L)

### **DSGN 101 Visual Culture I (3 credits)**

This course introduces the essential concepts of visual culture. The role that images play in producing cultural meaning is examined. It focuses on how sight, knowledge and power are related, or on how to read images. Prerequisites: None

### **DSGN 102 Visual Culture II (3 credits)**

This course focuses on visual experiences in the day-to-day life in the field of art, cinema, advertising, television, music videos and digital media, by using different approaches such as cultural studies, media and gender studies. *Prerequisite: DSGN 101*

### **DSGN 111 Basic Design I (3 credits)**

This course focuses on equipping the designer with the keys to the realm of concrete visual thinking and the ability to translate concepts, subjects, themes or narratives into visual language. The course also focuses on translating written or spoken word into visual symbols through 2D compositions. *Prerequisites: None*

### **DSGN 112 Basic Design II (3 credits)**

This course focuses on the text and the meaning and effects of visual language. Different aspects of art and design will be examined over the examples of two-and three-dimensional space by using a variety of tools *Prerequisite: DSGN 111, DSGN 141*

### **DSGN 141 Computer Culture I (3 credits)**

This course provides an overview of the role of the computer within the subject of creativity. Course content introduces extensive knowledge about computers, information networks, multimedia environments and issues related to design and innovation processes that involve computers. *Prerequisites: None*

### **DSGN 142 Computer Culture II (3 credits)**

This course develops understanding of the emerging cybercultures and virtual worlds necessary for efficient utilization in both professional and personal tasks. This course identifies the key issues with cybercultures and virtual worlds and explores the relationship of computers to design and the media. *Prerequisite: DSGN 111*

### **DSGN 201 Typography (3 credits)**

This course focuses on the fundamentals of typography history, technology, and theory. Course content emphasizes the study of letterforms, typographic composition, typographic expression and communication, the power and role of typography in constructing meaning, and typography as a tool for representation of concepts. *Prerequisite: DSGN 141*

### **DSGN 210 Digital Storytelling (3 Credits)**

Introduction to practical writing for visual and interactive media. Introduces concepts of interweaving traditional storytelling with digital platforms and interactivity in both fictional and non-fictional stories for web, games, social media, video, and mobile devices. *Prerequisites: None*

### **DSGN 211 Photography Techniques (3 credits)**

This course will focus on the technical and photographic aspects of the digital image including the use of digital camera (DSLR), digital camera features, modes of operation, photography techniques, effective use of light, storage media, connecting and downloading images to the computer, enhancing images via editing software, file size (resolution) issues, and printing. *Prerequisites: None*

### **DSGN 212 Photography Workshop (3 credits)**

This course focuses on intermediate and advanced photography techniques. Students will learn advanced editing of photographs by using industry standard software and to manipulate photographs in post-production for both commercial and contemporary art photography. The course will introduce specialized workshops to cover different types of equipment for photography studio applications. *Prerequisite: DSGN 211*

### **DSGN 223 Sound and Image (3 credits)**

This course emphasizes combining and composing visual and audio media for timeline multimedia formats. Primary focus is given to the production of video which includes 2-D animation using any combination of music, sound effects, recorded live sounds, computer-generated "noise," digitized video, non-interlaced video, alpha masked video, sprite animations, still bitmap images, and vector images. *Prerequisites: None*

### **DSGN 232 Digital Vector Graphics (3 credits)**

The course will focus on vector drawings and illustration development by using standard illustration application to create multimedia digital and printed vector graphics. Students will learn how to draw, edit, fill, transform, implement effects vector graphics shapes and typeface. *Prerequisite: DSGN 141*

**DSGN 241 Concept Development I (3 credits)**

This course focuses on the cultivation of ideas and problem-solving strategies for multimedia projects. Course content emphasizes the acquisition of skills for generating ideas and concepts through a variety of methodologies. Students will advance their skills in professional software.

*Prerequisite: DSGN 112*

**DSGN 244 Digital Image Processing (3 credits)**

This course introduces photographic image modification using computer technology. Student will integrate set of tools to manipulate photographic imagery by using various image editing features, advance compositing, and techniques to prepare multimedia artwork to be implemented digital or printed by using standard image application. *Prerequisite: DSGN 142*

**DSGN 261 Video Production I (3 credits)**

This course introduces the design and use of video equipment. Camera types, the working principles of the camera and TV system, lenses, camera movements, camera mounting equipment, and a basic knowledge of audio equipment are covered. Discussion also involves contemporary video production concepts and equipment, along with a basic history of technical development in this area.

*Prerequisites: None*

**DSGN 262 Video Production II (3 credits)**

This course focuses on multi-camera studio production. The visual content and technical aspects of studio production are extensively covered. Content emphasizes the various responsibilities associated with studio production processes and participation in producing quality studio productions. *Prerequisite: DSGN 261*

**DSGN 301 Web Design (3 credits)**

This course is a survey of the key design elements of publishing content on the World Wide Web. Course content includes processes such as concept development for interactive design works, information design, interface design, interaction design, optimization and integration for the Web, usability, beta-testing, etc., as well as the basic principles of publishing and managing visual content for hypermedia and an interactive portal site. Tools for creating and editing Web projects include browsers, browser helper applications, HTML editors, document management tools and image editors. *Prerequisites: None*

**DSGN 302 Interactive Web Projects (3 credits)**

This course expands upon the ideas introduced in DSGN 301 with further development in coding and software skills. The focus is on the use of the web and social media applications in marketing and advertising. Topics include branding, user identification, user needs, project planning, developing rich media content, interface design, site promotion, and creating a social media campaign. *Prerequisite: DSGN 301*

**DSGN 319 Compositing and Digital Effects (3 credits)**

This course introduces the basics of image manipulation, title design, compositing, graphic design and special visual effects for digital postproduction using various software applications. Areas of

application like chroma keying, CGI integration, and multilayer compositing are probed. Students will work with professional standard software. *Prerequisite: DSGN 142*

### **DSGN 321 Introduction to Multimedia Design (3 credits)**

This course is intended to give the students a broad foundational understanding of the multimedia design field along with an introduction to some of the essential tools. The focus is on the process of multimedia design and introduces the theories of project management. Students will advance knowledge about industry standard software. *Prerequisites: None*

### **DSGN 331 Multimedia Design (3 credits)**

The course focus on multimedia design development, creating user experience design skills as well as interaction design skills. Students will be expected to design work that combines appropriate multimedia content to meet the design brief. *Prerequisite: DSGN 321*

### **DSGN 332 Multimedia Production (3 credits)**

This course continues the work begun in DSGN 331 and applies the process of multimedia production, and project management, culminating in a completed multimedia experience ready to be delivered to the end user. Every aspect of a multimedia production is planned, designed, edited, programmed, and tested. A user testing report will also be included in the process. *Prerequisite: DSGN 331*

### **DSGN 341 3-D Computer Graphics (3 credits)**

This course introduces 3-D modeling and rendering software, basic modeling concepts and techniques, methods on how to create materials, scenes rendered with digital lights and cameras, and providing a perspective on the 3-D digital design and virtual environments. Students will work with industry standard software. *Prerequisite: DSGN 142*

### **DGSN 383 Social Media (3 Credits)**

Theoretical and practical introduction to Social Media and its role in the media experience. Students will research how social media has transformed personal and business communication with a particular focus on their own discipline. Significant practical work with current Social Media platforms. Introduction to data analytics is also covered. *Prerequisites: None*

### **DSGN 401 Capstone Project I (3 credits)**

This course focuses on the methodological basis of a capstone project focusing on progression of the concept and developing the skills needed to understand and carry out a research-based visualization process. *Pre-requisite: DSGN 332, Senior Level standing 90cr.*

### **DSGN 402 Capstone Project II (6 credits)**

This course emphasizes the production of the project researched and proposed in DSGN 401 and allows the student to demonstrate the practical skills and academic studies accumulated during the degree program. Emphasis is on meeting deadlines and on eliminating challenges determined by the project committee. Solutions to obstacles are suggested accordingly. *Prerequisite: DSGN 401*

### **DSGN 405 Multimedia Design Internship (6 credits)**

This course is a supervised professional experience in a professional workplace that provides hands on experience in multimedia and design, in either the private or public sector. At the conclusion of the internship each student will present a report summarizing the internship experience. Potentially, this experience may lead to generate ideas for capstone course. *Prerequisites: None*

**DSGN 411 Physical Interaction Design (3 credits)**

The course introduces physical interaction design in new media works with microcontroller and sensor technologies and explores interaction design practices adaptable for physical interaction, daily-life applications, and contemporary art works. Course content also introduces artistic strategies, structures, and methodologies for the creation of interactive installations and physical media-image-sound interaction projects. *Prerequisite: DSGN 341*

**DSGN 412 Media Law and Ethics (3 credits)**

Virtually every aspect of media practice has both a legal and an ethical dimension. The law tells us what we must (or must not) do; ethics suggests what we ought (or ought not) to do. The interplay of legal requirement and ethical obligation is what makes this course important. This course explores local, regional, and international laws regarding media production and distribution. In addition, ethical considerations will be discussed especially in the context of fast changing social media platforms. *Prerequisites: None*

**DSGN 421 Data Analytics and Visualization (3 credits)**

Data is everywhere in our society. Everything is data from scientific research to everyday human activity. The ability to understand and communicate data is becoming an essential skill in this era of big data. Visualization leverages our visual perception to provide a powerful yet accessible way to make sense of large and complex data. This course examines basic principles on how to design effective visualization for data analysis and communication. *Prerequisites: None*

**DSGN 430 Project Management for Creative Industries (3 credits)**

This course advances skills of project management with an emphasis on the creative industries (design, media etc.) Students will work with industry standard software to plan, estimate resources and pilot the progress of the project. Additionally, students will get a practical overview of the human aspects of project management. Students are expected to enroll in this class Co-requisitely with DSGN 401.

**ECON 101 Principles of Microeconomics (3 credits)**

This class is an introduction to economics as it applies to the functioning of markets, businesses and households. Students learn how individuals make decisions about how to use scarce resources efficiently and how these decisions affect markets and the overall economy. Effect of government policies on the functioning of markets is also examined. *Pre-requisites: None*

**ECON 102 Principles of Macroeconomics (3 credits)**

This course introduces the analysis of a market economy. Emphasis will be on the measurement and determinants of aggregate economic performance, including output, income, employment, prices, interest rates, and economic growth. Consideration will be given to the role of the monetary and banking system, the Federal Reserve, government fiscal policy, and the global economy in influencing domestic business cycles, inflation and growth. *Pre-requisites: ECON 101*

**ECON 311 Foundation in Economics (0 credits)**

The course gives candidates an insight into some of the key elements of both micro and macro-economics, providing a solid foundation and sound understanding for the varied field of economics. A focus is given to the demand and supply model, elasticities, the functions of money and the role the central bank, market structures, economic growth, inflation, equilibrium in the macro-economy and government policies. *Prerequisite: None*

**ECON 341 Engineering Economic Analysis (3 credits)**

The systematic evaluation of the economic benefits and costs of projects involving engineering design and analysis. Economic decision-making in an environment of limited resources and uncertainty. Present economy, the economy of multi-year projects, selection among competing and independent alternatives, sensitivity of outcomes to input parameters, before- and after-tax analyses, replacement economy, inflation, and breakeven analysis in production environments. *Prerequisite: MATH 152*

**ECON 510 Managerial Economics and Business Analytics (3 credits)**

Managerial Economics is the use of economic theory, mathematical and statistical techniques to examine how a firm can make optimal managerial decisions given the constraints it faces. The main objective of this course is to equip students with the necessary theory and techniques and the ability to apply them to inform and enhance managerial decision making. *Prerequisite: None*

**ELEC 204 Principles of Electrical Engineering (3 credits)**

This course provides an overview of circuit analysis by reduction methods, source transformations, and mesh and nodal analysis. This course introduces the basic fundamentals of DC machines (Motors, Generators) and transformer. The students will be able to define, identify and categorize the devices that make up rotating machinery. The students will also learn the different characteristics of rotating machinery and transformers along with electric power transmission. Analyse the relationship between the power developed in the primary and secondary of transformer along with electric power transmission. *Prerequisites: MATH 152 and PHYS 102*

**ELEC 210 Circuit Analysis I (3 credits)**

This course provides an overview of circuit analysis by reduction methods, source transformations, and mesh and nodal analysis. Topics also include operational amplifier model, transient analysis, alternating current circuits, impedance, power, phasor diagrams, and three-phase balanced networks, as well as computer programming and application of computer software for circuit analysis. *Prerequisites: MATH 152 and PHYS 102*

**ELEC 310 Circuit Analysis II (3 credits)**

This course focuses on transient and frequency response of RLC circuits, mutual inductance, network analysis using Laplace transformations, network functions, stability, convolution integrals, Bode diagrams, two-port networks, and computer analysis of circuits. The course requires filing an approved master plan with the department chair. *Prerequisites: ELEC 210 and MATH 252*

**ELEC 330 Fundamentals of Engineering Electronics (3 credits)**

The course is the application of diodes, JFETs, MOSFETs, and BJTs in typical electronic circuits. Content also includes analysis and design of rectifiers, filters, and simple amplifiers using transistors and operational amplifiers. *Prerequisite: ELEC 210*



**ELEC 330L Engineering Electronics Laboratory (1 credit)**

This course involves the experimental study of laboratory instruments, diodes, rectifier circuits, filters, transistors, and operational amplifiers. *Prerequisite/Co-requisite: ELEC 330*

**ENGL 101 Composition I (3 credits)**

ENGL 101 introduces the conventions of academic writing and critical thinking and teaches the writing skills necessary for success in college. Read and respond to a variety of texts from different disciplines and produce academic texts using a range of critical thinking and rhetorical strategies. Learn how to apply APA documentation style to ethically document sources in texts and reference lists. The course is designed to provide guided practice in the multi-step process of academic writing.

*Pre-requisites: None*

**ENGL 102 Composition II (3 credits)**

ENGL 102 introduces the conventions of research writing and teaches how to produce research papers using critical thinking and analytical skills in response to a variety of academic texts. The course is designed to provide guidance in all steps of the research process including choosing a topic, designing a research methodology, analyzing data, and writing up and presenting results.

*Pre-requisites: ENGL 101*

**ENGL 205 Business Communication (3 credits)**

ENGL 205 is designed to develop the English language skills needed to perform effectively in the current global marketplace. The course builds confidence in communicating orally and in writing in various business contexts, explains essential business vocabulary, and teaches the 21<sup>st</sup> Century skills essential for success in today's workplace. *Pre-requisites: None*

**ENGR 201 Methods of Analysis (3 credits)**

This course involves selected analytical and numerical methods for solving problems from various engineering fields: Solution of initial and boundary value problems, series solutions, Laplace transforms, and nonlinear equations; numerical methods for solving ordinary differential equations, accuracy of numerical methods, linear stability theory, and finite differences. This course also introduces a programming basic tool for computation problems with engineering applications.

*Prerequisite: MATH 152*

**ENGR 205: Multidisciplinary Research Methods (2 credits)**

This course provides an interdisciplinary approach to research methods used in various engineering fields. The course covers quantitative, qualitative, and mixed methods approaches, and their application in engineering research. It also introduces students to ethical considerations and data analysis techniques specific to engineering research.

*(Prerequisite: ENGL 102)*

**ENGR 401: Entrepreneurship for Engineers (2 credits)**

This course provides students with the knowledge and skills required to start and manage their own technology-based ventures. The course covers topics such as ideation, business model development, market research, intellectual property, and funding. The course is designed to provide students with

an understanding of the entrepreneurial process and to develop their skills in identifying, evaluating, and pursuing entrepreneurial opportunities.

*(Prerequisite: ENGR 205)*

**ENGM 411 Foundation in Research Methods:** This course focuses on providing students with the foundational knowledge and skills necessary to conduct research in engineering management. The course covers the essential elements of research design, methodology, and data analysis, as well as the ethical considerations involved in conducting research. The course will also introduce students to the various research techniques and tools commonly used in engineering management research.

**ENGM 535: Analytics for Engineering Managers:** This course focuses on the application of data analytics and statistical methods in engineering management. The course is designed to provide students with the knowledge and skills necessary to analyze data and make informed decisions using various analytical tools and techniques. The course will cover topics such as descriptive and inferential statistics, data visualization, data mining, machine learning, and optimization techniques.

**ENGM 528: Engineering and Sustainable Development:** The course focuses on the intersection of engineering and sustainable development. The course is designed to provide students with a holistic understanding of sustainable development and its applications in engineering. The course will cover topics such as sustainability principles, life cycle assessment, green engineering, and sustainable design.

#### **FINC 101 Essentials of Financial Analysis (3 credits)**

This course introduces the foundational knowledge in finance so that student can build skills and critically think about financial decisions made on a daily basis. The course begins with basic concepts, focusing on the economic environment (including financial markets, risk, the valuation process, and then shows how specific techniques and decision rules can be used to help maximize the value of the firm. *Prerequisites: ACCT 101*

#### **FINC 111 Banking (3 credits)**

This course provides an overview of the functions and services performed by banking and other financial institutions, as well as introduces the legal basis of the banker/customer relationship and facilitates awareness of the scale of competition within the financial services market. *Pre-requisites: None*

#### **FINC 211 Financial Services (3 credits)**

This course focuses on the scope and characteristics of the market for financial services and the operation constraints imposed. The course addresses the full range of financial services including investment and commercial banking, insurance, pension plans and risk management and mutual funds. Finally, the course will provide a comprehensive overview of the structure of the financial services industry and international financial markets. *Pre-requisites: None*

#### **FINC 231 Managerial Finance (3 credits)**

This course provides a comprehensive analysis of the structure of optimal decisions relative to the functional areas of corporate financial decision making. Emphasis is placed upon developing an understanding of applications and limitations of decision models, financing and dividend decisions of the corporation and leasing as a capital budgeting problem. *Prerequisite: FINC 101*

**FINC 311 Corporate Finance (3 credits)**

The aim of the course is to introduce students to the theory and application of why and how value enhancing corporate financial decisions are made and implemented. With the emphasis on publicly listed companies, topics covered include the corporate objective of management, investment evaluation models, project analysis and evaluation, sources and types of funding, issues in risk and return, asset pricing models, issues in capital structure and dividend policy and the efficiency of capital markets. The course is designed to ensure students with the necessary skill set for making value-changing financial decisions to maximize firm value *Prerequisite: FINC 231*

**FINC 312 International Finance (3 credits)**

Analysis of the international complexities of corporate financial management and investment strategies. Emphasis is placed on the nature of the close link between corporate financial management and developments in international financial institutions and international financial markets. *Prerequisite: FINC 231, ECON 102*

**FINC 321 Investments (3 credits)**

A survey of investments including corporate and government securities, real property and financial intermediaries. Survey of investment theory emphasizing security analysis, valuation and portfolio management *Prerequisite: FINC 231*

**FINC 331 Portfolio Management (3 credits)**

This course begins with an overview of investment environment and products, and then provides students with a solid foundation in modern portfolio theory and demonstrates its applications to portfolio management. Alternative asset allocation models are introduced to equip students in developing and implementing investment strategies, assessing and controlling portfolio risk, and evaluating portfolio performance. The course takes students beyond investment theories and trains them to use widely available technology to perform quantitative modelling using real world data. *Prerequisite: FINC 321*

**FINC 341 Financial Analysis (3 credits)**

This course introduces a wide range of securities and the characteristics. Course content focuses on using tools of analysis to evaluate securities and make better investing decisions. *Prerequisite: FINC 231*

**FINC 351 Starting a New Business (3 credits)**

Entrepreneurial ventures need capital to support their business models, grow market share and create shareholder value. This course explores the core considerations in addressing the financing needs and challenges to support the launch and growth of new ventures as well as growth considerations when starting a business and achieving new milestones. Major topics include investment analysis, capital structure and valuation. Financing options available to new ventures at

various stages of development are examined in depth. The criteria used by investors, debt financiers and other players in the capital market are also considered. *Prerequisite: FINC 231*

### **FINC 361 Mergers and Acquisitions (3 credits)**

This course brings together conceptual and empirical material in a systematic way and provides a basis for understanding mergers and acquisitions, takeovers and restructuring. *Prerequisite: FINC 311*

### **FINC 371 Financial Markets and Institutions (3 credits)**

This course is designed to provide a broad introduction to the workings of financial markets and institutions. The chapter are selected to cover three main aspects of the course including: an overview of how financial markets work and the various types of markets and institutions, the Federal Reserve and interest rates, commercial banking and related institution, and various applications of the material covered. *Prerequisite: FINC 101*

### **FINC 401 Internship (3 credits)**

The purpose of the Internship subject is to provide students with opportunity to demonstrate the application of conceptual knowledge to the real world via industry placement in their selected field. This allows students to integrate their theoretical and conceptual knowledge with the skills and problem-solving techniques required in the workplace. Other outcomes include the acquisition of knowledge, research skills and the attitudes of business professionals, the ability to think independently, grow in originality, creativity, initiative, curiosity, enthusiasm, and resourcefulness, the ability to communicate ideas, an understanding of theory and procedures; knowledge of pertinent literature; and adeptness in the workplace. This subject provides a valuable transition between university and the workplace. *Prerequisites: Minimum of 90 credits, CGPA of 2.00, MRKG 101, MGMT 101, FINC 101*

### **FINC 410 Data Mining and Machine Learning (3 credits)**

This course will enable students to gain critical knowledge and understanding of data mining and machine learning. Data mining and machine learning focuses on developing algorithms to automatically discover patterns and utilise models of large datasets. This course introduces students to the process and main techniques in data mining and machine learning. *Prerequisites: FINC 231*

### **FINC 412 Data Driven Financial Analysis (3 credits)**

This course is intended to give students the opportunity to widen and deepen their knowledge of financial theory and practice by explaining how financial models and techniques implemented. Students are expected to use Excel to model a number of common applications including the models used for valuation, construction of portfolios, estimation of risk measures, and performance measurement. By the end of the course students should have a critical understanding of finance concepts as well as an extended knowledge of the spreadsheet package. *Prerequisites: FINC 231*

### **FINC 536 Corporate Finance for a Global Environment**

The course is designed to offer candidates a rigorous learning experience that would allow them to thoroughly understand contemporary finance theories. It examines the fundamentals of finance with an increasing focus on applications relevant to corporate executives. Topics include time value of money, valuation of financial and real assets, relationships between risk and return, capital structure choice, and payout policy. As a result, the course's theme is the valuation process, which is

emphasized throughout the topics. Moreover, in the globalization era, the course considers financial and investment decision-making within the context of global environment. *Prerequisites: None*

### **HIST 201: World History through Art & the Humanities (3 credits)**

How are we going to study history and its transmission through art and culture? By attempting to discover the connection between different civilizations and the interplay of influence among them with the intention to find the common root of human expression. The course surveys world art and art history including the visual arts, sculpture, architecture from prehistoric times through WWII. Students will compare artistic styles, movements, artists, and theories of art history across cultures. *Prerequisites: none*

### **HRMT 302: Recruiting the Best Talent (3 credits)**

This course provides an overview of the recruitment process and strategies by which organizations identify and hire the best talents. Students will develop specific skills and acquire the competencies needed to effectively assess and select the best candidate for the best job vacancy. *Prerequisites: MGMT302*

### **HRMT 304: Compensation, Benefits and HRIS Systems (3 credits)**

Discover how compensation systems influence organizational productivity, equity, and competitiveness. Develop strategic and analytical business acumen skills by applying compensation principles to organizational objectives. Look at how corporations use HRIS systems for management, data, balance scorecard analyses, and payroll tracking to improve long-term performance. Get hands-on practice with tools and processes for developing job designs and descriptions, internal data systems, and pay surveys. *Prerequisites: FINC101, MGMT302*

### **HRMT 401: Labor Relations and Ethical Issues in HRM (3 credits)**

Explore techniques for effectively dealing with labor relations, including team management, industrial relations, grievances, and conflict resolution. Identify legal and ethical issues surrounding the contemporary study of labor relations and learn how to analyze these considering both Bahraini and international labor laws. Topics in course include business ethics, ethical management practices, ethical decision-making, dispute resolutions, and dealing with contemporary ethical dilemmas in the workforce. *Prerequisites: BUSN301, MGMT302, MGMT350*

### **HRMT 402: Training, Coaching, and Succession Planning (3 credits)**

Research shows that Training and Development increases employees' job satisfaction and morale, which leads to more efficiency and better profits. Acquire techniques for successfully fulfilling employee training and development needs, incorporating training and learning theories. Gain an overview of the main concepts, strategies and methodologies of employee training and development. Examine the key concepts at each stage of the training process including needs analysis, delivery options and program evaluation. *Prerequisites: MGMT302*

### **HRMT 403: Relationship and Performance Management (3 credits)**

How do you manage implementing career plans, writing performance improvement plans, or dealing with employee terminations or outplacements? Learn how the role of a performance and relationship manager is key to improving the skills and expertise of employees. Topics include managing performance systems, creating development plans, building succession plans, training and managing

performance reporting platforms, dealing with legal compliances, and enhancing organizational and communication skills for all levels of a contemporary organization. *Prerequisites: MGMT302*

#### **HRMT 480 Human Resources Internship (3 credits)**

This course provides students with the opportunity to practice on the job at an actual Human Resources department of a business organization for a period of six to seven weeks, thereby transferring and developing industry-specific and business skills acquired from prior study. *Prerequisites: minimum of 90 credits and a CGPA of 2.00, MGMT 101, FINC 101, MRKG 101*

#### **HRMT 499: Research Project: HR Practitioner Case Study (3 credits)**

Case studies tell stories of real-life experiences and events that can influence decisions and practices. Develop an original case study analysis research project that identifies local and multi-national key problems or challenges related to a diverse HRM topic. Examine specific HR business case examples and use past course readings, outside research, resources, and tools to create best solutions. Also, reflect on knowledge and skills learned throughout the HRM program for the development of this real-world case study project. Analytical and communicational skills should be evident in this project. Guidance will be given to prepare and present a case study research project in both written and presentation form. *Prerequisites: HRMT495, Minimum of 90 credits.*

#### **HRMT 305: Role of an HR Practitioner and Leader (3 credits)**

Exemplary HR leaders are known for being forward-thinking, strong communicators and collaborators, ethical, quick problem-solvers, innovative, and having strong conflict management and relationship skills. Learn the functions of HR practitioners and leaders, differences between generalist and specialist roles in small, midsize, and large corporations, and how they contribute to a company's success. Explore how organizational psychology theories and social sciences build the foundation for understanding human behavior, workplace productivity, and employee satisfaction. *Prerequisites: MGMT205, MGMT302*

#### **HRMT 406: International HRM (3 credits)**

Today, managing across borders is more common than not and requires effective communication, collaboration, and relationship management skills. Develop a critical understanding of human resources management's role in an international context. Topics covered include the recruitment and selection of expatriates, performance management, and reward systems in a multinational context. Case studies are explored for the better understanding of realistic problems in international HRM. Discover skillsets and talents needed to prepare future HR managers for the challenges of multiculturalism and global issues in the modern workplace. *Prerequisites: MGMT302*

#### **HUM 101: Forms & Ideas in the Humanities (3 credits)**

Introductory course provides instruction in the interdisciplinary analysis and interpretation of meaning in art, music and literature, and in the understanding of philosophical ideas in their own right and as they influence styles and themes in works of art. *Prerequisites: none*

#### **MATH 098 Pre-algebra (0 credits)**

This course introduces numbers and number systems, prime numbers, fractions, order of operations, rules of algebra, linear equations, graphs of straight lines, ratios, rates and proportions, direct and inverse variation, percentages, simple interest rates, areas, and volumes of simple geometric figures. *Pre-requisites: High School Math OR MATH 097*

**MATH 099 Pre-calculus (0 credits)**

This course introduces the rules of algebra, equations, inequalities, graphs, circles and lines, functions, transformations of functions, one-to-one and inverse functions, exponential functions, logarithmic functions, trigonometric functions and their identities, zeros of polynomials, complex numbers, the fundamental theorem of algebra, and systems of equations. *Pre-requisites:*

*High School Math OR MATH 097*

**MATH 115 Business Statistics (3 credits)**

This course introduces the concepts of and need for statistics, collection, tabulations, graphical representation of statistical data, frequency distributions, measures of central tendency, measures of dispersion and skewness, Kurtosis, probability and probability distributions, the binomial, the Poisson and the normal distributions, sampling, estimating means and confidence intervals, and correlation and regression.

*Pre-requisites: None*

**MATH 115 Introduction to Probability and Statistics (3 credits)**

This course introduces the concepts of and need for statistics, collection, tabulations, graphical representation of statistical data, frequency distributions, measures of central tendency, measures of dispersion and skewness, Kurtosis, probability and probability distributions, the binomial, the Poisson, and the normal distributions, estimating means and confidence intervals, and correlation and regression. Prerequisites: MATH 098 or placement exam score

**MATH 130 College Algebra (3 credits)**

This course introduces sets, number systems, fractions, polynomials, rules of algebra and linear equations and inequalities in one variable. It also covers functions and graphs, with a focus on polynomial, exponential and logarithmic functions. Other topics include equations of a straight line, systems of equations, and applications to real life situations. *Pre-requisites: MATH 098 or placement exam.*

**MATH 131 Finite Math with Calculus (3 credits)**

This course introduces matrix algebra, inequalities and systems of linear inequalities, linear programming, and basics of differential and integral calculus. *Pre-requisites: MATH 130*

**MATH 151 Calculus I (3 credits)**

This course aims to enhance the understanding of concepts and the development of problem-solving skills in the areas of single variable differential calculus and single variable integral calculus. Topics include limits, continuity, differentiation, curve sketching, optimization, and introductory integration. Functions studied range from simple algebraic and radical expressions to more sophisticated rational, logarithms, exponentials, and trigonometric functions. *Pre-requisites: MATH 099 or placement exam.*

**MATH 152 Calculus II (3 credits)**

This course involves applications and techniques of integration, including substitution, by parts, trigonometric substitution, by partial fractions. Improper integrals and numerical integration are also

covered. The course also introduces sequences and series, geometric series formula, criteria for convergence, power series, and Taylor expansion. *Pre-requisites: MATH 151*

### **MATH 153 Calculus I (4 credits)**

This course aims to enhance understanding of concepts and the development of problem-solving skills in the areas of single variable differential calculus and single variable integral calculus. Topics include limits, differentiation, curve sketching, optimization, and introductory integration. Functions studied range from simple algebraic and radical expressions to more sophisticated rational, logarithms, exponentials, and trigonometric functions. Prerequisites: MATH 099 or placement exam score

### **MATH 154 Calculus II (4 credits)**

This course involves applications and techniques of integration, including substitution, by parts, trigonometric substitution, and by partial fractions. The course also introduces improper integrals, numerical integration, sequences and series, geometric series formula, criteria for convergence, power series, and Taylor expansion. Prerequisites: MATH 153

### **MATH 203 Discrete Mathematics (3 credits)**

This course focuses on logic, methods of proof, set theory, number theory, equivalence and order relations, counting (combinations and permutations), and solving recurrence relations.

*Prerequisite: MATH 151 or MATH 153*

### **MATH 252 Calculus III (4 credits)**

This course emphasizes on vector functions (continuity, derivatives, and integrals), parametric curves and surfaces, polar coordinates, as well as functions of several variables (including continuity and partial derivatives, gradient, directional derivatives). Topics also include the chain rule, double and triple integrals, iterated integrals, integration using polar, cylindrical, and spherical coordinates, change of variables, line and surface integrals (including surface area), curl and divergence, and the integral theorems of Green, Stokes, and Gauss. *Pre-requisites: MATH 152 or MATH 154*

### **MATH 254 Introduction to Linear Algebra (4 credits)**

This course is a survey of systems of linear equations and matrices, Gauss elimination, matrices, matrix operations, inverses, elementary matrices, diagonal and triangular matrices, symmetric, skew symmetric matrices, determinants of square matrices, vectors in 2- and 3-dimensional space, norm, dot product, cross product, lines, planes, Euclidean vector spaces, linear mappings between Euclidean spaces, properties of linear mappings, general vector spaces, subspaces, linear independency, base and dimension, row, column and null spaces, rank and nullity, inner product, angle, orthogonality, Gram-Schmidt process, change of basis, orthogonal matrices, eigenvalues, eigenvectors, matrix diagonalization, linear transformations, Kernel, range, isomorphism and inverse linear transformations. *Pre-requisites: MATH 151*

### **MATH 255 Introduction to Linear Algebra (3 credits)**

This course focuses on systems of linear equations and matrices, Gauss elimination, matrices, determinants vectors in 2- and 3-dimensional space, norm, dot product, cross product, lines, planes, Euclidean vector spaces, general vector spaces, and matrix diagonalization. Prerequisites: MATH 153



**MATH 260 Probability and Statistics (4 credits)**

This course is an introduction to probability and statistics. It emphasizes on operations of sets, counting problems, definition of probability, conditional probability, Bayes' theorem, one- and two-dimensional random variables, mathematical expectation and variance, basic discrete and continuous probability distributions, moment generating functions, law of large numbers, and central limit theorem. It also includes aspects of descriptive statistics, statistical intervals, hypothesis testing and simple linear regression and correlation. *Pre-requisites: MATH 152 OR MATH 154*

**MECH 101 Solid Modeling I (3 credits)**

The course is designed to teach the student sketching and visualization skills that will be used throughout their academic years and their professional career. Students will be introduced to different tools used in engineering drafting and will learn to draw of views in orthographic projection using first and third angle projections, as well as isometric drawings. Linework: Visible, Hidden, Centre Axis, Dimension and Section Lines. Dimensioning Principles: Appropriate dimensions in engineering drawings. Sections and Sectional Views: Include appropriate sectional views in engineering drawings. Then students are introduced to SolidWorks, a CAD program predominately used in the mechanical and aerospace industry. Students will learn the basic steps in a CAD environment, Dimensioning, 2D & 3D creating and design. Students will have an introduction to assembly. *Pre-requisites: MATH 151*

**MECH 102 Solid Modeling I (3 credits)**

This course is a continuation of MECH 101. It mainly focuses on more advanced applications of the CAD software. It also includes introduction to concepts in engineering graphics and their implementation with Computer-Aided Design (CAD) parametric modelling tools. Creation of sketches, parts, assemblies, and engineering drawings. Application to group project, including oral and written reports.. *Prerequisite: MECH 101*

**MECH 210 Materials Science (3 credits)**

This course will enable students to get the fundamental knowledge about materials structure and their mechanical properties in order to select the appropriate materials for engineering applications and design. The course will also provide basic understanding on various modes of materials strengthening and failure. It will cover various types of materials namely metals, polymers and composites. *Prerequisite: CHEM 101*

**MECH 220 Engineering Mechanics - Dynamics (3 credits)**

The purpose of the course is to present the foundations and applications of the relationship between forces acting on an object and its motion. This knowledge is essential for the detailed study of further courses such that fluid dynamics, flight dynamics and structural dynamics. The course is also designed to emphasize the critical importance of good problem solving skills.

- Use vector notation to calculate the velocity and acceleration of a particle or rigid body in motion.
- Use Newton's second law to calculate acceleration and obtain information about the forces acting on the object.
- Energy methods. Use concepts of work, kinetic and potential energy in solving problems involving forces depending on object's position.

- Use momentum methods to determine the change in object's velocity. Analyze impacts, and forces exerted by continuous flow of mass.
- Analyse planar motions of rigid bodies without considering the forces and couples causing them.
- Introduction to vibrations. (If time permitted).. *Prerequisite: CIVL 200*

### **MECH 240: Introduction to Engineering Materials (3 credits)**

This course will enable students to get the fundamental knowledge about materials structure and their mechanical properties in order to select the appropriate materials for engineering applications and design. The course will also provide basic understanding on various modes of materials strengthening and failure. It will cover various types of materials namely metals, polymers and composites.. *Prerequisite: CHEM 101 and CIVL 200*

### **MECH 240L Materials Laboratory (1 credit)**

This course introduces students to experimental methods used to characterize engineering materials and mechanical behavior. Topics/experiments Included: experiments in mechanical properties, heat treatment, metallography, corrosion properties and X-ray diffraction. *Co-requisite: MECH 240*

### **MECH 310: Introduction to Engineering Design (3 credits)**

This course introduces a professional approach to engineering design problems. The course content focuses on problem definition, information gathering, feasibility studies, analysis, final design and communication. Several design studies and projects are also introduced. The course requires filing an approved master plan with the department chair. *Prerequisites: MECH 102, MECH 220*

### **MECH 312 Simulation of Engineering Systems (3 credits)**

This course introduces students to the concepts of modeling, simulation, and analysis of various mechanical systems, including dynamic, vibrational, electromechanical, and circuits for monitoring and controlling mechanical systems. Topics covered include an introduction to MATLAB, nonlinear algebraic equations, linear algebraic systems of equations, eigenvalue problems, regression and curve fitting, numerical differentiation and integration and ordinary differential equations.. *Prerequisites: MECH 220, CMPE 160, ELEC 204 and MATH 252*

### **MECH 314 Engineering Design: Mechanical Components (3 credits)**

This course involves the application of mechanics, physical properties of materials and solid mechanics to the design of machine elements. *Prerequisites: CIVL 301, MECH 220*

### **MECH 330L Control Systems Laboratory (1 credit)**

This course introduces students to control theory (e.g. stability, feedback, PID control) with applications in microprocessor-based control of dynamic, vibrational and mechatronic systems. "Bread-boarding" and BASIC programming of microcontrollers as well as graphical programming of PC-based controller interfaces are also discussed. *Prerequisites: ELEC 204, ENGR 201 and MECH 220*

### **MECH 340: Materials, Manufacturing and Design (3 credits)**

This course provides an overview of the effects of fabrication and thermomechanical processing on the properties and service behavior of engineering materials. Topics covered consist of fracture mechanics and materials behavior under a range of design conditions, as well as designing criteria

for engineering materials, including fatigue and creep. *Prerequisites: CIVL 301, MECH 240, and MECH 240L*

**MECH 350: Thermodynamics (3 credits)**

This course will provide undergraduate students with a comprehensive overview of the major areas of thermodynamics. Main thermodynamics concepts covered in this course range from the laws of thermodynamics, concepts of energy, work, temperature, spontaneous and Irreversible heat processes, refrigerators, heat pumps, mass, and energy analysis of controlled volumes and closed systems and entropy. *Prerequisites: CIVL 200 , MATH 252 and PHYS 105*

**MECH 351: Engineering Thermodynamics (3 credits)**

This course will build on concepts learned in Engineering thermodynamics (I). For the sake of brevity, in this class, students will learn a wide range of topics including: Work potential of Energy, Reversibility of Energy, Energy Transfer, Gas Power Cycles such as Diesel, Stirling, Ericson, Brayton, Rankine, Vapor and combined power cycles, Second Law analysis of Vapor cycles, Refrigerator, Heat Pumps, Thermodynamic Relations such as Maxwell, Calpeyron, Gas Vapor Mixtures and Air Conditioning, Dew point temperature and Airconditioning processes. . *Prerequisite: MECH 350*

**MECH 360 Fluid Mechanics (3 credits)**

Starting with an overview of fluid mechanics applications, then the fundamental fluids and flows properties are introduced. Fluid statics including pressure measurement devices are discussed. The Eulerian and Lagrangian approaches are presented along with some real-life applications. Integral formulation of fluid flow equations is discussed. Venturi meter and orifice meter are discussed as an application to the Bernoulli equation. Dimensional analysis and similitude are presented. Finally, viscous flow in pipes and ducts along with pressure losses are presented. Laminar and turbulent flows are introduced.. *Prerequisite: PHYS 105, and MECH 350*

**MECH 360L: Fluid Mechanics Laboratory (1 credit)**

Introduction to fluid mechanics laboratory and design of experiments, including experiments on, Bernoulli's Theorem, Minor Losses, Specific Gravity ,Impact of Jet, Reynolds' Number and Series and Parallel Pump. Students will also learn technical report writing and work in teams Co-requisite: MECH360

**MECH 405 Mechanical Engineering Internship(6 credit)**

This course provides students with the opportunity to practice on the job at a mechanical engineering firm or mechanical engineering department of an organization for a period of six to seven weeks, thereby transferring and developing industry-specific, mechanical engineering and other skills acquired from prior study. *Prerequisite: Senior standing (completing 90 credits), CGPA 2.0*

**MECH 405A : Mechanical Engineering Internship Part A (3 credits)**

This course provides students with the opportunity to practice on the job at an engineering firm or department of an organization directly related to their program of study,

thereby transferring and developing industry-specific skills in the appropriate engineering area of study and other skills acquired from prior study.

The internship period is four weeks, on the basis of 5days/week and 7 hours/day. *Pre-requisite: 60 credits, CGPA of 2.00.*

**MECH 405B : Mechanical Engineering Internship Part B (3 credits)**

This course provides students with the opportunity to practice on the job at an engineering firm or department of an organization directly related to their program of study, thereby transferring and developing industry-specific skills in the appropriate engineering area of study and other skills acquired from prior study.

The internship period is five weeks, on the basis of 5days/week and 7 hours/day. *Pre-requisite: MECH 405 A, CGPA of 2.00.*

**MECH 452 Principles of Heat Transfer (3 credits)**

This course focuses on the analytical and numerical solutions of steady and transient one and two-dimensional conduction problems, forced and natural convection in external and internal flows, as well as thermal radiation. *Prerequisites: MECH 360*

**MECH 490L Mechanical and Thermal Systems Laboratory (1 credit)**

This course introduces students to data acquisition theory, instrumentation, sensors, data reduction, statistical and uncertainty analysis, and experiment design. The concepts of designing, performing and reporting experiments on mechanical and thermal systems, mechanisms, vibrations, structures, thermodynamics, and heat transfer are also introduced. *Prerequisites: MECH 314, MECH 330L, MECH 351, and MECH 452*

**MECH 495A Mechanical Engineering Design: Capstone Project I (3 credits) And  
MECH 495B Mechanical Engineering Design: Capstone Project II (3 credits)**

These courses introduce and analyze the application of engineering principles and design techniques to the designing, building, and testing of an engineering system. Furthermore, ethics related to engineering practice are discussed. A single project is completed in this two-course sequence, which requires the presentation of an oral and a written report. *Prerequisites for 495A:90 credits or above, completing the internship and CGPA 2.0; Prerequisites for 495B:, MECH 495A*

**MECH 496 Advanced Machine Design (3 credits)**

This course focuses on the application of advanced mechanics of materials to the design and analysis of mechanical elements. Topics covered in the course also include probabilistic design and finite element methods as well as applications. Design projects involve extensive use of finite element programs. *Prerequisites: MECH 314 and MECH 340*

**MECH 498 Thermal System Analysis and Design (3 credits)**

This course provides students with knowledge on analysis, design and optimization of thermal systems, using microcomputers. Topics covered also include modeling of thermal systems and components, thermal system component characteristics and the effect on overall system

performance, the relationship among thermal sciences in the design process, and an introduction to thermo-economic optimization. *Prerequisites: MECH 351 and MECH 452*

**MECH 357 Introduction to Mechanical Vibrations (3 credits)**

This course analyzes the concept of mechanical vibration. Topics covered also include single- and multi-degree of freedom systems, free and forced vibrations, vibration isolation, vibration absorbers and theory of vibration measuring instruments. *Prerequisites: MECH 220, CMPE 160, and MATH 252*

**MECH 358 Automatic Control Systems (3 Credits)**

The course introduces students to the dynamic characteristics of control components and systems. Stability and response of closed-loop systems and design of control systems are also covered. *Prerequisite: MECH 220, CMPE 160, and MATH 252*

**MECH 365 Nonmetallic Materials (3 Credits)**

This course introduces the fundamentals of ceramics, polymers and composite materials. Topics covered also include materials design and selection, statistical methods of brittle materials design (appropriate for ceramic materials), rheological modeling of polymeric materials, and stress and strain analysis using classical lamination theory of multiply composite laminates. *Prerequisites: MECH 240, CIVL 301 and MECH 340*

**MECH 368 Powder-Based Manufacturing (3 Credits)**

This course teaches students about the manufacturing of micro and nanostructured engineering components and composites, starting with metal and/or ceramic powders. Topics covered also include powder production methods, characterization, powder shaping and compaction, sintering, hot consolidation, design considerations and finishing operations. *Prerequisite: MECH 340*

**MECH 408 Computer-Aided Manufacturing (3 Credits)**

This course introduces students to the concepts of computer-controlled manufacturing and assembly techniques and devices, databases and special languages, as well as agile manufacturing software programs and technologies. *Prerequisites: ENGR 201, MECH 102, MECH 314, and MECH 340*

**MECH 410 Heating, Ventilating and Air-Conditioning (3 credits)**

This course presents the fundamentals of air conditioning processes, psychometrics and building cooling-load calculations. Topics covered also include design and analysis of HVAC systems, equipment selection, design codes and standards and computerized cooling-load calculations. *Prerequisites: MECH 351 and MECH 452*

**MECH 415 Solar Energy Conversion (3 credits)**

This course involves the application of thermodynamics, fluid mechanics, and heat transfer to the thermal design of solar energy conversion systems. Computer simulations are also presented and used. *Prerequisites: MECH 351 and MECH 452*

**MECH 420 Biomechanics (3 credits)**

This course teaches students about the application of engineering methodologies for quantitative understanding of biological/physiological phenomena. Topics covered also include continuum mechanics principles, cardiovascular systems and components viewed from a mechanistic standpoint. *Prerequisites: CIVL 301, MECH 240 and MECH 360*

**MECH 425 Micro-Electro-Mechanical Systems (3 credits)**

This course focuses on microfabrication techniques, microsensors and micro-actuators, and scaling laws. A design project of a microdevice, including schematic creation, test of performance, layout generation, and layout versus schematic comparison, is required. Prerequisites for mechanical engineering majors: *ELEC 204, MECH 220, and MECH 240*

**MGMT 101 Principles of Management (3 credits)**

This course explores the basic managerial functions of planning, organizing, leading, motivating, and controlling the contemporary environment. *Pre-requisites: None*

**MGMT 205 Organizational Behavior (3 credits)**

This course is an introduction to the basic concepts in management and organizational behavior. The course applies these concepts to the management of people and resources toward the accomplishment of organizational goals. Emphasis is placed on acquainting students with the literature and on understanding the relationship between theory and practice. *Prerequisite: MGMT 101*

**MGMT 301 Operations Management (3 credits)**

This course examines issues included in productions and operations management, design, operation and control of industrial enterprises, plant location, scheduling quality control, layouts, facilities, planning, material processing and inventory control. *Prerequisite: MGMT 101, MATH 115*

**MGMT 302 Managing Human Resources (3 Credits)**

This course provides an overview of the processes by which organizations acquire, deploy, and retain their workforce. Students will develop specific knowledge, skills, and abilities needed to effectively carry out staffing activities, including HR planning, recruiting, selecting, placing, onboarding, training, and developing employees, labor relations, workplace safety, and compensation. Emphasis will be placed on the practical application of relevant theory, related research, and legal constraints as well as developing and applying critical thinking skills. Students will also develop skills in planning their career path. *Prerequisites: MGMT 101*

**MGMT 303 Management and Leadership Development (3 Credits)**

This course introduces students to the major concepts of the behavioral sciences that apply to the management of organizations. The course focuses on understanding factors and developing skills that affect the behavior and ultimately the performance of individuals and groups within organizations. Course activities are structured to provide students with opportunities for skill development through application, practice and reflection. *Prerequisite: MGMT 101*

**MGMT 305 International Business (3 Credits)**

This course reviews the principles, tools, processes, and practices used by managers to understand

international markets, cultures, economies and political environments and to achieve competitive advantage in an international setting. Topics covered include globalization, country differences (political, economic, legal, and cultural), global trade and investment, global monetary systems, strategy and structure of international businesses, and international business operations and practices. *Prerequisite: MGMT 205, ECON 102*

### **MGMT 306 Cross-Cultural Management (3 Credits)**

This course introduces students to culture as an important variable in international management and examines its impact on organizations, strategy, negotiations, management of human capital, leadership, team building, and ethics. The course content includes a metaphor approach to explore key differences among cultures and examine their relevance for international management practice. *Prerequisites: MGMT 305*

### **MGMT 310 Fundamentals of Family Business (3 Credits)**

This course introduces students to the unique challenges faced by family businesses and the potential solutions to these issues. Students examine the characteristics that define family businesses and the potential risks and benefits these bring to family businesses in Bahrain. The course includes discussion of issues such as family dynamics, generational gaps, leadership, the role of non-family members, governance, and succession planning. *Prerequisites: MGMT 101 and ACCT 102*

### **MGMT 312 Negotiation and Conflict Management (3 Credits)**

This course explores conflict as a management issue in business organizations and also investigates techniques and methods for reaching effective agreements. The course employs case studies, role playing and other experiential learning tools to develop analytical problem-solving abilities and enhance conflict resolution skills. *Prerequisite: MGMT 101*

### **MGMT 313 Managing Change and Innovation (3 Credits)**

This course explores the importance of innovation to business success and considers current trends in technology, society, consumer expectations and the workforce. The course includes examination of strategies for enabling innovation and overcoming obstacles to change. The course content also presents the concept of a learning organization in the context of transformational leadership. *Prerequisites: MGMT 205*

### **MGMT 314 Management Intervention and Consultation (3 Credits)**

This course introduces the management consulting industry and explores key activities associated with the consulting process. The course involves consideration of the consultant as an advisor and change agent; and examination of topics such as problem analysis, proposal development, project initiation, management of expectations, reputation and expertise, and knowledge transfer. *Prerequisites: MGMT 301*

### **MGMT 350 Business Ethics (3 credits)**

This course introduces the ethical dimensions of business as related to the various stakeholders inside and outside the organization. Topics include business ethical theory, ethical decision making, typical dilemmas, and corporate social responsibility. *Corequisite ENGL 205/ Prerequisite: MGMT 205*

### **MGMT 380 Project Management (3 Credits)**

This course explores the concepts and techniques of managing projects in service and manufacturing settings. Course content includes the following topics: project selection and evaluation; dynamics, motivation, and evaluation of team members; scheduling, budgeting, and closure. *Prerequisites: FINC 101, ACCT 102, ENGL 205, and MGMT 301*

### **MGMT 403 Entrepreneurship (3 Credits)**

The course introduces the fundamentals of starting the entrepreneurship journey as a career and as a business, backed up by empirical guidance and solid theoretical research in the field. Learners will be able to harness different tools and resources and would build the right attitude on how to start a new business venture that is relevant and can be competitive in the marketplace. *Prerequisites: MGMT 101, Minimum 70 credits*

### **MGMT 410 Business Policy and Strategic Management (3 credits)**

This course provides critical understanding of strategic management and business policies in modern organizations. This course is designed to develop problem-solving and decision-making skills in business situations that involve the organization as a whole and integrate knowledge and skills acquired from all areas of business. *Prerequisites: Minimum 75 credits, MGMT 101*

### **MGMT 401 Internship (3 credits)**

The purpose of the Internship subject is to provide students with opportunity to demonstrate the application of conceptual knowledge to the real world via industry placement in their selected field. This allows students to integrate their theoretical and conceptual knowledge with the skills and problem-solving techniques required in the workplace. Other outcomes include the acquisition of knowledge, research skills and the attitudes of business professionals, the ability to think independently, grow in originality, creativity, initiative, curiosity, enthusiasm, and resourcefulness, the ability to communicate ideas, an understanding of theory and procedures; knowledge of pertinent literature; and adeptness in the workplace. This subject provides a valuable transition between university and the workplace. *Prerequisites: minimum of 90 credits and a CGPA of 2.00, Business senior standing, MGMT 101, FINC 101, MRKG 101*

### **MGMT 404 Technology Entrepreneurship (3 credits)**

This course introduces the fundamentals for starting any business with some empirical guidance on how to use the tools and resources to start a new technology venture that is relevant and can be competitive in the marketplace. *Pre-requisites: None*

### **MGMT 513 Leadership Development and Team Building (3 credits)**

Leadership is the process by which a person guides and influences others to engage in collective endeavours and achieve common goals. Students will articulate goal-oriented personal leadership vision and develop their personal leadership plan. Throughout the semester, students will work in teams and will be receiving and giving personal feedback from and to their peers. This feedback will be incorporated in their self-evaluation and their personal plan. A before and after assessment will take place at the last meeting and students will present their leadership plan to the class.

*Prerequisites: None*

### **MGMT 520 Operations Management in Global Supply Chains (3 credits)**

Operations management is the design, operation, and improvement of the systems that create and deliver goods and services. Students will demonstrate mastery level knowledge of concepts and



tools in fundamental areas of operations management, including process design and analysis, quality management, inventory management, demand forecasting, sales and operations planning, material requirements planning, lean production, and supply chain management. Students will also develop the ability to perform both quantitative and qualitative analysis of problems and issues in operations management as well as to analyze the ethical consequences of their decisions.

*Prerequisites: None*

### **MGMT 530 People Analytics for Leaders (3 credits)**

The people analytics movement has contributed important insights to help managers become more effective at leading people and making better human-resources (HR) decisions. This course is designed to introduce these insights and the use of data to improve the practice of managing people within organizations. All practices and approaches learned in this course are backed up by robust empirical evidence that has demonstrated their effectiveness. Ethical considerations relating to the use of data about the organization's workforce will be discussed. Additionally, the course will examine important regional and international legal aspects pertaining to existing work laws and their implications. The course will utilize a variety of methods including lectures, case analyses, class discussions, and hands-on exploration of a variety of data sets. *Prerequisites: None*

### **MGMT 532 Global Strategic Management and Innovation (3 credits)**

This course is designed to teach candidates how to analyze the problems of managing an entire firm in the domestic and international context. The course will focus on the competitive strategy of the firm and will examine key challenges in securing its competitive advantage in the long and short terms in any given market. *Prerequisites: None*

### **MRKG 101 Principles of Marketing (3 credits)**

This is an introductory course in marketing. It examines the role of marketing within the organization and in society. Key marketing concepts include consumer needs, market research, pricing and promotion. *Pre-requisites: None*

### **MRKG 201 Consumer Behavior (3 credits)**

This course will help students understand how consumer behavior is central to the planning, development and implementation of marketing strategies. In addition to discussing classic consumer behavior concepts such as personality, perception, learning and attitude, this course will shed light on contemporary trends and issues including the role of new media, technological advances, and recent ethical concerns affecting the marketing industry. *Prerequisites: MRKG 101*

### **MRKG 202 Online Marketing Channels (3 credits)**

This course is designed to provide students with a thorough understanding of how different digital channels (including: social media marketing, search engine optimization (SEO), paid-search, email marketing, website optimization, and mobile marketing, among others) operate, in tandem, as a part of an overarching online marketing strategy. The students will also learn how digital marketing theory and research can be utilized to achieve marketing goals in the online sphere. *Prerequisites: None*

### **MRKG 401 Principles of Marketing Research (3 credits)**

The purpose of this course is to familiarize students with the key challenges facing marketing researchers in a modern world. The course will introduce students to the transactional stages of marketing research, including problem definition, research design development, data collection and

analysis, and communication of research findings. It will further teach students to apply research findings to current marketing challenges. *Prerequisites: Minimum 70 credits, MATH 115*

**MRKG 302 Marketing Strategy and Planning in a Digital World (3 credits)**

The purpose of this course is to familiarize students with the process of developing and implementing a marketing strategy in a digital world. The course focuses on competitive positioning at the heart of marketing strategy and offers in-depth emphasis on the processes used in marketing to achieve competitive advantage. The course pays special attention to the role of digital marketing tools in informing digital marketing strategy and planning. *Prerequisites: MRKG 101, MRKG 202, Minimum 60 credits*

**MRKG 310 Integrated Marketing Communications in a Digital World (3 credits)**

The purpose of this course is to familiarize students with an evolved definition of integrated marketing communications (IMC) and teach them how to effectively communicate in the business world. It will help students understand the importance of weaving together all marketing activities into one clear message and voice and how communications are produced and transmitted in a digital world. The subject additionally explores advertising and promotions, and the roles of social media, and other marketing tactics to effectively reach consumers. *Prerequisites: MRKG 101*

**MRKG 421 Data Analytics and Visualization (3 credits)**

The purpose of this course is to enable students to acquire critical knowledge and understanding of digital marketing analytics and its impact on marketing strategy and planning. Students will be able to critically analyse marketing data and use specialist tools to make informed marketing decisions. *Prerequisites: MRKG 101, MRKG 202, Minimum 60 credits*

**MRKG 430 Project Management for Creative Industries (3 credits)**

This course will give you the basic skills of project management with an emphasis on the creative industries (design, media etc.). You will acquire the technical tools to plan, estimate resources and pilot the progress of the project. Additionally, you will get a practical overview of the human aspects of project management. *Prerequisites: MGMT 101, Minimum 70 credits*

**MRKG 480 Marketing Internship (3 credits)**

The purpose of the Internship subject is to provide students with opportunity to demonstrate the application of conceptual knowledge to the real world via industry placement in their selected field. This allows students to integrate their theoretical and conceptual knowledge with the skills and problem-solving techniques required in the workplace. Other outcomes include the acquisition of knowledge, research skills and the attitudes of business professionals, the ability to think independently, grow in originality, creativity, initiative, curiosity, enthusiasm, and resourcefulness, the ability to communicate ideas, an understanding of theory and procedures; knowledge of pertinent literature; and adeptness in the workplace. This subject provides a valuable transition between university and the workplace. *Prerequisites: minimum of 90 credits and a CGPA of 2.00, Business senior standing, MGMT 101, FINC 101, MRKG 101*

**MRKG 431 Contemporary Issues in Social Media Campaigns (6 credits)**

The purpose of this course is to teach students about the latest developments in social media marketing research and practice. This will be achieved by presenting a balance of essential theory

and practical applications in the field of social media campaigns in the 21st century. *Prerequisites: MRKG 101, MRKG 202, Minimum 60 credits*

**MRKG 499 Marketing and Social Media Project (3 credits)**

This course is designed for final year digital marketing and social media students to further their digital marketing knowledge and skills. As they take this course, students will research and present solutions to a real-world digital marketing problem. This course encourages students to think analytically, logically, and creatively to integrate experience and knowledge in real world digital and social media marketing situations. *Prerequisites: MRKG401, Minimum 90 credits*

**MRKG 515 Marketing Management & Strategy (3 credits)**

This course explores a wide array of topics in marketing management and strategy, including elements of marketing strategy, planning, competition, and consumer behavior. Special emphasis is placed on developing students' analytical and creative understanding of the intricacies of marketing management in a business environment that is defined by vast advances in technology and increased attention to ethics and sustainability. *Prerequisites: None*

**MSYS 101 Principles of Management Information Systems (3 credits)**

This course provides an overview of management information systems (MIS) and provides practical applications of Excel in the business environment. Course topics include components of MIS, IT infrastructure including hardware and software, networks and MIS security. The course also covers management, social and ethical issues relating to MIS, as well as basics of Excel as an information system. *Pre-requisites: None*

**NDSE 120 Introduction to Industrial Engineering (1 credit)**

This course is an introduction and orientation to industrial engineering. Topics surveyed include concepts and approaches, illustrations of main methods and applications presented by a series of lectures given by the NDSE faculty. The course also involves an overview of departmental laboratories, basic information technologies, and software including mathematical packages and Web-based applications. *Pre-requisites: None*

**NDSE 202 Operations Research I: Linear Models (3 credits)**

The course aims to introduce a scientific approach to decision making in operations management employing the principles of linear programming. This course focuses on modeling concepts, linear programming, problem formulation, simplex and dual-simplex methods, duality and sensitivity analysis, transportation, trans-shipment and assignment problems and project scheduling and management. *Pre-requisites: MATH 152 OR MATH 154*

**NDSE 303 Operations Research II: Nonlinear Models (3 credits)**

This course focuses on nonlinear programming, optimization in one variable, convexity, unconstrained and constrained optimization in many variables, Kuhn-Tucker optimality conditions, direct search and gradient methods, computational complexity, and major heuristic approaches, such as simulated annealing, neural networks, tabu search, and genetic algorithms. *Prerequisite: NDSE 202*

**NDSE 304 Operations Research III: Stochastic Models (4 credits)**

This course emphasizes decision making under uncertainty and is an introduction to stochastic processes. Topics also include Markov chains, probabilistic dynamic programming, Markov decision processes, stochastic inventory theory, Poisson processes, and queuing and reliability models. *Prerequisite: NDSE 303, MATH 260*

### **NDSE 306 Systems Simulation (3 credits)**

This course introduces basic concepts of discrete-event simulation modeling and analysis. Topics include event-scheduling versus process-interaction approach, as well as random number and random variate generation, inverse transformation and other selected techniques, input data analysis and goodness-of-fit tests, specific computer simulation languages, and analysis of simulation output and model validation. *Prerequisite: MATH 260*

### **NDSE 312 Facilities Design and Planning (3 credits)**

This course focuses on the nature and classification of production systems. Topics include product design; forecasting methods, such as simple linear regression, moving average and exponential smoothing methods; capacity requirements planning; design of discrete production systems, such as product-based layout and assembly line balancing; process-based layout and design of workstations; group technology and cell design; material handling and storage systems; and facility location, including discrete and continuous space location models. *Pre-requisites: NDSE 120, NDSE 202*

### **NDSE 381 Safety Engineering (3 credits)**

This course focuses on human protection systems, emergency and accident handling, hazard identification techniques, safety vs reliability and systems safety quantification. The course relies on the applications of engineering design solutions that meet specified requirements with consideration of public health and safety, among other ethical and environmental requirements. It also develops an engineering approach to analysis, investigation of occupational accidents, and prepare prevention solutions. *Pre-requisites: NDSE 120.*

### **NDSE 405 Industrial Engineering Internship (6 credits)**

The purpose of the internship is to expose students to the profession and give them an opportunity to apply their academic knowledge in a practical setting. The internship consists of a minimum of 280 work hours (8 weeks) for fourth-year students with an approved employer. Internships are evaluated by the internship coordinator with a pass/fail grade. *Prerequisites: Senior standing (completing 90 credits), CGPA 2.0*

### **NDSE 405A : Industrial Engineering Internship Part A (3 credits)**

This course provides students with the opportunity to practice on the job at an engineering firm or department of an organization directly related to their program of study, thereby transferring and developing industry-specific skills in the appropriate engineering area of study and other skills acquired from prior study.

The internship period is four weeks, on the basis of 5 days/week and 7 hours/day. *Pre-requisite: Junior standing 60 credits, CGPA of 2.00.*

### **NDSE 405B : Industrial Engineering Internship Part B (3 credits)**

This course provides students with the opportunity to practice on the job at an engineering firm or department of an organization directly related to their program of study,

thereby transferring and developing industry-specific skills in the appropriate engineering area of study and other skills acquired from prior study.

The internship period is five weeks, on the basis of 5days/week and 7 hours/day. *Pre-requisite: NDSE 405 A, CGPA of 2.00.*

#### **NDSE 413 Supply Chain Management (4 credits)**

This course provides an overview of the fundamentals of supply chain management and enterprise resources planning (ERP). Topics also include aggregate production planning (static, dynamic, nonlinear, and lot sizing models), operations scheduling (flow shops and job shops), materials management and materials requirement planning (MRP), capacity resources planning (CRP), distribution system management, and implementation of manufacturing management strategies.

*Prerequisite: NDSE 312*

#### **NDSE 423 Quality Engineering (3 credits)**

This course provides an overview of the principles of quality control systems, process control concepts, specification and tolerances, process capability studies, control charts, acceptance sampling plans, cost aspects of quality decisions, quality improvement programs, and quality information systems. *Prerequisite: MATH 260*

#### **NDSE 495A Engineering Design: Capstone Project I (3 credits)**

These courses involve the application of industrial engineering principles and design techniques to the design, build, and testing of an engineering system. Issues related to ethics and engineering practice are also discussed. A single project is completed in this two-course sequence and is judged completed upon presentation of an oral and a written report. *Prerequisite: NDSE 306, NDSE 304, NDSE 381, NDSE 312, ECON 341, NDSE 405, Senior level (90 credits).*

#### **NSDE 495B Engineering Design: Capstone Project II (3 credits)**

These courses involve the application of industrial engineering principles and design techniques to the design, build, and testing of an engineering system. Issues related to ethics and engineering practice are also discussed. A single project is completed in this two-course sequence and is judged completed upon presentation of an oral and a written report. *Prerequisite: NDSE 495A*

#### **PHYS 101 Principles of Physics I (3 credits)**

This course provides an overview of the fundamental principles of physics in areas of mechanics. Topics include standards and units, vectors and coordinate systems, kinematics, dynamics of single particles, work energy and power, conservation on energy, dynamics of system of particles, collisions, and rotational kinematics and dynamics. The course is designed for students requiring calculus-based physics. *Pre-requisites: MATH 151 or MATH 153*

#### **PHYS 101L Principles of Physics I Laboratory (1 credit)**

This course is designed to reinforce topics presented in PHYS 101 lectures. Through scientific experimentation, students will improve their understanding of basic concepts in mechanics while developing their foundation of the scientific process. Laboratory work includes the setting up and running of physics' experiments, whether hands on or online. Regular activities include data taking, data presentation, data visualization, data analysis, fitting, and drawing of conclusions. *Pre-Co-requisites: PHYS 101*

**PHYS 102 Principles of Physics II (3 credits)**

The course provides an overview of the fundamental principles of physics in the areas of electricity and magnetism. Topics include electric field, Gauss law, electric potential, capacitance and dielectrics, current and resistance, direct current circuits, magnetic fields, sources of magnetic fields, Biot-Savart Law, Ampere's Law, Faraday's law, and Lenz's Law. The course is designed for students requiring calculus-based physics. *Prerequisites: PHYS 101 and either MATH 152 OR MATH 154*

**PHYS 102L Principles of Physics II Laboratory (1 credit)**

This course is designed to reinforce topics presented in PHYS 102 lectures. Through scientific experimentation, students will improve their understanding of basic concepts in electricity and magnetism while developing their foundation of the scientific process. Laboratory work includes the setting up and running of physics' experiments, whether hands on or online. Regular activities include data taking, data presentation, data visualization, data analysis, fitting, and drawing of conclusions. *Pre-Co-requisites: PHYS 102*

**PHYS 103 Physics and the Visual Arts (4 credits)**

Physics and the Visual Arts provides students in non-science or engineering disciplines a fundamental understanding of how physics relates to the visual arts. The focus of the course is optics and includes both light and radiations. The course is designed for students studying design or other programs where calculus is not required. *Pre-requisites: None*

**PHYS 104 Physics of Sound and Acoustics (4 credits)**

Physics of Sound and Acoustics provides students in non-science or engineering disciplines a fundamental understanding of the physics of sound and acoustics. The focus of the course is on the principles of musical and architectural acoustics, waves and vibrations, digital techniques for generating and recording sound, perception and measure of sound. The course is designed for students studying design or other programs where calculus is not required. *Pre-requisites: None*

**PHYS 105 Principles of Physics III (3 credits)**

This course provides an overview of the fundamental principles of physics in the areas of static equilibrium and elasticity, fluid mechanics, kinetic theory of gases, first and second law of thermodynamics, mechanical waves, vibrating bodies, and acoustic phenomena. *Prerequisites: PHYS 101 and either MATH154*

**PHYS 105L Principles of Physics III Laboratory (1 credit)**

PHYS 105L is designed to reinforce topics presented in PHYS 105 lectures. Through scientific experimentation, students will improve their understanding of basic concepts in static equilibrium and elasticity, fluid mechanics, kinetic theory of gases, first and second law of thermodynamics, mechanical waves, vibrating bodies, and acoustic phenomena while developing their foundation of the scientific process. *Pre-co-requisites: PHYS 105*

**POLS 321 Comparative Political Ideologies (3 credits)**

This course examines, compares, and contrasts a range of political ideologies and their interpretation and application in contemporary societies. Attention is paid to defining the role and function of ideologies in specific contemporary states. *Pre-requisites: None*

**PSYC 101 Introduction to Psychology (3 credits)**

Psychology is the scientific study of behavior and mental processes. The content focuses on the exploration of major theories and concepts, methods, and research findings in psychology. Topics include the biological bases of behavior, ethics involved in research, perception, cognition, learning, memory, emotion, motivation, development, personality, social psychology, psychological disorders and therapeutic approaches, and applied psychology.. *Pre-requisites: None*

**SOCS 101 Introduction to Sociology (3 credits)**

This course will introduce students to the basic concepts and theories of sociology, as well as to the methods utilized in sociological research. The course will address how sociological concepts and theories can be utilized to analyze and interpret our social world, and how profoundly our society and the groups to which students belong influence them. *Pre-requisites: None*

**SOCS 201 Introduction to Criminology (3 credits)**

The course surveys various theories of crime, with an emphasis on understanding the social causes of criminal behavior. The techniques for measuring crime as a social phenomenon and the nature of crime are examined. This course addresses crime types (such as consensual or white-collar crimes), the criminal justice system, and other social responses to crime with a focus on cyber-crime. The course prepares students to be informed citizens in a global technological society. *Pre-requisites: None*

**SUST 101 Principles of Sustainability (3 credits)**

This introductory course uses an interdisciplinary approach to help students understand the main concepts of sustainability. Students will learn about sustainability as it relates to economic development, social equity, and current environmental challenges. Students will also develop the ability to apply sustainable thinking in their personal and professional lives. *Pre-requisites: None*

**UNSS 101 University Success (1 credit) – Degree Plans starting in Fall 2023 and onwards**

This course is designed to help students function as independent learners within a university environment. The course teaches students various transferable study skills, including time management, dealing with group projects, test preparation, and critical reading. It also intends to raise students' understanding of themselves as learners. *Prerequisites: None*

## **COURSE DESCRIPTIONS ABBREVIATIONS**

Disciplinary Acronyms for Course Description Purposes

ACCT	Accounting
ARHG	Arabic Heritage
ARCH	Architecture
BIOL	Biology
BUSN	Business
CHEM	Chemistry
CIVL	Civil Engineering
CMPE	Computer Engineering
COSC	Computer Science
DSGN	Design
ECON	Economics
ELEC	Electrical Engineering
ENGL	English
ENGR	Engineering
ENVM	Environmental Science
FINC	Finance
MATH	Mathematics
MECH	Mechanical Engineering
MGMT	Management
MSYS	Management Information Systems
MRKG	Marketing
NDSE	Industrial Engineering
PHYS	Physics
PSYC	Psychology
SOSC	Sociology