

2021

College of Applied Industrial  
Technology (CAIT)



**Study Plan of  
Chemical Engineering  
Technology (CHET) Program**

## Table of Contents

1.	Introduction to College of Applied Industrial Technology (CAIT) .....	1
2.	CAIT Vision .....	1
3.	CAIT Mission .....	1
4.	CAIT Strategic Goals.....	1
5.	CAIT Objectives .....	2
6.	The Academic Departments in CAIT .....	3
7.	The Scientific Degree Awarded.....	4
8.	Duration of Study.....	4
9.	Admission Requirements .....	4
10.	Coding and Numbering .....	5
11.	Department of Chemical Engineering Technology.....	5
11.1.	Vision of the department.....	6
11.2.	Mission of the department .....	6
11.3.	Organizational framework of the department .....	6
12.	Chemical Engineering Technology Program (CHET).....	6
12.1.	Introduction.....	6
12.2.	Fields of Work .....	7
12.3.	Vision of CHET program .....	7
12.4.	Mission of CHET program .....	7
12.5.	Goals of CHET program.....	7
12.6.	Program Educational objectives (PEO) of CHET program.....	8
12.7.	Program Learning Outcomes (PLOs) of CHET program .....	9
12.8.	Program requirements .....	11
12.9.	Curriculum .....	15
12.10.	Statistics .....	18
12.11.	References.....	19
13.	Description of Courses .....	21
13.1.	Description of university requirements courses.....	21
13.2.	Description of college requirements courses .....	22
13.3.	Description of the compulsory courses for the CHET program .....	30
13.4.	Description of the elective courses for the CHET program.....	35
13.5.	Hierarchy of the CHET program .....	38
13.6.	Evaluation model for CHET program .....	39

## List of Tables

<b>Table (1):</b> University, college, and department requirements for the AS degree .....	11
<b>Table (2):</b> Details of university and college requirements for the study plan.....	12
<b>Table (3):</b> The scientific groups for the CHET program .....	13
<b>Table (4):</b> The distribution of credit units and contact hours for compulsory courses ...	13
<b>Table (5):</b> The distribution of credit units and contact hours for elective courses .....	14
<b>Table (6):</b> Preparatory year .....	15
<b>Table (7):</b> Freshman year .....	16
<b>Table (8):</b> Sophomore year .....	17
<b>Table (9):</b> The distribution of credit units and contact hours with percentage .....	18
<b>Table (10):</b> Comparison between the number of practical and theoretical courses with percentage .....	18
<b>Table (11):</b> The distribution of credit units over academic levels .....	18
<b>Table (12):</b> Comparison with corresponding programs in terms of program requirements .....	19
<b>Table (13):</b> Comparison with local and international colleges (university and college courses) .....	19
<b>Table (14):</b> Comparison with local and international colleges (program courses).....	20

## List of Figures

Figure – 1	CAIT Strategic Goals as driven from JU Strategic Directions .....	2
Figure – 2	Organizational framework of CAIT .....	3
Figure – 3	Coding and numbering system .....	5
Figure – 4	Organizational framework of the department .....	6
Figure – 5	Goals of CHET program as extracted from CAIT Strategic Goals.....	8
Figure – 6	Mission, Goals, PEOs, and PLOs of CHET program as extracted from CAIT and JU Mission .....	10
Figure – 7	The flowchart and hierarchy of the CHET program .....	38

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

## 1. Introduction to College of Applied Industrial Technology (CAIT)

With the approval of the Custodian of the Two Holy Mosques, the Chairman of the Council of Education, may God protect him, College of Applied Industrial Technology was established with government support. We aim to educate our youth in order to support our national economy. The college is located in the Governorate of Baish, where approximately 100 billion riyals is being invested in Jazan Economic City (JEC). JEC contains several industrial mills, such as refineries, Solb Steel plant, and Crystal factory for Titanium. The main goal of the college is to serve the industrial sector by providing highly trained Saudi youth, qualified through programs operating with international providers, to ensure quality and competitiveness.

## 2. CAIT Vision

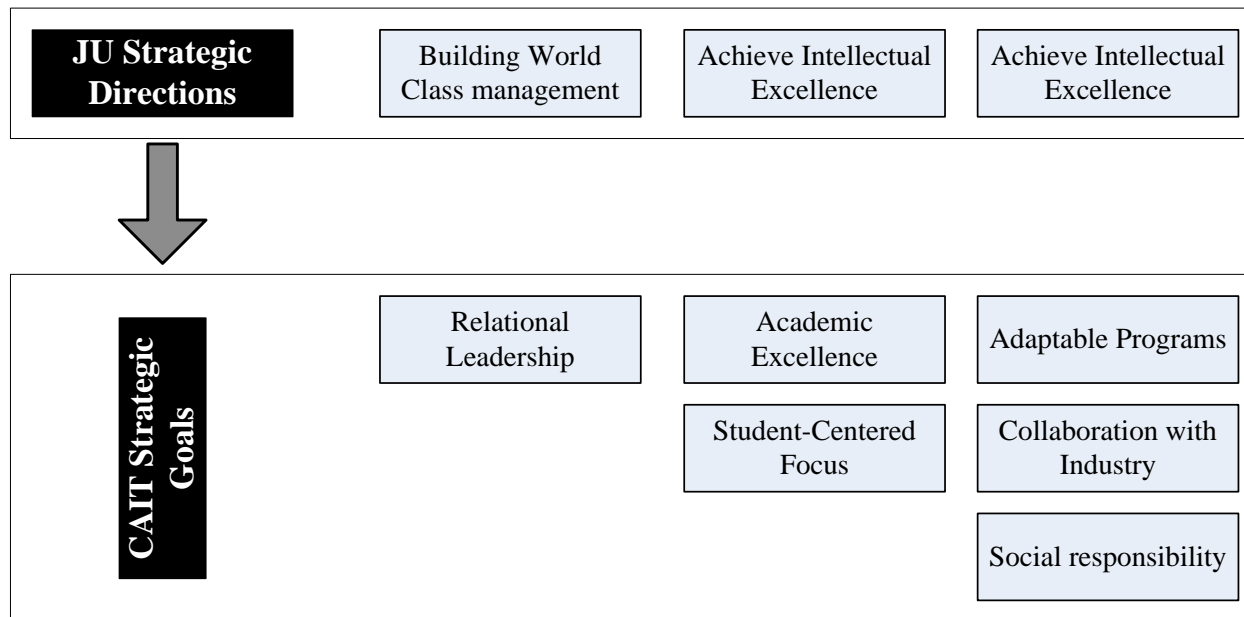
Be a distinct learning center in technical sciences in the Kingdom.

## 3. CAIT Mission

To service the industrial needs of Jazan and the Kingdom of Saudi Arabia with well-qualified technicians, through the provision of high-quality technical programs and strategic partnerships.

## 4. CAIT Strategic Goals

- 1- Relational Leadership
- 2- Academic Excellence
- 3- . Student-Centered Focus
- 4- Adaptable Programs
- 5- Collaboration with Industry
- 6- Social Responsibility



**Figure – 1 CAIT Strategic Goals as driven from JU Strategic Directions**

## 5. CAIT Objectives

1. Equip the students with the necessary skills and technical knowledge to work with a high degree of professionalism.
2. Imbue in the students a scientific approach to critical thinking, better cooperation in teamwork, and good communication with peers and others.
3. Enable students to apply academic knowledge to solve technical problems in their areas of specialization.
4. Inspire confidence in the students, and encourage a sense of social responsibility, good behavior, moral values, and professionalism.
5. Prepare students who have the ability to develop and to continue in their education.
6. Achieve an integrated educational system and set up multiple paths of academic programs, which respond to national needs and to the local labor market.

## 6. The Academic Departments in CAIT

College of Applied Industrial Technology (CAIT) consists of three departments. They are:

- 1- Department of Chemical Engineering Technology
  - (Chemical Engineering Technology Program)
- 2- Department of Electrical Engineering Technology
  - (Electrical Power Engineering Technology Program)
- 3- Department of Mechanical Engineering Technology
  - (Mechanical Maintenance Engineering Technology Program)

These programs have been designed in line with the standards of global technical engineering education, for the sake of the objectives of the Kingdom's development, taking into account the basics of accreditation by the National Commission for Academic Accreditation and Assessment (NCAAA) and the Accreditation Board for Engineering and Technology (ABET).

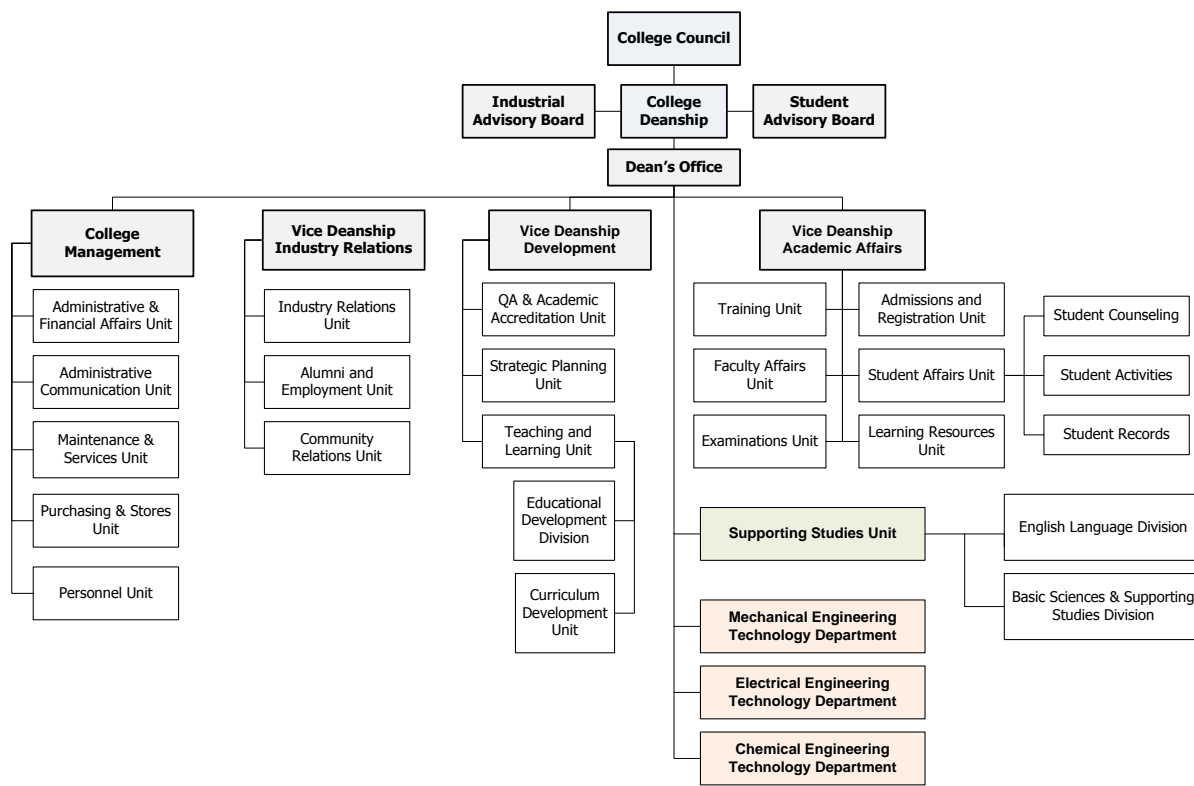


Figure – 2 Organizational framework of CAIT



## 7. The Scientific Degree Awarded

The college awards the degree of *Graduate Diploma (GD)* in the field of specialization.

## 8. Duration of Study

The duration of study in BCC is three (3) years, all in the **English language**. They are the preparatory, freshman, and sophomore years. Co-operative training is compulsory in the summer semester of the freshman year for eight (8) weeks. During the preparatory year, students mainly study English language, in addition to some basic mathematics and science. The other two years, freshman and sophomore, are allocated mainly to the specialized courses, which depends upon the department requirements, as well as some courses of humanities.

## 9. Admission Requirements

- 1- The student should have Saudi nationality. In case of the non-Saudi student, their mother should carry Saudi nationality.
- 2- The students must be graduated from high school (Science Section).
- 3- The students should not have been graduated for more than two years before admission.
- 4- The student may not have been dismissed from the university or another university for disciplinary reasons.
- 5- Admission is allowed in the case of high-school grade average not less than 60%.
- 6- The students should pass any other requirements which may be set by the college.
- 7- In coordination with the Admission and Registration Deanship, the college has the right to transfer any student to another college, in case if GPA less than 3.0 in his first preparatory year, according to the availability of the university tuition. A pledge is taken by the student regarding this action.
- 8- Students are distributed to departments after the preparatory year, according to their desire, their GPA, and available seats.

## 10. Coding and Numbering

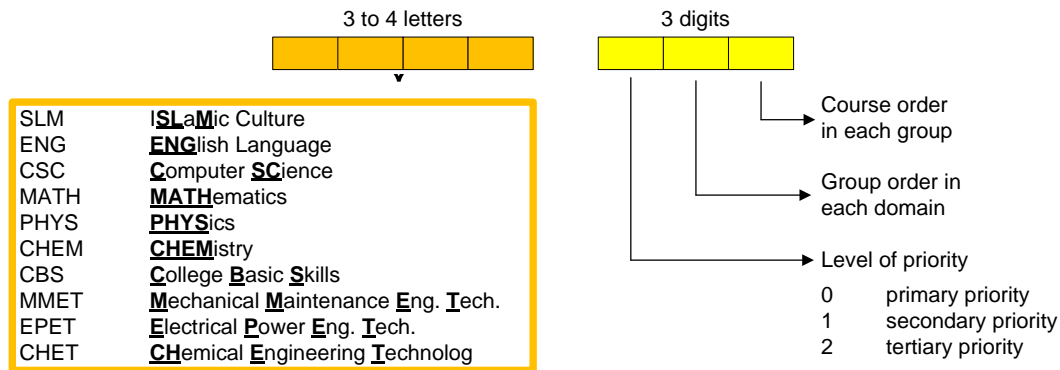


Figure – 3 Coding and numbering system

## 11. Department of Chemical Engineering Technology

The department was established in 2016 to achieve the vision and mission of the College. It plays an important role in the chemical and oil industries in KSA. The objectives of the department are also consistent with the overall objectives of the college in terms of:

1. Equip the students with the necessary skills and technical knowledge to work with a high degree of professionalism in the field of chemical engineering technology.
2. Imbue in the students a scientific approach to critical thinking, better cooperation in teamwork, and good communication with peers and others.
3. Enable students to apply academic knowledge to solve technical problems in the area of chemical engineering technology.
4. Inspire confidence in the students, and encourage a sense of social responsibility, good behavior, moral values, and professionalism.
5. Prepare students who have the ability to develop and to continue in their education.
6. Achieve an integrated educational system and set up multiple paths of academic programs, which respond to national needs and to the local labor market. In this regard, the department offers a unique program:

- Chemical Engineering Technology (CHET) Program

## 11.1. Vision of the department

National leadership in the field of technical education in Chemical Engineering.

## 11.2. Mission of the department

To service the industrial needs of Jazan and the Kingdom of Saudi Arabia with well-qualified Chemical Engineering Technology graduates, through the provision of high-quality technical programs and strategic partnerships.

## 11.3. Organizational framework of the department

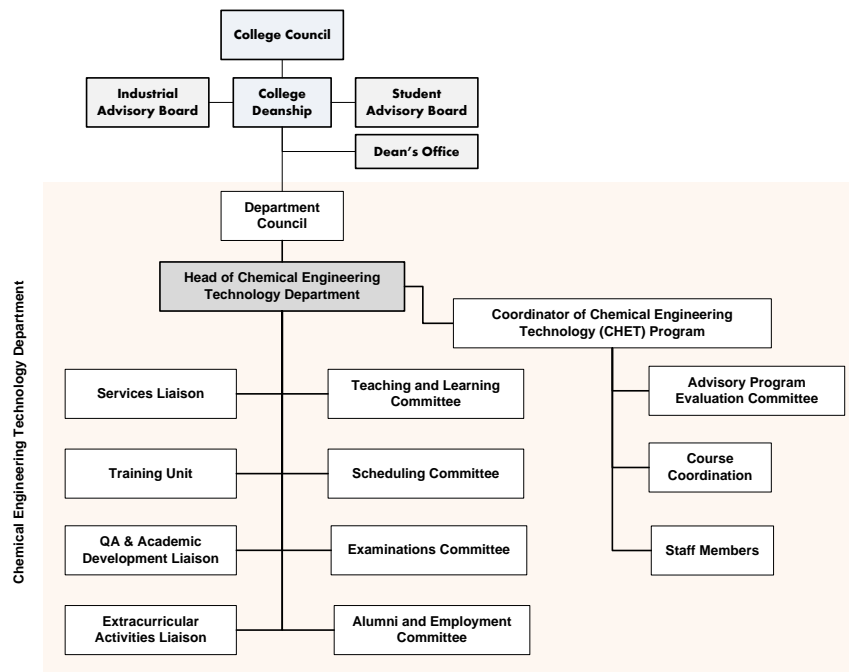


Figure – 4 Organizational framework of the department

## 12. Chemical Engineering Technology Program (CHET)

### 12.1. Introduction

Chemical engineering technology plays an important role in chemical and oil industries in the Kingdom of Saudi Arabia. Therefore, the Chemical Engineering Technology (CHET) program is carefully designed to provide a distinct technology curriculum that responds to the needs of these industries.

The Chemical Engineering Technology (CHET) program falls under the Department of Chemical Engineering Technology. This department plays an important role in chemical and oil industries in Saudi Arabia. Therefore, the CHET program had been established to serve these industries.

## 12.2. Fields of Work

The Chemical Engineering Technology (CHET) program is aimed at the following areas of work:

- 1- Oil industries
- 2- Chemical industries
- 3- Food industries
- 4- Desalination and water treatment
- 5- Environmental pollution

## 12.3. Vision of CHET program

The vision of the program is in-line with the College's vision of being a distinct program in chemical engineering technology in the Kingdom.

## 12.4. Mission of CHET program

The mission of the program is in-line with the mission of both college and department in a sense of: “To prepare well-qualified technicians for immediate employment in the field of Chemical Engineering Technology, through the provision of high-quality technical programs and strategic partnership”.

## 12.5. Goals of CHET program

- 1- To provide process-oriented purposeful leadership.
- 2- To prepare qualified graduates who are valued as members of the workforce in CHET–related industries.

- 3- To provide an academic environment that stimulates excellence through student focused strategies.
- 4- To collaborate with industry and the community to cater to their needs and the needs of the program's students.

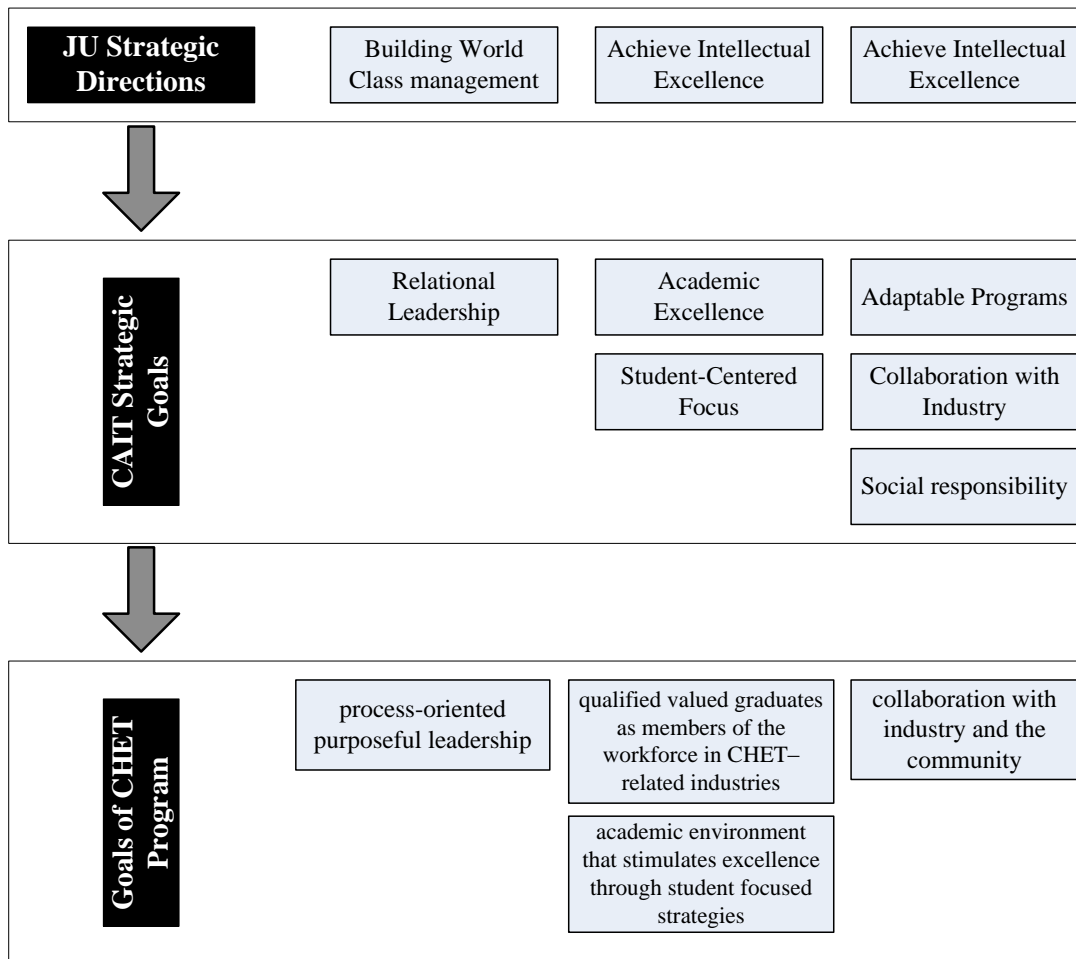


Figure – 5 Goals of CHET program as extracted from CAIT Strategic Goals

## 12.6. Program Educational objectives (PEO) of CHET program

- 1- Graduates will meet employers' expectation in Chemical Engineering Technology by undertake active roles in the development of their technical community and ensure promotion in their professional positions and community.

- 2- Graduates will acquire development in their profession, by continuous and life-long learning activities, in order to address contemporary issues in chemical engineering technology, in ethical and professional manner.
- 3- Graduates will communicate effectively and work independently or in diverse teams with ethical responsibility and respect of diversity.

### 12.7. Program Learning Outcomes (PLOs) of CHET program

The program learning outcomes (PLOs) may be listed according to the Accreditation Board for Engineering and Technology (ABET) and the National Quality Framework (NQF) as:

#### a. Knowledge

- 1- An ability to demonstrate a broad and coherent body of knowledge, with depth in the underlying principles and concepts in the discipline,

#### b. Skills

- 2- An ability to apply knowledge, techniques, skills, and modern tools of mathematics, science, engineering, and technology to solve well-defined engineering problems appropriate to the discipline,
- 3- An ability to design solutions for well-defined technical problems and assist with the engineering design of systems, components, or processes appropriate to the discipline,
- 4- An ability to apply written, oral, and graphical communication in well-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature,
- 5- An ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results,

#### c. Values

- 6- An ability to function effectively as a member of a technical team, a commitment to quality, timeliness, and continuous improvement, and
- 7- An ability to engage in self-directed continuing professional development.

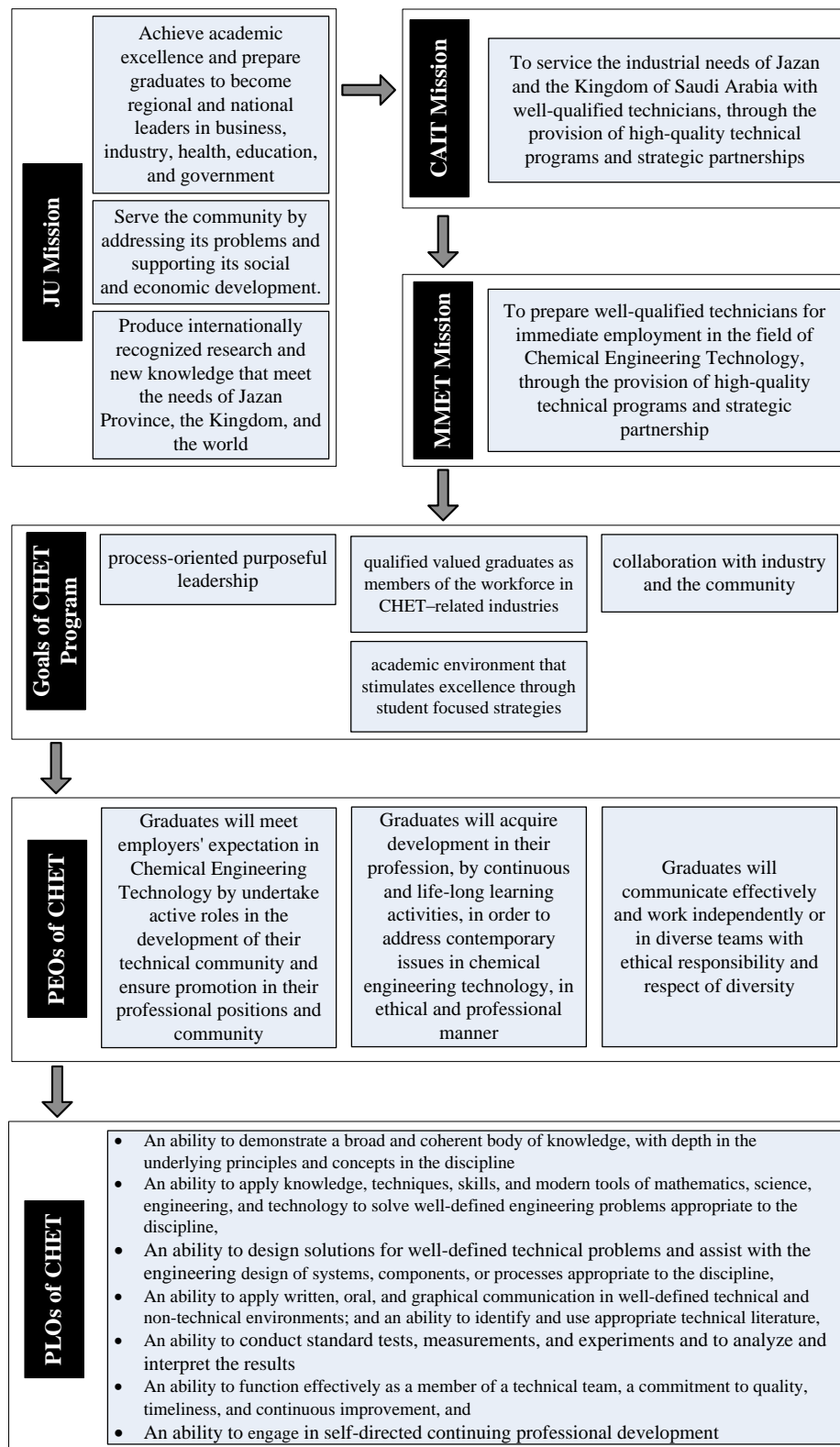


Figure – 6 Mission, Goals, PEOs, and PLOs of CHET program as extracted from CAIT and JU Mission

## 12.8. Program requirements

Table (1) represents the distribution of credit units for the Chemical Engineering Technology (CHET) program among university, college, and department.

**Table (1):** University, college, and department requirements for the AS degree

Requirement	Credit units
University	2
College	53
Department	37
Total	92

Table (2) shows the details of credit units and contact hours for university and college requirements only.



**Table (2):** Details of university and college requirements for the study plan<sup>1</sup>

	Course Code	Course Name	Credit Units	Contact Hours
<b>University Requirements</b>				
	103 SLM	Islamic Culture	2	2
<b>University requirements</b>		<b>1 Course</b>	<b>2</b>	<b>2</b>
<b>College Requirements</b>				
<b>English Language</b>	000 ENG	English Language – Level 0	2	20*
	001 ENG	English Language – Level 1	3	20*
	002 ENG	English Language – Level 2	3	20*
	003 ENG	English Language – Level 3	3	20*
	004 ENG	English Language – Level 4	3	20*
	193 ENG	Technical English	3	5
	194 ENG	Communication Skills	3	5
	295 ENG	Technical Report Writing	1	3
<b>College Basic Skills</b>	001 CBS	Study Skills	1	1
	203 CBS	Organizational Behavior and Ethics	1	1
	001 CSC	Computer Essentials	1	3
<b>Sciences and Mathematics</b>	091 MATH	Mathematics – I	4	5
	092 MATH	Mathematics – II	4	5
	193 MATH	Calculus	3	4
	195 MATH	Applied Statistics	2	2
	091 PHYS	General Physics	4	5
	191 CHEM	General Chemistry	3	4
<b>Basic Engineering</b>	011 MMET	Engineering Drawing	2	5
	112 MMET	Workshop Technology	3	5
	213 MMET	Industrial Safety and Environment	1	3
	111 EPET	Electric Circuit – I	3	4
<b>College requirements</b>		<b>21 Courses</b>	<b>53</b>	<b>110</b>

<sup>1</sup> \* is giving to half-term courses (8 weeks)

Table (3) shows the scientific groups for the CHET program.

**Table (3):** The scientific groups for the CHET program

Group Name	Number
Basic Mechanical Engineering	1
Material and Machine Elements	2
Mechanical Maintenance	3
Elective Group 1	4
Elective Group 2	5
Elective Group 3	6
Elective Group4	7
Elective Group 5 (Field Training)	8
Project	9

The distribution of credit units and contact hours for compulsory and elective courses is depicted in Table (4) and Table (5).

**Table (4):** The distribution of credit units and contact hours for compulsory courses

Discipline	Course Code	Course name	Credit Units	Contact Hours
Basic Chemical Engineering (1)	111 CHET	Introduction to Chemical Engineering Technology	3	5
	112 CHET	Applied Organic Chemistry	3	4
	116 CHET	Equipment Design & Drawing	1	3
	213 CHET	Methods of Chemical Analysis	3	4
Transport Phenomena and Thermodynamics (2)	121 CHET	Momentum Transfer	2	3
	122 CHET	Chemical Engineering Thermodynamics	3	4
Petroleum Technology (3)	231 CHET	Separation Process	3	5
	232 CHET	Petroleum Refining and Testing	3	5
Project (9)	291 CHET	Chemical Engineering Technology Project	2	5
<b>Total of Compulsory Courses</b>		<b>9 Courses</b>	<b>23</b>	<b>38</b>

**Table (5):** The distribution of credit units and contact hours for elective courses

Discipline	Course Code	Pre-Requisite	Course name	Credit Units	Contact Hours
Elective Group 1 (24*)	241 CHET	122 CHET	Process Heat Transfer (Elective 11)	3	5
	242 CHET		Elective Course 12		
	243 CHET		Elective Course 13		
	244 CHET		Elective Course 14		
	245 CHET		Elective Course 15		
Elective Group 2 (25*)	251 CHET	121 CHET	Mass Transfer Operations (Elective21)	3	4
	252 CHET		Elective Course 22		
	253 CHET		Elective Course 23		
	254 CHET		Elective Course 24		
	255 CHET		Elective Course 25		
Elective Group 3 (26*)	261 CHET	213 CHET	Process Installation and Control (Elective31)	3	4
	262 CHET		Elective Course 32		
	263 CHET		Elective Course 33		
	264 CHET		Elective Course 34		
	265 CHET		Elective Course 35		
Elective Group 4 (27*)	271 CHET	112 CHET	Environmental Pollution (Elective41)	3	5
	272 CHET		Elective Course 42		
	273 CHET		Elective Course 43		
	274 CHET		Elective Course 44		
	275 CHET		Elective Course 45		
Elective Group 5 (*8*)	181 CHET	194 ENG & Cr Unit	Co-Op Training	2	40
	282 CHET		On-the-Job Training		
<b>Total of Elective Courses</b>			<b>5 Courses</b>	<b>14</b>	<b>58</b>

\* It means the elective course from 1 to 5 within each group and according to sponsorship.

## 12.9. Curriculum

Table (6): Preparatory year<sup>2</sup>

First Semester				Half-term <input type="checkbox"/>			
Course Code	Course name	Pre-requisite	Credit Units	Weekly Contact Hours			
				Lec	Lab	Tut	Total
000 ENG	English Language – Level 0	--	2	5	15	0	20*
001 ENG	English Language – Level 1	000 ENG	3	5	15	0	20*
091 MATH	Mathematics –I	--	4	3	0	2	5
011 MMET	Engineering Drawing	--	2	0	5	0	5
001 CBS	Study Skills	--	1	1	0	0	1
<b>Total</b>	<b>5 Courses</b>		<b>12</b>	<b>9</b>	<b>20</b>	<b>2</b>	<b>31</b>

Second Semester				Half-term <input type="checkbox"/>				Summer Semester <input type="checkbox"/>			
Course Code	Course name	Pre-requisite	Credit Units	Weekly Contact Hours							
				Lec	Lab	Tut	Total				
002 ENG	English Language – Level 2	001 ENG	3	5	15	0	20*				
003 ENG	English Language – Level 3	002 ENG	3	5	15	0	20*				
004 ENG	English Language – Level 4	003 ENG	3	5	15	0	20*				
092 MATH	Mathematics – II	091 MATH	4	3	0	2	5				
091 PHYS	General Physics	--	4	3	2	0	5				
<b>Total</b>	<b>4 Courses</b>		<b>14</b>	<b>11</b>	<b>17</b>	<b>2</b>	<b>30</b>				
	<b>1 Course (Summer Semester)</b>		<b>3</b>	<b>5</b>	<b>15</b>	<b>0</b>	<b>20</b>				
<b>Overall</b>	<b>10 Courses</b>		<b>29</b>	<b>22.5</b>	<b>44.5</b>	<b>4</b>	<b>71</b>				

<sup>2</sup> \* is giving to half-term courses (8 weeks)

**Table (7):** Freshman year

First Semester							
Course Code	Course name	Pre-requisite	Credit Units	Weekly Contact Hours			
				Lec	Lab	Tut	Total
193 ENG	Technical English	004 ENG	3	2	3	0	5
001 CSC	Computer Essentials	--	1	0	3	0	3
193 MATH	Calculus	092 MATH	3	2	0	2	4
191 CHEM	General Chemistry	--	3	2	2	0	4
112 MMET	Workshop Technology	011 MMET	3	1	4	0	5
111 EPET	Electric Circuit – I	091 PHYS	3	2	2	0	4
111 CHET	Introduction to Chemical Engineering Technology	--	3	2	3	0	5
<b>Total</b>	<b>7 Courses</b>		<b>19</b>	<b>11</b>	<b>17</b>	<b>2</b>	<b>30</b>

Second Semester							
Course Code	Course name	Pre-requisite	Credit Units	Weekly Contact Hours			
				Lec	Lab	Tut	Total
194 ENG	Communication Skills	004 ENG	3	2	3	0	5
195 MATH	Applied Statistics	092 MATH	2	1	0	1	2
103 SLM	Islamic Culture	--	2	2	0	0	2
112 CHET	Applied Organic Chemistry	191 CHEM	3	2	2	0	4
116 CHET	Equipment Design & Drawing	011 MMET	1	0	3	0	3
121 CHET	Momentum Transfer	111 CHET	2	1	2	0	3
122 CHET	Chemical Engineering Thermodynamics	091 PHYS	3	2	2	0	4
<b>Total</b>	<b>7 Courses</b>		<b>16</b>	<b>10</b>	<b>12</b>	<b>1</b>	<b>23</b>
<b>Overall</b>	<b>14 Courses</b>		<b>35</b>	<b>21</b>	<b>29</b>	<b>3</b>	<b>53</b>

Summer Semester							
Course Code	Course name	Pre-requisite	Credit Units	Weekly Contact Hours			
				Lec	Lab	Tut	Total
*8* CHET	Elective Group 5	194 ENG + Credit Units <sup>#</sup>	2	0	40	0	40
<b>Total</b>	<b>1 Course</b>		<b>2</b>	<b>0</b>	<b>40</b>	<b>0</b>	<b>40</b>

\*8\* Means the following decisions :

#181 CHET

#282 CHET

50 Credit Units for unsponsored students

70 Credit Units for sponsored students

**Table (8):** Sophomore year

First Semester							
Course Code	Course name	Pre-requisite	Credit Units	Weekly Contact Hours			
				Lec	Lab	Tut	Total
295 ENG	Technical Report Writing	193 ENG	1	0	3	0	3
213 MMET	Industrial Safety and Environment	--	1	0	3	0	3
231 CHET	Separation Process	111 CHET	3	2	3	0	5
213 CHET	Methods of Chemical Analysis	112 CHET	3	2	2	0	4
24* CHET	Elective Group 1	Acc. to Course	3	2	3	0	5
<b>Total</b>	<b>5 Courses</b>		<b>11</b>	<b>6</b>	<b>14</b>	<b>0</b>	<b>20</b>

Second Semester							
Course Code	Course name	Pre-requisite	Credit Units	Weekly Contact Hours			
				Lec	Lab	Tut	Total
203 CBS	Organizational Behavior and Ethics	--	1	1	0	0	1
232 CHET	Petroleum Refining and Testing	231 CHET	3	2	3	0	5
25* CHET	Elective Group 2	Acc. to Course	3	2	2	0	4
26* CHET	Elective Group 3	Acc. to Course	3	2	2	0	4
27* CHET	Elective Group 4	Acc. to Course	3	2	3	0	5
291 CHET	Chemical Engineering Technology Project	295 ENG + 50 Credit Units	2	0	5	0	5
<b>Total</b>	<b>6 Courses</b>		<b>15</b>	<b>9</b>	<b>15</b>	<b>0</b>	<b>24</b>
<b>Overall</b>	<b>11 Courses</b>		<b>26</b>	<b>15</b>	<b>29</b>	<b>0</b>	<b>44</b>

## 12.10. Statistics

Table (9) shows the percentage distribution of credit units and contact hours for university, college, and department requirements.

**Table (9):** The distribution of credit units and contact hours with percentage

Requirement		No. of Courses	Credit Units		Contact Hours
			No.	%	
Humanities	Culture, Ethics, and Skills	3	4	4.35	4
	English Language	8	21	22.83	63
Computer Science		1	1	1.09	3
Mathematics and Science		6	20	21.74	25
Basic Engineering		4	9	9.78	17
Chemical Engineering Technology		14	37	40.21	96
<b>Total</b>		<b>36</b>	<b>92</b>	<b>100</b>	<b>208</b>

Table (10) compares between the number of practical and theoretical courses with percentages.

**Table (10):** Comparison between the number of practical and theoretical courses with percentage

	Practical Courses		Theoretical Courses		Total
	Number	%	Number	%	
All courses	28	77.78	8	22.22	36
Program Courses only	14	100	0	0	14

Finally Table (11) shows the distribution of credit units over academic levels.

**Table (11):** The distribution of credit units over academic levels

Semester	University and College Requirements	Department Requirements	Total for each level	Total for Academic Year
First	12	--	12	29
Second	14	--	14	
Summer (1)	3	--	3	
Third	16	3	19	35
Fourth	7	9	16	
Summer (2)	--	2	2	2
Fifth	2	9	11	26
Sixth	1	14	15	
<b>Total</b>	<b>55</b>	<b>37</b>	<b>92</b>	

## 12.11. References

**Table (12):** Comparison with corresponding programs in terms of program requirements

Requirements	Credit Units (CAIT)	Credit Units (JIC)	Credit Units (YIC)
University	2	2	4
College	53	61	55
Department	37	39	38
<b>Total</b>	<b>92</b>	<b>102</b>	<b>97</b>

**Table (13):** Comparison with local and international colleges (university and college courses)

Course Code	Course Name	CAIT	JIC	YIC	SCO	EMC	CaC	CeC
103 SLM	Islamic Culture	√	√	√	--	--	--	--
001 CSC	Computer Essentials	√	√	√	√	√	√	√
000 ENG	English Language – Level 0	√	√	√	--	--	--	--
001 ENG	English Language – Level 1							
002 ENG	English Language – Level 2							
003 ENG	English Language – Level 3							
004 ENG	English Language – Level 4							
193 ENG	Technical English	√	√	√	--	√	--	--
194 ENG	Communication Skills	√	√	√	--	--	√	√
295 ENG	Technical Report Writing	√	√	√	--	√	√	√
001 CBS	Study Skills	√	√	--	--	--	--	--
203 CBS	Organizational Behavior and Ethics	√	√	--	--	--	√	√
091 MATH	Mathematics – I	√	√	√	√	√	√	√
092 MATH	Mathematics – II	√	√	√	√	√	√	√
193 MATH	Calculus	√	√	√	√	--	√	√
295 MATH	Applied Statistics	√	--	√	--	--	√	--
091 PHYS	General Physics	√	√	√	--	--	√	√
191 CHEM	General Chemistry	√	√	√	--	--	--	--
011 MMET	Engineering Drawing	√	√	√	√	√	√	√
112 MMET	Workshop Technology	√	√	√	√	√	√	√
213 MMET	Industrial Safety and Environment	√	√	√	√	√	√	√
111 EPET	Electric Circuit – I	√	√	--	√	√	√	√

- CAIT College of Applied Industrial Technology
- JIC Jubail Industrial College
- YIC Yanbu Industrial College
- SCO Sheridan College Oakville
- EMC East Mississippi Community College
- CaC Canadore College, Toronto, Canada
- CeC Centennial College, Toronto, Canada



**Table (14):** Comparison with local and international colleges (program courses)

Course Code	Course Name	CAIT	JIC	YIC	SCO	FCB	DuC	LaC
111 CHET	Introduction to Chemical Engineering Technology	√	√	√	√	√	√	--
112 CHET	Applied Organic Chemistry	√	√	√	√	√	√	--
116 CHET	Equipment Design & Drawing	√	√	√	--	--	--	--
213 CHET	Methods of Chemical Analysis	√		√	√	√	√	--
121 CHET	Momentum Transfer	√	√	√	--	--	--	√
122 CHET	Chemical Engineering Thermodynamics	√	√	√	--	√	√	√
231 CHET	Separation Process	√	√	--	√	--	√	√
232 CHET	Petroleum Refining and Testing	√	√	√	--	--	√	
241 CHET	Process Heat Transfer (ELECTIVE 11)	√	√	--	√	--	√	√
251 CHET	Mass Transfer Operations (ELECTIVE 21)	√	√	√	√	--	--	--
261 CHET	Process Installation and Control (ELECTIVE 31)	√	--	√	√	--	--	--
271 CHET	Environmental Pollution (ELECTIVE 41)	√	√	√	√	--	√	√
181 CHET	Co-Op Training (ELECTIVE 5)	√	√	√	√	√	--	--

- CAIT College of Applied Industrial Technology
- JIC Jubail Industrial College
- YIC Yanbu Industrial College
- SCO Sheridan College Oakville
- FCB Fanshaw College Blvd London, Ontario
- DuC Durham College, Toronto, Canada
- LaC Lambton College, Canada

### 13. Description of Courses

#### 13.1. Description of university requirements courses

<b>Course Code</b>	<b>103 SLM</b>			
<b>Course Title</b>	<b>Islamic Culture</b>			
<b>Year/Level</b>	<b>Freshman/2</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>2</b>	<b>2</b>	<b>0</b>	<b>0</b>
<b>Prerequisite</b>	<b>None</b>			
<b>Course Description</b>	<p>The course aims to introduce the Islamic way of economic life and the relationship of man's life with the earning of money and spending. It looks at the relationship of financial communities with each other in terms of distribution and trading, as well as the rules and legal provisions that regulate economic life and financial transactions. It compares existing economic systems, in order to declare a comparative statement of Islamic economic attributes and basic characteristics.</p>			

### 13.2. Description of college requirements courses

<b>Course Code</b>	<b>000 ENG</b>			
<b>Course Title</b>	<b>English Language – Level 0 (half Term – 8 weeks)</b>			
<b>Year/Level</b>	<b>Preparatory/1</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>2</b>	<b>5</b>	<b>15</b>	<b>0</b>
<b>Prerequisite</b>	<b>None</b>			
<b>Course Description</b>	<p>This is a 2 credit unit course designed for students at the beginning of the preparatory year. The course is labelled 000 for it is recognized that the students placed in the class have score so low on the entrance/proficiency they would not normally be accepted into the Preparatory Year program. The general aim of this course is to begin at the A0 - starter level.</p> <p>ENG 000 is a starter level course intended to provide students with a foundation from which they can advance from A0 to A1 on the Common European Framework of Reference for Languages (CEFR). At the successful conclusion of this course students will have attained sufficient basic English skills to understand sentences (recognise complete sentences, identify core vocabulary and components of the sentence, and identify basic punctuation functions). Another objective of this course is to provide teaching-learning activities which should contribute to the development of the skill of understanding spoken English, particularly in an academic context, e.g. lectures and discussions. Since English is the language of instruction at BCC, students must possess the requisite ability to listen to a lecture in English and to take notes on it; the lecture method is an integral part of the instructional process.</p>			

<b>Course Code</b>	<b>001 ENG</b>			
<b>Course Title</b>	<b>English Language – Level 1 (half Term – 8 weeks)</b>			
<b>Year/Level</b>	<b>Preparatory/1</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>3</b>	<b>5</b>	<b>15</b>	<b>0</b>
<b>Prerequisite</b>	<b>000 ENG or Placement Test</b>			
<b>Course Description</b>	<p>This is a 3 credit unit course designed for students at the beginning of the preparatory year. The general aim of this course is to bring students to a near A2 level on the CEFR.</p> <p>ENG 001 is a starter level for approximately 40% of the college's new intake students. At the successful conclusion of this course students will have attained sufficient basic English skills to understand sentences (recognize complete sentences, identify core vocabulary and components of the sentence, and identify basic punctuation functions). Another objective of this course is to provide teaching-learning activities which should contribute to the development of the skill of understanding spoken English, particularly in an academic context, e.g. lectures and discussions.</p>			

<b>Course Code</b>	<b>002 ENG</b>			
<b>Course Title</b>	<b>English Language – Level 2 (half Term – 8 weeks)</b>			
<b>Year/Level</b>	<b>Preparatory/2</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>3</b>	<b>5</b>	<b>15</b>	<b>0</b>
<b>Prerequisite</b>	<b>001 ENG or Placement Test</b>			
<b>Course Description</b>	<p>This is a 3-credit unit course designed for students midway through the preparatory year. The course shifts instruction from General English to technical English required for their major and the work place setting.</p> <p>At the successful conclusion of this course students will have attained sufficient English skills to understand sentences (recognise complete sentences, identify core vocabulary and components of the sentence, and identify basic punctuation functions). Another objective of this course is to provide teaching-learning activities which should contribute to the development of the skill of understanding spoken English, particularly in an academic context, e.g. lectures and discussions.</p>			

<b>Course Code</b>	<b>003 ENG</b>			
<b>Course Title</b>	<b>English Language – Level 3 (half Term – 8 weeks)</b>			
<b>Year/Level</b>	<b>Preparatory/2</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>3</b>	<b>5</b>	<b>15</b>	<b>0</b>
<b>Prerequisite</b>	<b>002 ENG or Placement Test</b>			
<b>Course Description</b>	<p>This is a 3 credit unit course designed for students in the upper levels of the preparatory year. This course carries on with the subjects introduced in ENG_002. The course is designed to train students in technical English within ‘simulated’ work place settings. ENG_003 is an elementary course intended to provide students with a further foundation from which they can advance from A2 to B1 on the Common European Framework of Reference for Languages (CEFR).</p> <p>The course aims to help learners achieve an overall English language proficiency of Elementary User defined as A2 (CEFR), developing generative language to interact in an elementary way, such as asking and answering simple questions. A second goal is to introduce the student to technical vocabulary needed in the core diploma programs.</p>			



<b>Course Code</b>	<b>004 ENG</b>			
<b>Course Title</b>	<b>English Language – Level 4 (half Term – 8 weeks)</b>			
<b>Year/Level</b>	<b>Preparatory/3</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>3</b>	<b>5</b>	<b>15</b>	<b>0</b>
<b>Prerequisite</b>	<b>003 ENG or Placement Test</b>			
<b>Course Description</b>	<p>This is a 3 credit unit course designed for students completing their first year of English study. The course concentrates on technical English required for their major and the work place setting.</p> <p>The main objective of this course is to provide teaching-learning activities which should contribute to the development of the skill of understanding spoken English, particularly in an academic context, e.g. lectures and discussions.</p>			

<b>Course Code</b>	<b>193 ENG</b>			
<b>Course Title</b>	<b>Technical English</b>			
<b>Year/Level</b>	<b>Freshman/1</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>3</b>	<b>2</b>	<b>3</b>	<b>0</b>
<b>Prerequisite</b>	<b>004 ENG</b>			
<b>Course Description</b>	<p>The program's mission is to prepare students to study in English at a tertiary level in the fields of Mechanical, Electrical and Chemical Engineering. The program's operational goal is to equip students with sufficient language skills to succeed in the college's programs. Therefore, the operational goal of this course is to facilitate and improve oral proficiency at the appropriate level. The course will be reviewed at the end of the academic year. Student outcomes will be compared to course objectives to determine areas of program improvement. At that time, teaching quality, text quality, class size, appropriateness of course objectives and time frame, and extra-curricular support will be assessed as possible change variables.</p>			

<b>Course Code</b>	<b>194 ENG</b>			
<b>Course Title</b>	<b>Communication Skills</b>			
<b>Year/Level</b>	<b>Freshman/2</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>3</b>	<b>2</b>	<b>3</b>	<b>0</b>
<b>Prerequisite</b>	<b>004 ENG</b>			
<b>Course Description</b>	<p>194 ENG is a pre-intermediate level course intended to provide students with a further foundation from which they can consolidate B1 learning skills on the Common European Framework of Reference for Languages (CEFR). It gives students the opportunity to practice and expand their communicative competency and to extend the limits of their knowledge of vocabulary and idioms, within the context of oral English. It encourages students to think quickly, to listen, interpret and respond, to express opinions, and to justify their ideas. Students are encouraged to participate in class discussion and to ask freely on any aspect of the language with which they require help. Students prepare PowerPoint slideshows and practice and deliver spoken presentations. Students planning to participate in the Co-Op summer training program improve in both speaking and writing, in preparation for the program.</p>			

<b>Course Code</b>	<b>295 ENG</b>			
<b>Course Title</b>	<b>Technical Report Writing</b>			
<b>Year/Level</b>	<b>Sophomore/1</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>1</b>	<b>0</b>	<b>3</b>	<b>0</b>
<b>Prerequisite</b>	<b>004 ENG</b>			
<b>Course Description</b>	<p>Technical Report Writing will give students experience in preparing technical reports. Following the Final Report Template, it will guide students through to the completion of the written technical report. Oral interview skills will be introduced.</p>			

<b>Course Code</b>	<b>001 CBS</b>			
<b>Course Title</b>	<b>College Study Skills</b>			
<b>Year/Level</b>	<b>Preparatory/1</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>
<b>Prerequisite</b>	<b>None</b>			
<b>Course Description</b>	<p>The course will cover some of the key skills needed by college students including: goal-setting, motivation, time and stress management, classroom skills, preparing for exams, and analytical/critical thinking.</p>			

<b>Course Code</b>	<b>203 CBS</b>			
<b>Course Title</b>	<b>Organizational Behaviour and Ethics</b>			
<b>Year/Level</b>	<b>Sophomore/2</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>
<b>Prerequisite</b>	<b>None</b>			
<b>Course Description</b>	<p>The course is designed to provide students with an understanding and awareness of the various factors that influence individual and group behavior within organizations. It also explores the ethical aspects of decision making and behavior in the workplace. The field of organizational behavior derives many concepts and methods from the behavioral and social sciences such as psychology, sociology, social psychology, and anthropology. In the workplace today, a good understanding of the theory of human relations in organizations is essential. Some contemporary organizational issues include individual and group dynamics, motivation, leadership, organizational structure, morale, power, organizational change, and development.</p>			

<b>Course Code</b>	<b>001 CSC</b>			
<b>Course Title</b>	<b>Computer Essentials</b>			
<b>Year/Level</b>	<b>Preparatory/Second</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>1</b>	<b>0</b>	<b>3</b>	<b>0</b>
<b>Prerequisite</b>	<b>None</b>			
<b>Course Description</b>	<p>The course is an introduction to computer systems components, Windows Operating Systems and its utilities. The course also gives hands-on exposure to applications software, as well as an introduction to Internet tools and technologies.</p>			

<b>Course Code</b>	<b>091 MATH</b>			
<b>Course Title</b>	<b>Mathematics – I</b>			
<b>Year/Level</b>	<b>Preparatory/1</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>4</b>	<b>3</b>	<b>0</b>	<b>2</b>
<b>Prerequisite</b>	<b>None</b>			
<b>Course Description</b>	<p>The course is designed to provide knowledge and educational experience to students in basic and fundamental mathematical concepts required for technical courses. The topics may include: factoring of polynomials, equations and inequalities in one variable, two dimensional co-ordinate system and graphs, introduction to functions, linear and quadratic functions, synthetic division, remainder theorem and the factor theorem, and zeros of polynomial functions.</p>			

<b>Course Code</b>	<b>092 MATH</b>			
<b>Course Title</b>	<b>Mathematics – II</b>			
<b>Year/Level</b>	<b>Preparatory/2</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>4</b>	<b>3</b>	<b>0</b>	<b>2</b>
<b>Prerequisite</b>	<b>091 MATH</b>			
<b>Course Description</b>	The course is a logical extension of 091 MATH and designed for students studying for the AS degree. The course introduces some advanced algebraic topics such as inverse of functions, exponential and logarithmic functions with their graphs and their properties, trigonometric functions, trigonometric identities, inverse trigonometric functions, parabolas and ellipses, matrices and system of linear equations. The course also introduces the concepts of elementary analytic geometry.			

<b>Course Code</b>	<b>193 MATH</b>			
<b>Course Title</b>	<b>Calculus</b>			
<b>Year/Level</b>	<b>Freshman/1</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>3</b>	<b>2</b>	<b>0</b>	<b>2</b>
<b>Prerequisite</b>	<b>092 MATH</b>			
<b>Course Description</b>	This is a theoretical course designed to provide knowledge and educational experience to students in order to solve mathematical problems involved in technical specialty courses. The topics may include: limits and continuity, differentiation, applications of differentiation, indeterminate form, L' Hopital rule, indefinite and definite integrals with their applications. The course should enable the students to acquire sufficient understanding in ordinary differential equations of first order and modeling.			

<b>Course Code</b>	<b>195 MATH</b>			
<b>Course Title</b>	<b>Applied Statistics</b>			
<b>Year/Level</b>	<b>Freshman/2</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>2</b>	<b>1</b>	<b>0</b>	<b>1</b>
<b>Prerequisite</b>	<b>092 MATH</b>			
<b>Course Description</b>	The aim of this course is to develop the students' understanding of statistical concepts and ability to apply them in their respective streams. The topics may include: sampling classification and statistical analysis of data. The course describes a non-tabulated (tabulated) set of data through frequency, relative frequency, cumulative frequency distributions and their graphical presentations, measures of central tendency, measures of dispersion, analysis of ordered pairs data through linear correlation and linear regression, probability, normal distribution, binomial distribution, T-distribution, and index numbers.			



<b>Course Code</b>	<b>091 PHYS</b>			
<b>Course Title</b>	<b>General Physics</b>			
<b>Year/Level</b>	<b>Preparatory/2</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>4</b>	<b>3</b>	<b>2</b>	<b>0</b>
<b>Prerequisite</b>	<b>None</b>			
<b>Course Description</b>	<p>This course is designed to introduce the basic principles of engineering mechanics for study of applied technology. The course identifies measuring using both imperial and metric systems with conversion between them, then provides physics concepts and applications in motion and forces, work and energy, electrostatic forces, magnetism, DC and AC electric circuit components, light nature, reflection and refraction of light. Techniques, skills, and modern computerized apparatus necessary to make laboratory measurements possible are adopted. Experiments are made to support the theory and to meet the needs of engineering technology programs.</p>			

<b>Course Code</b>	<b>191 CHEM</b>			
<b>Course Title</b>	<b>General Chemistry</b>			
<b>Year/Level</b>	<b>Freshman/1</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>3</b>	<b>2</b>	<b>2</b>	<b>0</b>
<b>Prerequisite</b>	<b>None</b>			
<b>Course Description</b>	<p>This course offers understanding of chemistry for students who have not had this course taught in English. The course enables students to learn the states of matter and units of measurements, atoms, molecules and ions, the modern view of the atomic structure, the electronic structure of atoms and related hypothesis, periodic table, stoichiometry (calculations with chemical formulas, types of chemical reaction), solutions (definition, properties and concentrations), solubility and precipitation reactions, red-ox reaction and its implication, chemistry of nonmetals, basic concepts of chemical bonding, saturated and unsaturated hydrocarbons, and organic compounds. The practical components of the course include teaching students awareness of safety regulations as well as their ability in experimentation, observation, measurements, and documentation.</p>			

<b>Course Code</b>	<b>011 MMET</b>			
<b>Course Title</b>	<b>Engineering Drawing</b>			
<b>Year/Level</b>	<b>Preparatory/1</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>2</b>	<b>0</b>	<b>5</b>	<b>0</b>
<b>Prerequisite</b>	<b>None</b>			
<b>Course Description</b>	This introductory course in drawing and drafting covers the use of drawing instruments, geometrical operations, sketching and shape descriptions, orthographic views, sectional views, and reading assembly drawings. The course also introduces the drawing of basic machine elements (gears, fasteners, pulleys, coupling, bearings, shafts, keys) with identification.			

<b>Course Code</b>	<b>112 MMET</b>			
<b>Course Title</b>	<b>Workshop Technology</b>			
<b>Year/Level</b>	<b>Freshman/1</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>3</b>	<b>1</b>	<b>4</b>	<b>0</b>
<b>Prerequisite</b>	<b>011 MMET</b>			
<b>Course Description</b>	This subject deals with various hand tools, measuring instruments, production, and welding machines. This is an introductory course which provides the basic theoretical and practical skills on workshop technology including precautions inside workshop and safety rules for hand tools various machines. The course contents may include definition of machinist and use of hand tools and measuring instruments used in bench and sheet metal working, and dealing with the machines settled in production workshops including turning lathes, shaper machines, milling machines, drilling machines, and welding techniques.			

<b>Course Code</b>	<b>213 MMET</b>			
<b>Course Title</b>	<b>Industrial Safety and Environment</b>			
<b>Year/Level</b>	<b>Sophomore/1</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>1</b>	<b>0</b>	<b>3</b>	<b>0</b>
<b>Prerequisite</b>	<b>None</b>			
<b>Course Description</b>	This course introduces the concept of health and safety through practical training in a work environment. It aims at forming within the students sound attitudes towards safety and environment. Students recognize general safety, mechanical, electrical, and chemical hazards, fire safety, the factors influencing environmental pollution, and the regulatory methods to control them.			



<b>Course Code</b>	<b>111 EPET</b>			
<b>Course Title</b>	<b>Electric Circuit – I</b>			
<b>Year/Level</b>	<b>Freshman/1</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>3</b>	<b>2</b>	<b>2</b>	<b>0</b>
<b>Prerequisite</b>	<b>091 PHYS</b>			
<b>Course Description</b>	This is a foundation course which introduces students to the elements of electrical circuits, variables in electrical circuits, Ohm's law, Kirchhoff's law, series and parallel connections, DC circuits: simple resistance circuitry, star and delta connections, current and voltage source and conversion between them, methods of circuit analysis, cumulative effect of sources, Thevenin's theorem, maximum power, AC circuits: elements representation with respect to time, vector representation of voltage and current, implementation of methods utilized in analysis of circuits, enhancing power factor.			

### 13.3. Description of the compulsory courses for the CHET program

<b>Course Code</b>	<b>111 CHET</b>			
<b>Course Title</b>	<b>Introduction to Chemical Engineering Technology</b>			
<b>Year/Level</b>	<b>Freshman/1</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>3</b>	<b>2</b>	<b>3</b>	<b>0</b>
<b>Prerequisite</b>	<b>None</b>			
<b>Course Description</b>	This course is an introductory course dealing with the fundamental concepts, calculations and processing technology employed in the chemical process industry. The calculations cover basic physical and chemical concepts, stoichiometry of chemical reactions, mixtures of fluids and combustion of fuels, in addition to simple material and energy balance concepts applied to process units. This course will also cover the introduction to process instrumentation lines, pump and valve symbols, vessel symbols, heat and mass transfer equipment, type of equipments, types of storage vessels and their shapes, valves, gauges, pipes and color codes, insulation. Typical chemical processing industries are also dealt with. Laboratory sessions are mainly devoted to formal calculations consolidating the principles and concepts outlined with some experimental exercises where appropriate.			



<b>Course Code</b>	<b>112 CHET</b>			
<b>Course Title</b>	<b>Applied Organic Chemistry</b>			
<b>Year/Level</b>	<b>Freshman/2</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>3</b>	<b>2</b>	<b>2</b>	<b>0</b>
<b>Prerequisite</b>	<b>191 CHEM</b>			
<b>Course Description</b>	<p>This course introduces the student to apply organic chemistry. It deals with the classification, functional group and nomenclature of organic compounds. This course covers basic topics on simple reaction mechanisms of alkanes, alkenes, alkynes, aldehydes, ketones, alcohols, phenols, carboxylic acids, aromatic compounds, and amines. The course also gives emphasis to the chemistry of petroleum, downstream industries, such as dyes, soaps and detergents, paints, adhesives, pharmaceuticals, and polymers (i.e., plastics, resins, and elastomers). The course will be supported by laboratory experiments</p>			

<b>Course Code</b>	<b>116 CHET</b>			
<b>Course Title</b>	<b>Equipment Design &amp; Drawing</b>			
<b>Year/Level</b>	<b>Freshman/2</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>1</b>	<b>0</b>	<b>3</b>	<b>0</b>
<b>Prerequisite</b>	<b>011 MMET</b>			
<b>Course Description</b>	<p>This course outlines drawing template with layout as well as identifying equipment and instruments based on symbols with focus on drawing process flow diagrams. Students will learn applying chemical and mechanical design aspects of process equipment and design heat exchangers, evaporators, absorbers, distillation columns, reactors and filters.</p>			

<b>Course Code</b>	<b>121 CHET</b>			
<b>Course Title</b>	<b>Momentum Transfer</b>			
<b>Year/Level</b>	<b>Freshman/2</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>2</b>	<b>1</b>	<b>2</b>	<b>0</b>
<b>Prerequisite</b>	<b>111 CHET</b>			
<b>Course Description</b>	<p>The flow and behavior of fluid is important in many of the unit operations in process engineer. A fluid may be defined as a substance that does not permanently resist distortion and hence will be changing its shape. In this course gases, liquid and vapor are considered to have the characteristics of fluid and to obey many of the same laws. In the process industries, many of the materials are in fluid form and must be stored, handled, pumped and processed, so it is necessary that we become familiar with the principles that govern the flow of fluid and the equipment used. This course is also dealing with the fundamental concepts, principles of momentum transfer and applications in packed and fluidized beds, types and functions of valves, flanges, and fluid flow measurement using Orifice meter, Venturi meter, Pitot tube, Rotameter, pump functions and types of compressor, blowers, advantageous and disadvantageous.</p>			



<b>Course Code</b>	<b>122 CHET</b>			
<b>Course Title</b>	<b>Chemical Engineering Thermodynamics</b>			
<b>Year/Level</b>	<b>Freshman/2</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>3</b>	<b>2</b>	<b>2</b>	<b>0</b>
<b>Prerequisite</b>	<b>091 PHYS</b>			
<b>Course Description</b>	This is course provides the basic thermodynamic fundamentals, the principle of conservation of energy as applied to thermodynamic systems, in addition to the laws of thermodynamics. This course also deals with the study of properties of pure substances, including calculation of work transfer and heat transfer in Non-flow and Flow processes. Laboratory experiments and/or exercise problems support the theoretical classes.			

<b>Course Code</b>	<b>213 CHET</b>			
<b>Course Title</b>	<b>Methods of Chemical Analysis</b>			
<b>Year/Level</b>	<b>Sophomore/2</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>3</b>	<b>2</b>	<b>2</b>	<b>0</b>
<b>Prerequisite</b>	<b>112 CHET</b>			
<b>Course Description</b>	This course concentrates on the various chemical and instrumental techniques used in chemical and applied industries. The course focuses on macro analysis methods (volumetric and gravimetric analysis) and instrumental techniques like spectrophotometry (UV-VIS, IR, X-Ray, AAS) and chromatography. Laboratory experiments reinforce the theory.			

<b>Course Code</b>	<b>231 CHET</b>			
<b>Course Title</b>	<b>Separation Process</b>			
<b>Year/Level</b>	<b>Sophomore/1</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>3</b>	<b>2</b>	<b>3</b>	<b>0</b>
<b>Prerequisite</b>	<b>121 CHET</b>			
<b>Course Description</b>	This course deals with the application of the science and engineering science that you have learned to the separation of chemical and biological mixtures. Specific processes considered will include distillation, gas absorption, extraction, adsorption, and membrane-based processes. The object of the subject is to understand how separation work, and to further develop your ability to apply basic principles to the solution of specific problems. Laboratory experiments and/or exercise problems support the theoretical classes.			

<b>Course Code</b>	<b>232 CHET</b>			
<b>Course Title</b>	<b>Petroleum Refining and Testing</b>			
<b>Year/Level</b>	<b>Sophomore/2</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>3</b>	<b>2</b>	<b>3</b>	<b>0</b>
<b>Prerequisite</b>	<b>231 CHET</b>			
<b>Course Description</b>	<p>Petroleum provides the largest fraction of primary energy supply in the world. Transportation of people and goods in many parts of the world depend almost completely on petroleum fuels, such as gasoline, jet fuel, diesel fuel, and marine fuel. Apart from the fuels, materials that are necessary for operating the combustion engines of cars, trucks, planes, and trains also come from petroleum. These materials include lubricating oils (motor oils), greases, tires on the wheels of the vehicles, and asphalt to pave the roads for smooth rides in transportation vehicles. All petroleum fuels and many materials are produced by processing of crude oil in petroleum refineries. Petroleum refineries also supply feedstock to the petrochemicals and chemical industry for producing all consumer goods from rubber and plastics (polymers) to cosmetics and medicine. This course addresses the origin and occurrence, composition, physico-chemical properties of petroleum, petroleum refining to review how a variety of physical processes and chemical reactions in separate refinery units are integrated to process compliant fuels and materials, function of Saudi Aramco refineries.</p>			
<b>Course Code</b>	<b>291 CHET</b>			
<b>Course Title</b>	<b>Chemical Engineering Technology Project</b>			
<b>Year/Level</b>	<b>Sophomore/2</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>2</b>	<b>0</b>	<b>5</b>	<b>0</b>
<b>Prerequisite</b>	<b>295 ENG + 50 Credit Units</b>			
<b>Course Description</b>	<p>Final Year Project (FYP) is a compulsory final year course which students of BCC must take at the end of their Academic Program to complete the requirements of their Graduate Diploma degree. The concept of FYP emphasizes practical work more than theoretical studies. FYP is an opportunity for final year technical students to demonstrate their capabilities in applying the knowledge acquired during their academic program to produce workpiece, service broken or damaged components such as sealing, gaskets, O-rings, fasteners, studs, couplings, bearings, etc, as well as fabricate component and assemble/disassemble parts using hand and power tools. It enables the students to experience similar and/or real situation on how projects are carried out in the industry.</p>			

### 13.4. Description of the elective courses for the CHET program

#### Elective Group (1) ( 24\*)

<b>Course Code</b>	<b>241 CHET</b>			
<b>Course Title</b>	<b>Process Heat Transfer</b>			
<b>Year/Level</b>	<b>Sophomore/1</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	3	2	3	0
<b>Prerequisite</b>	<b>122 CHET</b>			
<b>Course Description</b>	This course introduces the student to the basics of heat transfer phenomena. Basic laws and mechanisms of steady state heat transfer are introduced along with their applications to process equipment including heat exchangers, boilers, evaporators, cooling towers and condensers. Operating and maintenance problems in heat exchangers are being discussed. This course is supported by laboratory experiments on heat exchangers like shell and tube, double pipe, and cross flow. Also includes experiments on free and forced convection and radiation, radial heat conduction, and thermal conductivity.			

#### Elective Group (2) (25\*)

<b>Course Code</b>	<b>251 CHET</b>			
<b>Course Title</b>	<b>Mass Transfer Operations</b>			
<b>Year/Level</b>	<b>Sophomore/1</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	3	2	2	0
<b>Prerequisite</b>	<b>121 CHET</b>			
<b>Course Description</b>	This course presents the principles of mass transfer and their application in separation and purification processes. The course integrates Momentum transfer (CH ET 121) and Process Heat Transfer (CHET 241) in developing rate expressions for mass transfer in multiphase, multi-component systems. Empirical correlations for mass coefficients in various situations; Dimensionless numbers and their significance.			





**Elective Group (3) (26\*)**

<b>Course Code</b>	<b>261 CHET</b>			
<b>Course Title</b>	<b>Process Installation and Control</b>			
<b>Year/Level</b>	<b>Sophomore/2</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>3</b>	<b>2</b>	<b>2</b>	<b>0</b>
<b>Prerequisite</b>	<b>213 CHET</b>			
<b>Course Description</b>	<p>This course introduces the student to the basic principles of instrumentation and process control. Types of instruments, control systems and measurements used to control process variables, types of primary sensing elements, transducers, and transmitters in process industries are studied. The importance of equipment calibration and correcting equipment calibration errors will be discussed. Measurement of physical variables such as flow, temperature, pressure, and level will be examined. The introduction to process control includes the application of automatic control actions: proportional, integral, and derivative modes will also be covered. Different types of control loops and common industrial control systems, types of storage tanks and level indicators, pressure vessels will be discussed.</p>			

**Elective Group (4) (27\*)**

<b>Course Code</b>	<b>271 CHET</b>			
<b>Course Title</b>	<b>Environmental Pollution</b>			
<b>Year/Level</b>	<b>Sophomore/2</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>3</b>	<b>2</b>	<b>3</b>	<b>0</b>
<b>Prerequisite</b>	<b>112 CHET</b>			
<b>Course Description</b>	<p>This course introduces the student to the main aspects of water and air pollution and solid waste. Sources, means of measurement and treatment, and control processes, as well as recycling and disposal procedures are studied. The course includes the study of selected topics of social and global concern related to the subject of environmental pollution. Laboratory activities concentrate mainly on determination of pollutant levels in water and wastewater.</p>			



**Elective Group (5) (\*8\*)**

<b>Course Code</b>	<b>181 CHET</b>			
<b>Course Title</b>	<b>Co-Op Training</b>			
<b>Year/Level</b>	<b>Freshman/Training Semester</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>2</b>	<b>0</b>	<b>40</b>	<b>0</b>
<b>Prerequisite</b>	<b>60 Credit Units for unsponsored students</b>			
<b>Course Description</b>	The cooperative training program involves placement of students in industries relevant to their academic and technical interests. The students spend eight (8) weeks during the summer semester in the Freshman year in companies or industries to work there and receive practical training.			

<b>Course Code</b>	<b>282 CHET</b>			
<b>Course Title</b>	<b>On-the-Job Training (OJT)</b>			
<b>Year/Level</b>	<b>Sophomore/Training Semester</b>			
<b>Hours</b>	<b>Credit</b>	<b>Lec.</b>	<b>Lab.</b>	<b>Tut.</b>
	<b>2</b>	<b>0</b>	<b>40</b>	<b>0</b>
<b>Prerequisite</b>	<b>90 Credit Units for sponsored students</b>			
<b>Course Description</b>	This course is directed especially for sponsored students to undergo training at their sponsors' work places. The training lasts sixteen (16) weeks during the summer semester in the Sophomore year. This kind of on-the-job training helps students to transfer their academic experience from class halls into real practical life, enhances students' practical experience, and enables them to take responsibility from the first day of employment.			

### 13.5. Hierarchy of the CHET program

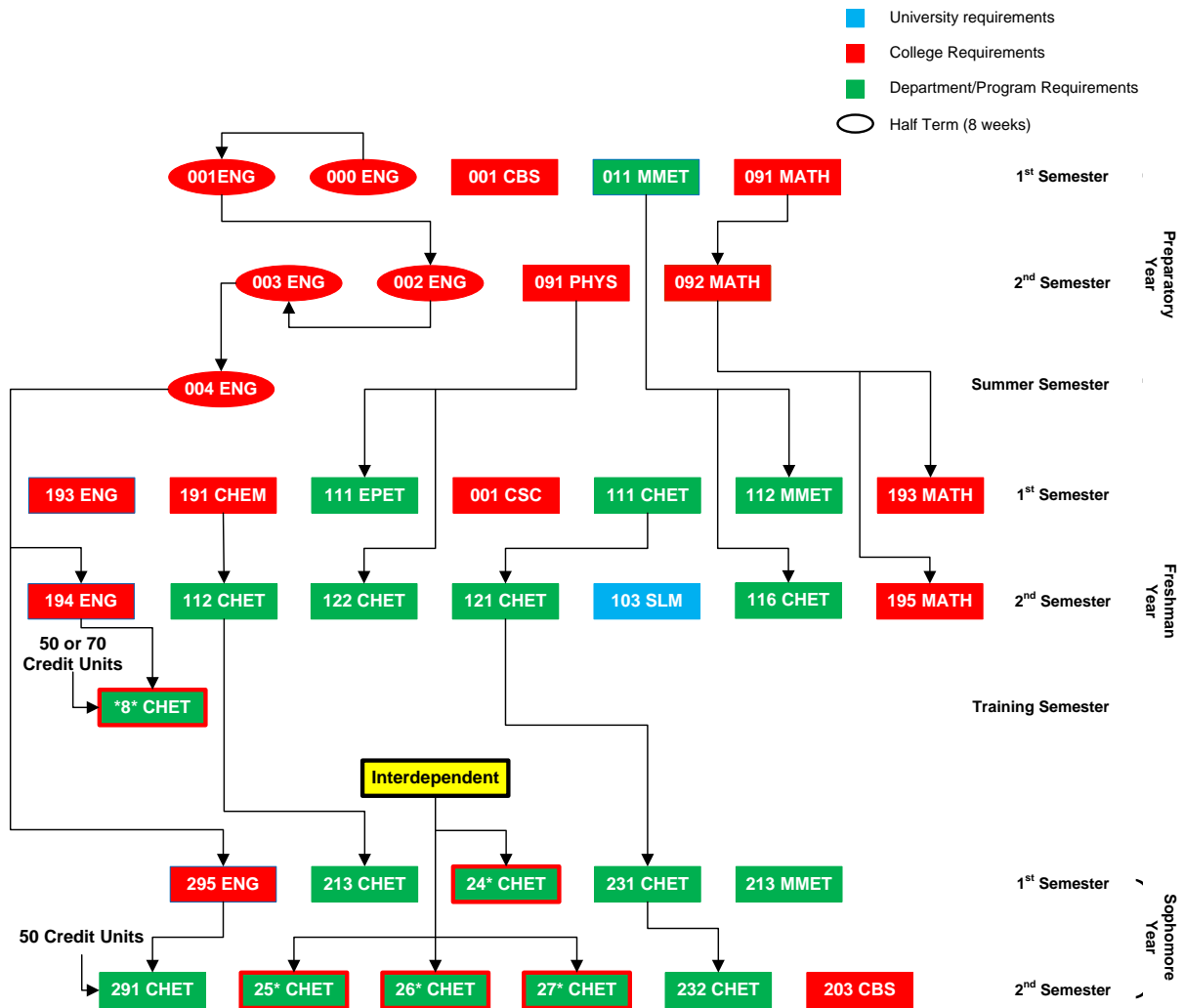


Figure – 7 The flowchart and hierarchy of the CHET program

### 13.6. Evaluation model for CHET program

**College:** College of Applied Industrial Technology    **Program:** Chemical Engineering Technology  
Baish Governorate  
**Department:** Chemical Engineering Technology    **Date:** 19/05/1442 H (03/01/2021)

Point	Met	Not Met	Notices
College Origination	√	--	
Program Mission	√	--	
The Agreement between University and College Missions	√	--	
Program Objectives	√	--	
Program Outcomes	√	--	
The Survey of Labor Market and Society Needs	√	--	
Comparison with Corresponding Programs (Similarities and Differences)	√	--	
Reasons for Selection	√	--	
Identification of Human Resources for the Program	√	--	
Identification of Facilities and Equipment for the Program	√	--	
The Requirements for Joining the Program	√	--	
The Requirements of Academic Degree Achievement	√	--	
Duration of Study	√	--	
Degree Awarded	√	--	
Number of Credit Units for Preparatory Year (if Applicable)	√	--	
Identification of University Requirements	√	--	
Identification of College Requirements	√	--	
Identification of Department Requirements	√	--	
The Agreed Credit Units with National Qualification Framework	√	--	
Coding and Numbering for Courses	√	--	
Program Description	√	--	Exists in college webpage
Self Study (for Updated Plan)	√	--	New plan starts 20212
Short Description of Courses	√	--	
Detailed Description of Courses (Including Evaluation and References)	√	--	Exists in college webpage
Outside Arbitration for the Plan	√	--	
External Evaluator Report	√	--	
Response to the External Evaluator Report	√	--	
Fields of Work	√	--	
The Differences between Older and Updated Plan	√	--	002CBS replaced with 116MMET
The Plan in English	√	--	Arabic Language exists
References	√	--	