

BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING

(Curriculum applicable to students who entered as freshmen beginning academic year 2015-2016)

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	1	DRAW10W	ENGINEERING DRAWING	-	4.5	1.0			MVA
		FIL10	FILIPINO 1	4.5	-	3.0			SLHS
		HME01	HUMANITIES ELECTIVE	4.5	-	3.0			SLHS
		MATH10-3	ALGEBRA	4.5	-	3.0			MATH
		MATH12-1	PLANE AND SPHERICAL TRIGONOMETRY	4.5	-	3.0			MATH
		NSTP1	NATIONAL SERVICE TRAINING PROGRAM 1	-	4.5	(1.5)			SOCIP
		PE11-1	PHYSICAL EDUCATION 1 (PHYSICAL FITNESS AND GROUP GAMES)	-	3.0	(2.0)			ATHLETICS
			Total	18.0	12.0	13.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	2	CAD10L	COMPUTER-AIDED DRAFTING	-	4.5	1.0	DRAW10W		MVA
		CHM11-2	GENERAL CHEMISTRY 1	3.0	-	2.0			CHE-CHM
		CHM11-2L	GENERAL CHEMISTRY LABORATORY 1	-	4.5	1.0		CHM11-2	CHE-CHM
		CS10-1L	COMPUTER FUNDAMENTALS AND PROGRAMMING LABORATORY	-	9.0	2.0	MATH10-3		SOIT
		FIL11	FILIPINO 2	4.5	-	3.0			SLHS
		MATH10-4	ADVANCED ALGEBRA	4.5	-	3.0	MATH10-3		MATH
		MATH13-1	SOLID MENSURATION	3.0	-	2.0	MATH12-1		MATH
		NSTP2	NATIONAL SERVICE TRAINING PROGRAM 2	-	4.5	(1.5)	NSTP1		SOCIP
		PE12	PHYSICAL EDUCATION 2 (DANCE, MARTIAL ARTS AND BOARD GAMES)	-	3.0	(2.0)			ATHLETICS
		Total	15.0	25.5	14.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	3	CHM12-2	GENERAL CHEMISTRY 2	3.0	-	2.0	CHM11-2, CHM11-2L		CHE-CHM
		CHM12-2L	GENERAL CHEMISTRY LABORATORY 2	-	4.5	1.0	CHM11-2, CHM11-2L	CHM12-2	CHE-CHM
		ENG10	ENGLISH FOR ACADEMIC PURPOSES 1	4.5	-	3.0			SLHS
		MATH21-1	CALCULUS 1	7.5	-	5.0	MATH13-1, MATH10-4		MATH
		RZL10	RIZAL'S WORKS & WRITINGS OF OTHER FILIPINO HEROES	4.5	-	3.0			SLHS

	NSTP3	NATIONAL SERVICE TRAINING PROGRAM 3	-	4.5	(1.5)	NSTP2		SOCIP
	PE13-2	PHYSICAL EDUCATION 3 (INDIVIDUAL / DUAL SPORTS)	-	3.0	(2.0)			ATHLETICS
Total			19.5	12.0	14.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	4	CHM13-2P	GENERAL CHEMISTRY 3	3.0	4.5	3.0	CHM12-2, CHM12-2L		CHE-CHM
		CHM13X	GENERAL CHEMISTRY EXIT EXAM	-	-	0.0	CHM12-2	CHM13-2P	CHE-CHM
		ENG11	ENGLISH FOR ACADEMIC PURPOSES 2	4.5	-	3.0	ENG10		SLHS
		HME02	HUMANITIES ELECTIVE	4.5	-	3.0			SLHS
		MATH22-1	CALCULUS 2	7.5	-	5.0	MATH21-1		MATH
		NSTP4	NATIONAL SERVICE TRAINING PROGRAM 4	-	4.5	(1.5)	NSTP3		SOCIP
		PE14	PHYSICAL EDUCATION 4 (TEAM SPORTS)	-	3.0	(2.0)			ATHLETICS
			Total	19.5	12.0	14.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	1	CHE101	INTRODUCTION TO CHEMICAL ENGINEERING	1.5	-	1.0	CHM13-2P		CHE-CHM
		CHM111	ANALYTICAL CHEMISTRY 1	4.5	-	3.0	CHM13-2P, CHM13X		CHE-CHM
		CHM111L	ANALYTICAL CHEMISTRY LABORATORY 1	-	9.0	2.0	CHM13-2P	CHM111	CHE-CHM
		MATH15-1	LINEAR ALGEBRA	3.0	-	2.0	MATH13-1, MATH10-4		MATH
		MATH16-1L	INTRODUCTION TO SCIENTIFIC COMPUTING	-	4.5	1.0	MATH22-1, CS10-1L		MATH
		MATH23-1	CALCULUS 3	4.5	-	3.0	MATH22-1		MATH
		MATH23-1X	ENGINEERING MATHEMATICS EXIT EXAM	-	-	0.0	MATH22-1	MATH23-1	MATH
		PHY10	GENERAL PHYSICS 1	3.0	-	2.0	MATH22-1		PHYSICS
		PHY10L	GENERAL PHYSICS LABORATORY 1	-	4.5	1.0	MATH22-1		PHYSICS
Total				16.5	18.0	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	2	CHE111P	CHEMICAL ENGINEERING CALCULATIONS 1	3.0	4.5	3.0	CHE101, CHM111, MATH15-1		CHE-CHM
		CHM142	ORGANIC CHEMISTRY 1	3.0	-	2.0	CHM13X, CHM13-2P		CHE-CHM
		CHM142L	ORGANIC CHEMISTRY LABORATORY 1	-	4.5	1.0	CHM13-2P	CHM142	CHE-CHM

	MATH24-1	DIFFERENTIAL EQUATIONS	4.5	-	3.0	MATH23-1, MATH23-1X		MATH
	PHY11	GENERAL PHYSICS 2	3.0	-	2.0	PHY10, PHY10L		PHYSICS
	PHY11L	GENERAL PHYSICS LABORATORY 2	-	4.5	1.0	PHY10, PHY10L	PHY11	PHYSICS
	ENG12	ENGLISH FOR THE WORKPLACE 1	4.5	-	3.0	ENG11		SLHS
Total			18.0	13.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	3	CHE112P	CHEMICAL ENGINEERING CALCULATIONS 2	3.0	4.5	3.0	CHE111P		CHE-CHM
		CHE50P	MATHEMATICAL METHODS IN CHEMICAL ENGINEERING	3.0	4.5	3.0	MATH24-1, MATH15-1, MATH16-1L		CHE-CHM
		CHM143	ORGANIC CHEMISTRY 2	3.0	-	2.0	CHM142		CHE-CHM
		CHM143L	ORGANIC CHEMISTRY LABORATORY 2	-	4.5	1.0	CHM142, CHM142L	CHM143	CHE-CHM
		CHM144	INDUSTRIAL CHEMISTRY	3.0	-	2.0	CHM142, CHM142L		CHE-CHM
		CHM144L	INDUSTRIAL CHEMISTRY LABORATORY	-	4.5	1.0	CHM142, CHM142L	CHM144	CHE-CHM
		PHY12	GENERAL PHYSICS 3	3.0	-	2.0	PHY11, PHY11L		PHYSICS
		PHY12L	GENERAL PHYSICS LABORATORY 3	-	4.5	1.0	PHY11, PHY11L	PHY12	PHYSICS
Total				15.0	22.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	4	CHM170L	PHYSICAL CHEMISTRY LABORATORY 1	-	4.5	1.0	CHM111, CHM111L	CHM170P	CHE-CHM
		CHM170P	PHYSICAL CHEMISTRY 1	3.0	4.5	3.0	CHM111, CHM111L, MATH22-1		CHE-CHM
		ENG13	ENGLISH FOR THE WORKPLACE 2	4.5	-	3.0	ENG12		SLHS
		MATH30-7	PROBABILITY AND STATISTICS	4.5	-	3.0	MATH23-1		MATH
		MEC30	STATICS OF RIGID BODIES	4.5	-	3.0	PHY11, PHY11L		CEGE
		PHY13	GENERAL PHYSICS 4	3.0	-	2.0	PHY12, PHY12L		PHYSICS
		PHY13L	GENERAL PHYSICS LABORATORY 4	-	4.5	1.0	PHY12, PHY12L	PHY13	PHYSICS
		PHY13X	GENERAL PHYSICS EXIT EXAM	-	-	0.0	PHY12, PHY12L	PHY13, PHY13L	PHYSICS
Total				19.5	13.5	16.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	1	CHE121-1P	CHEMICAL ENGINEERING THERMODYNAMICS 1	3.0	4.5	3.0	CHM170P, CHE112P		CHE-CHM
		CHM171L	PHYSICAL CHEMISTRY LABORATORY 2	-	4.5	1.0	CHM170L, CHM170P	CHM171P	CHE-CHM
		CHM171P	PHYSICAL CHEMISTRY 2	3.0	4.5	3.0	CHM170P, CHM170L		CHE-CHM
		CHM171X	ADVANCED CHEMISTRY EXIT EXAM	-	-	0.0	CHM144, CHM170P	CHM171P	CHE-CHM
		EE21	BASIC ELECTRICAL ENGINEERING	3.0	-	2.0	PHY12, PHY12L, MATH24-1		EECE
		EE21L	BASIC ELECTRICAL ENGINEERING LABORATORY	-	4.5	1.0	PHY12, PHY12L, MATH24-1	EE21	EECE
		MEC31-1	DYNAMICS OF RIGID BODIES	3.0	-	2.0	MEC30		MME
			STS ELECTIVE	4.5	-	3.0			CHE-CHM
Total				16.5	18.0	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	2	CHE130-1P	PRINCIPLES OF TRANSPORT PROCESSES	3.0	4.5	3.0	CHE121-1P, MATH24-1	CHE134-1P	CHE-CHM
		CHE134-1P	FLOW OF FLUIDS	3.0	4.5	3.0	CHE121-1P	CHE130-1P	CHE-CHM
		EMG20	ENGINEERING MANAGEMENT	4.5	-	3.0			IE-EMG
		ENV110-1	ENVIRONMENTAL ENGINEERING AND ENVIRONMENTAL SAFETY	4.5	-	3.0	CHM13-2P		CHE-CHM
		MSE20	FUNDAMENTALS OF MATERIALS SCIENCE AND ENGINEERING	4.5	-	3.0	PHY13, PHY13L, PHY13X, CHM12-2		CHE-CHM
			Total	19.5	9.0	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	3	BIO149	BIOTECHNOLOGY	4.5	-	3.0	CHM143		CHE-CHM
		CHE122-1	CHEMICAL ENGINEERING THERMODYNAMICS 2	4.5	-	3.0	CHE121-1P		CHE-CHM
		CHE122-1X	MATERIAL BALANCES AND PROCESS THERMODYNAMICS EXIT EXAM	-	-	0.0	CHE112P, CHE121-1P	CHE122-1	CHE-CHM
		CHE133-1P	HEAT AND MASS TRANSFER APPLICATIONS	3.0	4.5	3.0	CHE130-1P, CHE134-1P		CHE-CHM
		CHE143-1	CHEMICAL REACTION ENGINEERING 1	3.0	-	2.0	CHM171P, CHE50P		CHE-CHM

	CHE150-1L	CHEMICAL ENGINEERING LABORATORY 1	-	4.5	1.0	CHE134-1P		CHE-CHM
	MEC32	MECHANICS OF DEFORMABLE BODIES	4.5	-	3.0	MEC31-1		CEGE
	Total		19.5	9.0	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	4	CHE135-1P	SEPARATION PROCESSES	3.0	4.5	3.0	CHE122-1, CHE133-1P		CHE-CHM
		CHE135-1X	TRANSPORT AND SEPARATION PROCESSES EXIT EXAM	-	-	0.0	CHE133-1P	CHE135-1P	CHE-CHM
		CHE136-1	INTRODUCTION TO PARTICLE TECHNOLOGY	3.0	-	2.0	CHE134-1P		CHE-CHM
		CHE145-1	CHEMICAL REACTION ENGINEERING 2	3.0	-	2.0	CHE130-1P, CHE143-1		CHE-CHM
		CHE198-1	METHODS OF RESEARCH AND EXPERIMENTAL DESIGN	3.0	-	2.0	MATH30-7, CHE133-1P		CHE-CHM
		CHE40	ENGINEERING ECONOMY	4.5	-	3.0	MATH24-1		CHE-CHM
			PROFESSIONAL ELECTIVE 1	4.5	-	3.0			CHE-CHM
		Total		21.0	4.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
4	1	CHE142-1	BIOCHEMICAL ENGINEERING	4.5	-	3.0	CHE143-1, BIO149		CHE-CHM
		CHE142-1X	PROCESS INDUSTRIES AND ENVIRONMENTAL ENGINEERING EXIT EXAM	-	-	0.0	CHE143-1, ENV110-1, BIO149	CHE142-1	CHE-CHM
		CHE151-1L	CHEMICAL ENGINEERING LABORATORY 2	-	4.5	1.0	CHE150-1L, CHE135-1P		CHE-CHM
		CHE160-1L	COMPUTER APPLICATIONS IN CHEMICAL ENGINEERING	-	4.5	1.0	CHE133-1P, CHE50P		CHE-CHM
		CHE170-1	CHEMICAL PROCESS INDUSTRIES	4.5	-	3.0	CHE112P, CHM144		CHE-CHM
		CHE188-1	QUANTITATIVE METHODS IN MANAGEMENT	4.5	-	3.0	EMG20, CHE40, CHE50P		CHE-CHM
		CHE200-1L	THESIS	-	4.5	1.0	CHE198-1		CHE-CHM
			PROFESSIONAL ELECTIVE 2	4.5	-	3.0			
		Total		18.0	13.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
4	2	CHE180-1	PROCESS AND EQUIPMENT DESIGN	3.0	-	2.0	CHE135-1P, CHE136-1, CHE135-1X	CHE181-1D	CHE-CHM
		CHE181-1D	PLANT DESIGN 1	-	4.5	1.0	CHE135-1P, CHE136-1, CHE135-1X	CHE180-1	CHE-CHM
		CHE183-1	CHEMICAL PROCESS SAFETY	4.5	-	3.0	CHE170-1, ENV110-1		CHE-CHM
		CHE184-1P	PROCESS DYNAMICS AND CONTROL	3.0	4.5	3.0	CHE170-1, CHE50P		CHE-CHM
		CHE185-1	INDUSTRIAL WASTE MANAGEMENT AND CONTROL	4.5	-	3.0	CHE170-1, ENV110-1		CHE-CHM
		CHE70-1	CHE LAWS AND ETHICS	3.0	-	2.0		CHE181-1D	CHE-CHM
			Total	18.0	9.0	14.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
4	3	CHE182-1	PLANT DESIGN 2	3.0	-	2.0	CHE180-1, CHE181-1D, CHE183-1, CHE70-1		CHE-CHM
		CHE184X	PROCESS DESIGN EXIT EXAM	-	-	0.0	CHE180-1, CHE181-1D, CHE184-1P	CHE182-1	CHE-CHM
		CHE199-1R	CHEMICAL ENGINEERING PRACTICE	-	16.0	2.0	CHE180-1, CHE181-1D, CHE183-1, CHE70-1		CHE-CHM
		HME03	HUMANITIES ELECTIVE 3	4.5	-	3.0			SLHS
		SSE01	SOCIAL SCIENCE ELECTIVE	4.5	-	3.0			SLHS
			Total	12.0	16.0	10.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
4	4	CHE189-1F	PLANT VISITS AND SEMINARS	-	4.5	1.0	CHE182-1		CHE-CHM
		CHE199D	COMPREHENSIVE REVIEW AND EXAMINATION IN FUNDAMENTALS OF ENGINEERING SCIENCES AND CHEMICAL ENGINEERING	-	9.0	2.0	CHE199-1R		CCESC
		SSE02	SOCIAL SCIENCE ELECTIVE	4.5	-	3.0			SLHS
			PROFESSIONAL ELECTIVE 3	4.5	-	3.0			CHE-CHM
			STS ELECTIVE	4.5	-	3.0			CHE-CHM
			Total	13.5	13.5	12.0			

PROFESSIONAL ELECTIVES : 9.0 UNITS

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	4	ABT190P	INDUSTRIAL MICROBIOLOGY	3.0	4.5	3.0	BIO149		CHE-CHM
		CHE190-2	INTRODUCTION TO FOOD SCIENCE AND ENGINEERING	4.5	-	3.0	CHE133-1P	CHE135-1X	CHE-CHM
		PRT191	OVERVIEW OF PETROLEUM REFINING (WITH PROCESS FOCUS)	4.5	-	3.0	CHE133-1P		CHE-CHM
		SET190	INTRODUCTION TO SUSTAINABLE ENGINEERING	4.5	-	3.0	CHE133-1P		CHE-CHM

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
4	1	ABT191P	MOLECULAR BIOLOGY AND BIOTECHNOLOGY	3.0	4.5	3.0	ABT190P		CHE-CHM
		CHE191-2	FOOD ENGINEERING UNIT OPERATIONS A	4.5	-	3.0	CHE190-2		CHE-CHM
		PRT193	PETROLEUM REFINING EQUIPMENT	4.5	-	3.0	PRT191		CHE-CHM
		SET191	GREEN CHEMISTRY AND GREEN PROCESS ENGINEERING	4.5	-	3.0	SET190		CHE-CHM

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
4	4	ABT192	GENE BIOTECHNOLOGY	4.5	-	3.0	ABT191P		CHE-CHM
		ABT193P	BIOINFORMATICS	3.0	4.5	3.0	ABT191P		CHE-CHM
		CHE192-2	FOOD ENGINEERING UNIT OPERATIONS B	4.5	-	3.0	CHE190-2		CHE-CHM
		CHE193-2	FOOD PACKAGING	4.5	-	3.0			CHE-CHM
		PRT194	PETROLEUM REFINING SAFETY	4.5	-	3.0	PRT193		CHE-CHM
		SET192	IMPACT ASSESSMENT, LIFE CYCLE EVALUATIONS AND INDUSTRIAL ECOLOGY	4.5	-	3.0	SET191		CHE-CHM
		SET193	CHALLENGES AND OPPORTUNITIES IN SUSTAINABILITY AND CLIMATE CHANGE	4.5	-	3.0	SET191		CHE-CHM

SCIENCE, TECHNOLOGY AND SOCIETY ELECTIVES : 6.0 UNITS

	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
	BIO186	BIOENTREPRENEURSHIP AND ISSUES IN BIOTECHNOLOGY	4.5	-	3.0			CHE-CHM
	BIO99	SOCIAL STUDIES OF BIOSCIENCE AND BIOTECHNOLOGY	4.5	-	3.0			CHE-CHM
	CHE99	ENVIRONMENTAL CONFLICTS AND SOCIAL CHANGE	4.5	-	3.0			CHE-CHM
	BIO99-1	CONFLICTS AND EVOLUTION OF MODERN MEDICINE	4.5	-	3.0			CHE-CHM
	CHM99	DEVELOPMENT AND RISE OF MODERN SCIENCE	4.5	-	3.0			CHE-CHM

Total Academic Units : 227.00

BACHELOR OF SCIENCE IN CHEMISTRY

(Curriculum applicable to students who entered as freshmen beginning academic year 2015-2016)

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	1	BIO15	GENERAL BIOLOGY	4.5	-	3.0			CHE-CHM
		BIO15L	GENERAL BIOLOGY LABORATORY	-	4.5	1.0		BIO15	CHE-CHM
		FIL10	FILIPINO 1	4.5	-	3.0			SLHS
		MATH10-3	ALGEBRA	4.5	-	3.0			MATH
		MATH12-1	PLANE AND SPHERICAL TRIGONOMETRY	4.5	-	3.0			MATH
		NSTP1	NATIONAL SERVICE TRAINING PROGRAM 1	-	4.5	(1.5)			SOCIP
		PE11-1	PHYSICAL EDUCATION 1 (PHYSICAL FITNESS AND GROUP GAMES)	-	3.0	(2.0)			ATHLETICS
		Total	18.0	12.0	13.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	2	CHM11-2	GENERAL CHEMISTRY 1	3.0	-	2.0			CHE-CHM
		CHM11-2L	GENERAL CHEMISTRY LABORATORY 1	-	4.5	1.0		CHM11-2	CHE-CHM
		CS10-1L	COMPUTER FUNDAMENTALS AND PROGRAMMING LABORATORY	-	9.0	2.0	MATH10-3		SOIT
		ENG10	ENGLISH FOR ACADEMIC PURPOSES 1	4.5	-	3.0			SLHS
		FIL11	FILIPINO 2	4.5	-	3.0	FIL10		SLHS
		MATH10-4	ADVANCED ALGEBRA	4.5	-	3.0	MATH10-3		MATH
		MATH13-1	SOLID MENSURATION	3.0	-	2.0	MATH12-1		MATH
		NSTP2	NATIONAL SERVICE TRAINING PROGRAM 2	-	4.5	(1.5)	NSTP1		SOCIP
PE12	PHYSICAL EDUCATION 2 (DANCE, MARTIAL ARTS AND BOARD GAMES)	-	3.0	(2.0)			ATHLETICS		
		Total		19.5	21.0	16.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	3	CHM12-2	GENERAL CHEMISTRY 2	3.0	-	2.0	CHM11-2, CHM11-2L		CHE-CHM
		CHM12-2L	GENERAL CHEMISTRY LABORATORY 2	-	4.5	1.0	CHM11-2, CHM11-2L	CHM12-2	CHE-CHM
		ENG11	ENGLISH FOR ACADEMIC PURPOSES 2	4.5	-	3.0	ENG10		SLHS
		MATH21-1	CALCULUS 1	7.5	-	5.0	MATH13-1, MATH10-4		MATH
		SSE01	SOCIAL SCIENCE ELECTIVE	4.5	-	3.0			SLHS
		NSTP3	NATIONAL SERVICE TRAINING PROGRAM 3	-	4.5	(1.5)	NSTP2		SOCIP
		PE13-2	PHYSICAL EDUCATION 3 (INDIVIDUAL / DUAL SPORTS)	-	3.0	(2.0)			ATHLETICS
Total			19.5	12.0	14.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	4	CHM13-2P	GENERAL CHEMISTRY 3	3.0	4.5	3.0	CHM12-2, CHM12-2L	CHM13L	CHE-CHM
		CHM13L	GENERAL CHEMISTRY LABORATORY 3	-	4.5	1.0	CHM12-2, CHM12-2L	CHM13-2P	CHE-CHM
		CHM13X	GENERAL CHEMISTRY EXIT EXAM	-	-	0.0			CHE-CHM
		HME01	HUMANITIES ELECTIVE	4.5	-	3.0			SLHS
		MATH22-1	CALCULUS 2	7.5	-	5.0	MATH21-1		MATH
		SSE02	SOCIAL SCIENCE ELECTIVE	4.5	-	3.0			SLHS
		NSTP4	NATIONAL SERVICE TRAINING PROGRAM 4	-	4.5	(1.5)	NSTP3		SOCIP
		PE14	PHYSICAL EDUCATION 4 (TEAM SPORTS)	-	3.0	(2.0)			ATHLETICS
			Total	19.5	16.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	1	CHM112	ANALYTICAL CHEMISTRY 1	4.5	-	3.0	CHM13-2P, CHM13X, CHM13L		CHE-CHM
		CHM112L	ANALYTICAL CHEMISTRY LABORATORY 1	-	9.0	2.0	CHM13-2P, CHM13L	CHM112	CHE-CHM
		HME02	HUMANITIES ELECTIVE	4.5	-	3.0			SLHS
		MATH16-1L	INTRODUCTION TO SCIENTIFIC COMPUTING	-	4.5	1.0	MATH22-1, CS10-1L		MATH
		PHY10	GENERAL PHYSICS 1	3.0	-	2.0	MATH22-1		PHYSICS
		PHY10L	GENERAL PHYSICS LABORATORY 1	-	4.5	1.0	MATH22-1	PHY10	PHYSICS
		RZL10	RIZAL'S WORKS & WRITINGS OF OTHER FILIPINO HEROES	4.5	-	3.0			SLHS
Total			16.5	18.0	15.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	2	CHM145	ORGANIC CHEMISTRY 1	4.5	-	3.0	CHM13X, CHM13L, CHM13-2P		CHE-CHM
		CHM145L	ORGANIC CHEMISTRY LABORATORY 1	-	9.0	2.0	CHM13L, CHM13-2P	CHM145	CHE-CHM
		HME03	HUMANITIES ELECTIVE	4.5	-	3.0			SLHS
		MATH30-7	PROBABILITY AND STATISTICS	4.5	-	3.0	MATH22-1		MATH
		PHY11	GENERAL PHYSICS 2	3.0	-	2.0	PHY10, PHY10L		PHYSICS
		PHY11L	GENERAL PHYSICS LABORATORY 2	-	4.5	1.0	PHY10, PHY10L	PHY11	PHYSICS
			Total	16.5	13.5	14.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	3	CHM146	ORGANIC CHEMISTRY 2	4.5	-	3.0	CHM145, CHM145L		CHE-CHM
		CHM146L	ORGANIC CHEMISTRY LABORATORY 2	-	9.0	2.0	CHM145, CHM145L	CHM146	CHE-CHM
		CHM170L	PHYSICAL CHEMISTRY LABORATORY 1	-	4.5	1.0	CHM112, CHM112L, MATH22-1	CHM170P	CHE-CHM
		CHM170P	PHYSICAL CHEMISTRY 1	3.0	4.5	3.0	CHM112, CHM112L, MATH22-1	CHM170L	CHE-CHM
		ENG12	ENGLISH FOR THE WORKPLACE 1	4.5	-	3.0	ENG11		SLHS
		PHY12	GENERAL PHYSICS 3	3.0	-	2.0	PHY11, PHY11L		PHYSICS
		PHY12L	GENERAL PHYSICS LABORATORY 3	-	4.5	1.0	PHY11, PHY11L	PHY12	PHYSICS
		Total	15.0	22.5	15.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	4	BIO149	BIOTECHNOLOGY	4.5	-	3.0	CHM146		CHE-CHM
		CHM147	ORGANIC CHEMISTRY 3	4.5	-	3.0	CHM146, CHM146L		CHE-CHM
		CHM147X	ORGANIC CHEMISTRY EXIT EXAM	-	-	0.0	CHM146, CHM146L	CHM147	CHE-CHM
		CHM171L	PHYSICAL CHEMISTRY LABORATORY 2	-	4.5	1.0	CHM170L, CHM170P	CHM171P	CHE-CHM
		CHM171P	PHYSICAL CHEMISTRY 2	3.0	4.5	3.0	CHM170P, CHM170L		CHE-CHM
		PHY13	GENERAL PHYSICS 4	3.0	-	2.0	PHY12, PHY12L		PHYSICS
		PHY13L	GENERAL PHYSICS LABORATORY 4	-	4.5	1.0	PHY12, PHY12L	PHY13	PHYSICS
			Total	15.0	13.5	13.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	1	CHM115	ANALYTICAL CHEMISTRY 2	4.5	-	3.0	CHM146, CHM112, CHM112L, CHM146L		CHE-CHM
		CHM115L	ANALYTICAL CHEMISTRY LABORATORY 2	-	9.0	2.0	CHM146, CHM112, CHM112L, CHM146L	CHM115	CHE-CHM

	CHM115X	ANALYTICAL CHEMISTRY EXIT EXAM	-	-	0.0	CHM146, CHM112, CHM146L	CHM115	CHE-CHM
	CHM131	ADVANCED INORGANIC CHEMISTRY 1	3.0	-	2.0	CHM112, CHM146, CHM146L, CHM147X		CHE-CHM
	CHM175	QUANTUM CHEMISTRY	4.5	-	3.0	CHM171P, CHM171L, PHY13, PHY13L, MATH22-1		CHE-CHM
	CHM175X	QUANTUM CHEMISTRY EXIT EXAM	-	-	0.0	CHM171P	CHM175	CHE-CHM
	ENG13	ENGLISH FOR THE WORKPLACE 2	4.5	-	3.0	ENG12		SLHS
Total			16.5	9.0	13.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	2	CHM132	ADVANCE INORGANIC CHEMISTRY 2	3.0	-	2.0	CHM131		CHE-CHM
		CHM132X	ADVANCED INORGANIC CHEMISTRY EXIT EXAM	-	-	0.0	CHM131	CHM132	CHE-CHM
		CHM148P	FOOD CHEMISTRY AND ANALYSIS	3.0	4.5	3.0	CHM146, CHM146L		CHE-CHM
		CHM149	ENVIRONMENTAL CHEMISTRY	4.5	-	3.0	CHM115, CHM115L, CHM147		CHE-CHM
		CHM160-1	BIOCHEMISTRY 1	3.0	-	2.0	CHM146, CHM112, CHM147X, CHM115X		CHE-CHM
		CHM160L	BIOCHEMISTRY 1 LABORATORY	-	4.5	1.0	CHM146, CHM112	CHM160-1	CHE-CHM
		CHM198P	RESEARCH METHODS AND EXPERIMENTAL DESIGN	1.5	4.5	2.0	CHM131, MATH30-7		CHE-CHM
		CHM70	CHEMISTRY LAWS AND ETHICS	1.5	-	1.0	CHM115X, CHM147X, CHM175X		CHE-CHM
Total			16.5	13.5	14.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	3	CHM161	BIOCHEMISTRY 2	3.0	-	2.0	CHM160L, CHM160-1	CHM161L	CHE-CHM
		CHM161L	BIOCHEMISTRY 2 LABORATORY	-	4.5	1.0	CHM160L, CHM160-1	CHM161	CHE-CHM
		CHM161X	BIOCHEMISTRY EXIT EXAM	-	-	0.0	CHM160L, CHM160-1	CHM161	CHE-CHM
		CHM200-0L	THESIS 1	-	4.5	1.0	CHM198P		CHE-CHM
			STS ELECTIVE	4.5	-	3.0			CHE-CHM
			Total	7.5	9.0	7.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	4	CHM198D	APPLIED CHEMISTRY (CORRELATION COURSE)	-	9.0	2.0	CHM161X, CHM175X, CHM132X, CHM115X, CHM147X		CCESC
		CHM199R	CHEMISTRY PRACTICE	-	-	2.0	CHM132X, CHM115X, CHM161X, CHM175X, CHM147X		CHE-CHM
		CHM200-1L	THESIS 2	-	4.5	1.0	CHM200-0L		CHE-CHM
			STS ELECTIVE	4.5	-	3.0			CHE-CHM
			Total	4.5	13.5	8.0			

SCIENCE, TECHNOLOGY AND SOCIETY ELECTIVES : 6.0 UNITS

		Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
		BIO186	BIOENTREPRENEURSHIP AND ISSUES IN BIOTECHNOLOGY	4.5	-	3.0			CHE-CHM
		BIO99	SOCIAL STUDIES OF BIOSCIENCE AND BIOTECHNOLOGY	4.5	-	3.0			CHE-CHM
		CHE99	ENVIRONMENTAL CONFLICTS AND SOCIAL CHANGE	4.5	-	3.0			CHE-CHM
		BIO99-1	CONFLICTS AND EVOLUTION OF MODERN MEDICINE	4.5	-	3.0			CHE-CHM
		CHM99	DEVELOPMENT AND RISE OF MODERN SCIENCE	4.5	-	3.0			CHE-CHM

Total Academic Units : 157.00

BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING AND CHEMISTRY (DOUBLE DEGREE)

(Curriculum applicable to students who entered as freshmen beginning academic year 2015-2016)

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	1	BIO15	GENERAL BIOLOGY	4.5	-	3.0			CHE-CHM
		BIO15L	GENERAL BIOLOGY LABORATORY	-	4.5	1.0		BIO15	CHE-CHM
		DRAW10W	ENGINEERING DRAWING	-	4.5	1.0			MVA
		FIL10	FILIPINO 1	4.5	-	3.0			SLHS
		MATH10-3	ALGEBRA	4.5	-	3.0			MATH
		MATH12-1	PLANE AND SPHERICAL TRIGONOMETRY	4.5	-	3.0			MATH
		NSTP1	NATIONAL SERVICE TRAINING PROGRAM 1	-	4.5	(1.5)			SOCIP
		PE11-1	PHYSICAL EDUCATION 1 (PHYSICAL FITNESS AND GROUP GAMES)	-	3.0	(2.0)			ATHLETICS
Total			18.0	16.5	14.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	2	CAD10L	COMPUTER-AIDED DRAFTING	-	4.5	1.0	DRAW10W		MVA
		CHM11-2	GENERAL CHEMISTRY 1	3.0	-	2.0			CHE-CHM
		CHM11-2L	GENERAL CHEMISTRY LABORATORY 1	-	4.5	1.0		CHM11-2	CHE-CHM
		FIL11	FILIPINO 2	4.5	-	3.0			SLHS
		HME01	INTRODUCTION TO PHILOSOPHY	4.5	-	3.0			SLHS
		MATH10-4	ADVANCED ALGEBRA	4.5	-	3.0	MATH10-3		MATH
		MATH13-1	SOLID MENSURATION	3.0	-	2.0	MATH12-1		MATH
		NSTP2	NATIONAL SERVICE TRAINING PROGRAM 2	-	4.5	(1.5)	NSTP1		SOCIP
	PE12	PHYSICAL EDUCATION 2 (DANCE, MARTIAL ARTS AND BOARD GAMES)	-	3.0	(2.0)			ATHLETICS	
		Total	19.5	16.5	15.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	3	CHM12-2	GENERAL CHEMISTRY 2	3.0	-	2.0	CHM11-2, CHM11-2L		CHE-CHM
		CHM12-2L	GENERAL CHEMISTRY LABORATORY 2	-	4.5	1.0	CHM11-2, CHM11-2L	CHM12-2	CHE-CHM
		CS10-1L	COMPUTER FUNDAMENTALS AND PROGRAMMING LABORATORY	-	9.0	2.0	MATH10-3		SOIT
		ENG10	ENGLISH FOR ACADEMIC PURPOSES 1	4.5	-	3.0			SLHS
		HME02	INTRODUCTION TO PHILOSOPHY	4.5	-	3.0			SLHS
		MATH21-1	CALCULUS 1	7.5	-	5.0	MATH13-1, MATH10-4		MATH

	NSTP3	NATIONAL SERVICE TRAINING PROGRAM 3	-	4.5	(1.5)	NSTP2		SOCIP
	PE13-2	PHYSICAL EDUCATION 3 (INDIVIDUAL / DUAL SPORTS)	-	3.0	(2.0)			ATHLETICS
Total			19.5	21.0	16.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	4	CHM13-2P	GENERAL CHEMISTRY 3	3.0	4.5	3.0	CHM12-2, CHM12-2L		CHE-CHM
		CHM13L	GENERAL CHEMISTRY LABORATORY 3	-	4.5	1.0	CHM12-2, CHM12-2L	CHM13-2P	CHE-CHM
		CHM13X	GENERAL CHEMISTRY EXIT EXAM	-	-	0.0	CHM12-2	CHM13-2P	CHE-CHM
		ENG11	ENGLISH FOR ACADEMIC PURPOSES 2	4.5	-	3.0	ENG10		SLHS
		MATH22-1	CALCULUS 2	7.5	-	5.0	MATH21-1		MATH
		SSE01	GENERAL PSYCHOLOGY	4.5	-	3.0			SLHS
		NSTP4	NATIONAL SERVICE TRAINING PROGRAM 4	-	4.5	(1.5)	NSTP3		SOCIP
		PE14	PHYSICAL EDUCATION 4 (TEAM SPORTS)	-	3.0	(2.0)			ATHLETICS
Total				19.5	16.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	1	CHE101	INTRODUCTION TO CHEMICAL ENGINEERING	1.5	-	1.0	CHM13-2P		CHE-CHM
		CHM112	ANALYTICAL CHEMISTRY 1	4.5	-	3.0	CHM13-2P, CHM13X, CHM13L		CHE-CHM
		CHM112L	ANALYTICAL CHEMISTRY LABORATORY 1	-	9.0	2.0	CHM13-2P, CHM13L	CHM112	CHE-CHM
		ENG12	ENGLISH FOR THE WORKPLACE 1	4.5	-	3.0	ENG11		SLHS
		MATH23-1	CALCULUS 3	4.5	-	3.0	MATH22-1		MATH
		MATH23-1X	ENGINEERING MATHEMATICS EXIT EXAM	-	-	0.0	MATH22-1	MATH23-1	MATH
		PHY10	GENERAL PHYSICS 1	3.0	-	2.0	MATH22-1		PHYSICS
		PHY10L	GENERAL PHYSICS LABORATORY 1	-	4.5	1.0	MATH22-1	PHY10	PHYSICS
Total				18.0	13.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	2	CHM145	ORGANIC CHEMISTRY 1	4.5	-	3.0	CHM13X, CHM13L, CHM13-2P		CHE-CHM
		CHM145L	ORGANIC CHEMISTRY LABORATORY 1	-	9.0	2.0	CHM13L, CHM13-2P	CHM145	CHE-CHM
		MATH15-1	LINEAR ALGEBRA	3.0	-	2.0	MATH13-1, MATH10-4		MATH

MATH16-1L	INTRODUCTION TO SCIENTIFIC COMPUTING	-	4.5	1.0	MATH22-1, CS10-1L		MATH
MATH24-1	DIFFERENTIAL EQUATIONS	4.5	-	3.0	MATH23-1, MATH23-1X		MATH
PHY11	GENERAL PHYSICS 2	3.0	-	2.0	PHY10, PHY10L		PHYSICS
PHY11L	GENERAL PHYSICS LABORATORY 2	-	4.5	1.0	PHY10, PHY10L	PHY11	PHYSICS
Total		15.0	18.0	14.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	3	CHE111P	CHEMICAL ENGINEERING CALCULATIONS 1	3.0	4.5	3.0	CHE101, CHM112, MATH15-1		CHE-CHM
		CHM146	ORGANIC CHEMISTRY 2	4.5	-	3.0	CHM145, CHM145L		CHE-CHM
		CHM146L	ORGANIC CHEMISTRY LABORATORY 2	-	9.0	2.0	CHM145, CHM145L	CHM146	CHE-CHM
		PHY12	GENERAL PHYSICS 3	3.0	-	2.0	PHY11, PHY11L		PHYSICS
		PHY12L	GENERAL PHYSICS LABORATORY 3	-	4.5	1.0	PHY11, PHY11L	PHY12	PHYSICS
			STS ELECTIVE	4.5	-	3.0			CHE-CHM
		Total		15.0	18.0	14.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	4	CHE112P	CHEMICAL ENGINEERING CALCULATIONS 2	3.0	4.5	3.0	CHE111P		CHE-CHM
		CHM144	INDUSTRIAL CHEMISTRY	3.0	-	2.0	CHM146, CHM146L		CHE-CHM
		CHM144L	INDUSTRIAL CHEMISTRY LABORATORY	-	4.5	1.0	CHM146L, CHM146	CHM144	CHE-CHM
		CHM147	ORGANIC CHEMISTRY 3	4.5	-	3.0	CHM146, CHM146L		CHE-CHM
		CHM147X	ORGANIC CHEMISTRY EXIT EXAM	-	-	0.0	CHM146, CHM146L	CHM147	CHE-CHM
		CHM170L	PHYSICAL CHEMISTRY LABORATORY 1	-	4.5	1.0	CHM112, CHM112L	CHM170P	CHE-CHM
		CHM170P	PHYSICAL CHEMISTRY 1	3.0	4.5	3.0	CHM112, CHM112L, MATH22-1		CHE-CHM
		PHY13	GENERAL PHYSICS 4	3.0	-	2.0	PHY12, PHY12L		PHYSICS
		PHY13L	GENERAL PHYSICS LABORATORY 4	-	4.5	1.0	PHY12, PHY12L	PHY13	PHYSICS
		PHY13X	GENERAL PHYSICS EXIT EXAM	-	-	0.0	PHY12	PHY13	PHYSICS
		Total		16.5	22.5	16.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	1	CHE50P	MATHEMATICAL METHODS IN CHEMICAL ENGINEERING	3.0	4.5	3.0	MATH24-1, MATH16-1L		CHE-CHM
		CHM115	ANALYTICAL CHEMISTRY 2	4.5	-	3.0	CHM146, CHM112		CHE-CHM
		CHM115L	ANALYTICAL CHEMISTRY LABORATORY 2	-	9.0	2.0	CHM146, CHM112, CHM112L	CHM115	CHE-CHM
		CHM115X	ANALYTICAL CHEMISTRY EXIT EXAM	-	-	0.0	CHM146, CHM112, CHM146L	CHM115	CHE-CHM
		EE21	BASIC ELECTRICAL ENGINEERING	3.0	-	2.0	PHY12, PHY12L, MATH24-1		EECE
		EE21L	BASIC ELECTRICAL ENGINEERING LABORATORY	-	4.5	1.0	PHY12, PHY12L, MATH24-1		EECE
		MSE20	FUNDAMENTALS OF MATERIALS SCIENCE AND ENGINEERING	4.5	-	3.0	PHY13, PHY13L, PHY13X, CHM12-2		CHE-CHM
Total			15.0	18.0	14.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	2	CHE121-1P	CHEMICAL ENGINEERING THERMODYNAMICS 1	3.0	4.5	3.0	CHM170P, CHE112P		CHE-CHM
		CHM171L	PHYSICAL CHEMISTRY LABORATORY 2	-	4.5	1.0	CHM170L, CHM170P	CHM171P	CHE-CHM
		CHM171P	PHYSICAL CHEMISTRY 2	3.0	4.5	3.0	CHM170P, CHM170L		CHE-CHM
		ENG13	ENGLISH FOR THE WORKPLACE 2	4.5	-	3.0	ENG12		SLHS
		MEC30	STATICS OF RIGID BODIES	4.5	-	3.0	PHY11, PHY11L		CEGE
			STS ELECTIVE	4.5	-	3.0			CHE-CHM
Total			19.5	13.5	16.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	3	CHE122-1	CHEMICAL ENGINEERING THERMODYNAMICS 2	4.5	-	3.0	CHE121-1P		CHE-CHM
		CHE122-1X	MATERIAL BALANCES AND PROCESS THERMODYNAMICS EXIT EXAM	-	-	0.0	CHE112P, CHE121-1P	CHE122-1	CHE-CHM
		CHE130-1P	PRINCIPLES OF TRANSPORT PROCESSES	3.0	4.5	3.0	CHE121-1P	CHE134-1P	CHE-CHM
		CHE134-1P	FLOW OF FLUIDS	3.0	4.5	3.0	CHE121-1P	CHE130-1P	CHE-CHM

	CHM160-1	BIOCHEMISTRY 1	3.0	-	2.0	CHM146, CHM112, CHM147X, CHM115X		CHE-CHM
	CHM160L	BIOCHEMISTRY 1 LABORATORY	-	4.5	1.0	CHM146, CHM112	CHM160-1	CHE-CHM
	RZL10	RIZAL'S WORKS & WRITINGS OF OTHER FILIPINO HEROES	4.5	-	3.0			SLHS
Total			18.0	13.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co- requisites	Caretaker
3	4	CHE133-1P	HEAT AND MASS TRANSFER APPLICATIONS	3.0	4.5	3.0	CHE130-1P, CHE134-1P		CHE-CHM
		CHE143-1	CHEMICAL REACTION ENGINEERING 1	3.0	-	2.0	CHM171P, CHE50P		CHE-CHM
		CHE40	ENGINEERING ECONOMY	4.5	-	3.0	MATH24-1		CHE-CHM
		CHM131	ADVANCED INORGANIC CHEMISTRY 1	3.0	-	2.0	CHM112, CHM146, CHM147X		CHE-CHM
		MATH30-7	PROBABILITY AND STATISTICS	4.5	-	3.0	MATH23-1		MATH
		MEC31-1	DYNAMICS OF RIGID BODIES	3.0	-	2.0	MEC30		MME
			Total	21.0	4.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co- requisites	Caretaker
4	1	CHE135-1P	SEPARATION PROCESSES	3.0	4.5	3.0	CHE122-1, CHE133-1P, CHE122-1X		CHE-CHM
		CHE135-1X	TRANSPORT AND SEPARATION PROCESSES EXIT EXAM	-	-	0.0	CHE133-1P, CHE134-1P	CHE135- 1P, CHE136-1	CHE-CHM
		CHE136-1	INTRODUCTION TO PARTICLE TECHNOLOGY	3.0	-	2.0	CHE134-1P		CHE-CHM
		CHE145-1	CHEMICAL REACTION ENGINEERING 2	3.0	-	2.0	CHE130-1P, CHE143-1		CHE-CHM
		CHE150-1L	CHEMICAL ENGINEERING LABORATORY 1	-	4.5	1.0	CHE134-1P		CHE-CHM
		CHM132	ADVANCE INORGANIC CHEMISTRY 2	3.0	-	2.0	CHM131		CHE-CHM
		CHM132X	ADVANCED INORGANIC CHEMISTRY EXIT EXAM	-	-	0.0	CHM131	CHM132	CHE-CHM
		CHM161	BIOCHEMISTRY 2	3.0	-	2.0	CHM160L, CHM160-1		CHE-CHM
		CHM161L	BIOCHEMISTRY 2 LABORATORY	-	4.5	1.0	CHM160L, CHM160-1	CHM161	CHE-CHM
		CHM161X	BIOCHEMISTRY EXIT EXAM	-	-	0.0	CHM160L, CHM160-1	CHM161	CHE-CHM
		MEC32	MECHANICS OF DEFORMABLE BODIES	4.5	-	3.0	MEC31-1		CEGE
Total			19.5	13.5	16.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
4	2	BIO149	BIOTECHNOLOGY	4.5	-	3.0	CHM146		CHE-CHM
		CHE151-1L	CHEMICAL ENGINEERING LABORATORY 2	-	4.5	1.0	CHE150-1L, CHE135-1P		CHE-CHM
		CHE170-1	CHEMICAL PROCESS INDUSTRIES	4.5	-	3.0	CHE112P, CHM144		CHE-CHM
		CHE70-1	CHE LAWS AND ETHICS	3.0	-	2.0	CHE101	ENV110-1	CHE-CHM
		CHM175	QUANTUM CHEMISTRY	4.5	-	3.0	CHM171P		CHE-CHM
		CHM175X	QUANTUM CHEMISTRY EXIT EXAM	-	-	0.0	CHM171P	CHM175	CHE-CHM
		ENV110-1	ENVIRONMENTAL ENGINEERING AND ENVIRONMENTAL SAFETY	4.5	-	3.0	CHM13-2P		CHE-CHM
Total			21.0	4.5	15.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
4	3	CHE160-1L	COMPUTER APPLICATIONS IN CHEMICAL ENGINEERING	-	4.5	1.0	CHE133-1P, CHE50P		CHE-CHM
		CHE180-1	PROCESS AND EQUIPMENT DESIGN	3.0	-	2.0	CHE135-1P, CHE136-1, CHE135-1X	CHE181-1D	CHE-CHM
		CHE181-1D	PLANT DESIGN 1	-	4.5	1.0	CHE135-1P, CHE136-1, CHE135-1X	CHE180-1	CHE-CHM
		CHE183-1	CHEMICAL PROCESS SAFETY	4.5	-	3.0	CHE170-1, ENV110-1		CHE-CHM
		CHE184-1P	PROCESS DYNAMICS AND CONTROL	3.0	4.5	3.0	CHE170-1, CHE50P		CHE-CHM
		CHE198-1	METHODS OF RESEARCH AND EXPERIMENTAL DESIGN	3.0	-	2.0	MATH30-7, CHE133-1P		CHE-CHM
		EMG20	ENGINEERING MANAGEMENT	4.5	-	3.0			IE-EMG
			Total	18.0	13.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
4	4	CHE142-1	BIOCHEMICAL ENGINEERING	4.5	-	3.0	CHE143-1, BIO149		CHE-CHM
		CHE142-1X	PROCESS INDUSTRIES AND ENVIRONMENTAL ENGINEERING EXIT EXAM	-	-	0.0	CHE143-1, ENV110-1, BIO149	CHE142-1	CHE-CHM
		CHE182-1	PLANT DESIGN 2	3.0	-	2.0	CHE180-1, CHE181-1D, CHE183-1, CHE70-1		CHE-CHM

	CHE184X	PROCESS DESIGN EXIT EXAM	-	-	0.0	CHE180-1, CHE181-1D, CHE184-1P	CHE182-1	CHE-CHM
	CHE185-1	INDUSTRIAL WASTE MANAGEMENT AND CONTROL	4.5	-	3.0	CHE170-1, ENV110-1		CHE-CHM
	CHE188-1	QUANTITATIVE METHODS IN MANAGEMENT	4.5	-	3.0	EMG20, CHE40, CHE50P		CHE-CHM
	CHM200-2L	THESIS 1	-	4.5	1.0	CHE198-1		CHE-CHM
	CHM70	CHEMISTRY LAWS AND ETHICS	1.5	-	1.0	CHM145, CHM112		CHE-CHM
	HME03	HUMANITIES ELECTIVE	4.5	-	3.0			SLHS
Total			22.5	4.5	16.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co- requisites	Caretaker
5	1	CHE199-1R	CHEMICAL ENGINEERING PRACTICE	-	16.0	2.0	CHE180-1, CHE181-1D, CHE183-1, CHE70-1		CHE-CHM
		CHM200-3L	THESIS 2	-	4.5	1.0	CHM200-2L		CHE-CHM
Total				0.0	20.5	3.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co- requisites	Caretaker
5	2	CHE189-1F	PLANT VISITS AND SEMINARS	-	4.5	1.0	CHE181-1D		CHE-CHM
		CHE199D	COMPREHENSIVE REVIEW AND EXAMINATION IN FUNDAMENTALS OF ENGINEERING SCIENCES AND CHEMICAL ENGINEERING	-	9.0	2.0	CHE199-1R		CCESC
		CHM198D	APPLIED CHEMISTRY (CORRELATION COURSE)	-	9.0	2.0	CHM161X, CHM175X, CHM160-1, CHM132X		CCESC
		SSE02	SOCIAL SCIENCE ELECTIVE	4.5	-	3.0			SLHS
Total				4.5	22.5	8.0			

SCIENCE, TECHNOLOGY AND SOCIETY ELECTIVES : 6.0 UNITS

	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
	BIO186	BIOENTREPRENEURSHIP AND ISSUES IN BIOTECHNOLOGY	4.5	-	3.0			CHE-CHM
	BIO99	SOCIAL STUDIES OF BIOSCIENCE AND BIOTECHNOLOGY	4.5	-	3.0			CHE-CHM
	CHE99	ENVIRONMENTAL CONFLICTS AND SOCIAL CHANGE	4.5	-	3.0			CHE-CHM
	BIO99-1	CONFLICTS AND EVOLUTION OF MODERN MEDICINE	4.5	-	3.0			CHE-CHM
	CHM99	DEVELOPMENT AND RISE OF MODERN SCIENCE	4.5	-	3.0			CHE-CHM

Total Academic Units : 252.00

BACHELOR OF SCIENCE IN BIOLOGICAL ENGINEERING

(Curriculum applicable to students who entered as freshmen beginning academic year 2015-2016)

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	1	BIO16	BIOMOLECULES, CELL AND TISSUES	4.5	-	3.0			CHE-CHM
		BIO16L	GENERAL BIOLOGY LABORATORY	-	4.5	1.0		BIO16	CHE-CHM
		DRAW10W	ENGINEERING DRAWING	-	4.5	1.0			MVA
		HME01	HUMANITIES ELECTIVE	4.5	-	3.0			SLHS
		MATH10-3	ALGEBRA	4.5	-	3.0			MATH
		MATH12-1	PLANE AND SPHERICAL TRIGONOMETRY	4.5	-	3.0			MATH
		NSTP1	NATIONAL SERVICE TRAINING PROGRAM 1	-	4.5	(1.5)			SOCIP
		PE11-1	PHYSICAL EDUCATION 1 (PHYSICAL FITNESS AND GROUP GAMES)	-	3.0	(2.0)			ATHLETICS
			Total	18.0	16.5	14.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	2	BIO152-1	FUNDAMENTALS OF GENETICS AND BIOTECHNOLOGY	4.5	-	3.0	BIO16		CHE-CHM
		BIO152-1L	FUNDAMENTALS OF GENETICS AND BIOTECHNOLOGY LABORATORY	-	4.5	1.0	BIO16, BIO16L	BIO152-1	CHE-CHM
		CHM11-2	GENERAL CHEMISTRY 1	3.0	-	2.0			CHE-CHM
		CHM11-2L	GENERAL CHEMISTRY LABORATORY 1	-	4.5	1.0		CHM11-2	CHE-CHM
		HME02	HUMANITIES ELECTIVE	4.5	-	3.0			SLHS
		MATH10-4	ADVANCED ALGEBRA	4.5	-	3.0	MATH10-3		MATH
		MATH13-1	SOLID MENSURATION	3.0	-	2.0	MATH12-1		MATH
		NSTP2	NATIONAL SERVICE TRAINING PROGRAM 2	-	4.5	(1.5)	NSTP1		SOCIP
		PE12	PHYSICAL EDUCATION 2 (DANCE, MARTIAL ARTS AND BOARD GAMES)	-	3.0	(2.0)			ATHLETICS
		Total	19.5	16.5	15.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	3	BIO153-2	FUNDAMENTALS OF BIOENGINEERING	4.5	-	3.0	BIO152-1		CHE-CHM
		CAD10L	COMPUTER-AIDED DRAFTING	-	4.5	1.0	DRAW10W		MVA
		CHM12-2	GENERAL CHEMISTRY 2	3.0	-	2.0	CHM11-2, CHM11-2L		CHE-CHM
		CHM12-2L	GENERAL CHEMISTRY LABORATORY 2	-	4.5	1.0	CHM11-2, CHM11-2L	CHM12-2	CHE-CHM
		ENG10	ENGLISH FOR ACADEMIC PURPOSES 1	4.5	-	3.0			SLHS
		MATH21-1	CALCULUS 1	7.5	-	5.0	MATH13-1, MATH10-4		MATH

	NSTP3	NATIONAL SERVICE TRAINING PROGRAM 3	-	4.5	(1.5)	NSTP2		SOCIP
	PE13-2	PHYSICAL EDUCATION 3 (INDIVIDUAL / DUAL SPORTS)	-	3.0	(2.0)			ATHLETICS
Total			19.5	16.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	4	CHM13-2P	GENERAL CHEMISTRY 3	3.0	4.5	3.0	CHM12-2, CHM12-2L		CHE-CHM
		CHM13L	GENERAL CHEMISTRY LABORATORY 3	-	4.5	1.0	CHM12-2, CHM12-2L	CHM13-2P	CHE-CHM
		CS10-1L	COMPUTER FUNDAMENTALS AND PROGRAMMING LABORATORY	-	9.0	2.0	MATH10-3		SOIT
		ENG11	ENGLISH FOR ACADEMIC PURPOSES 2	4.5	-	3.0	ENG10		SLHS
		MATH22-1	CALCULUS 2	7.5	-	5.0	MATH21-1		MATH
		NSTP4	NATIONAL SERVICE TRAINING PROGRAM 4	-	4.5	(1.5)	NSTP3		SOCIP
		PE14	PHYSICAL EDUCATION 4 (TEAM SPORTS)	-	3.0	(2.0)			ATHLETICS
Total				15.0	25.5	14.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	1	BIO162-2	PHYSIOLOGY FOR BIOENGINEERS	4.5	-	3.0	BIO153-2		CHE-CHM
		MATH23-1	CALCULUS 3	4.5	-	3.0	MATH22-1		MATH
		PHY10	GENERAL PHYSICS 1	3.0	-	2.0	MATH22-1		PHYSICS
		PHY10L	GENERAL PHYSICS LABORATORY 1	-	4.5	1.0	MATH22-1	PHY10	PHYSICS
		RZL10	RIZAL'S WORKS & WRITINGS OF OTHER FILIPINO HEROES	4.5	-	3.0			SLHS
		MATH15-1	LINEAR ALGEBRA	3.0	-	2.0	MATH13-1, MATH10-4		MATH
			Total	19.5	4.5	14.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	2	CHM112	ANALYTICAL CHEMISTRY 1	4.5	-	3.0	CHM13-2P		CHE-CHM
		CHM112L	ANALYTICAL CHEMISTRY LABORATORY 1	-	9.0	2.0	CHM13-2P	CHM112	CHE-CHM
		FIL10	FILIPINO 1	4.5	-	3.0			SLHS
		MATH16-1L	INTRODUCTION TO SCIENTIFIC COMPUTING	-	4.5	1.0	MATH22-1, CS10-1L		MATH
		MATH24-1	DIFFERENTIAL EQUATIONS	4.5	-	3.0	MATH23-1		MATH

	PHY11	GENERAL PHYSICS 2	3.0	-	2.0	PHY10, PHY10L		PHYSICS
	PHY11L	GENERAL PHYSICS LABORATORY 2	-	4.5	1.0	PHY10, PHY10L	PHY11	PHYSICS
Total			16.5	18.0	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	3	BIO136-2	MICROBIOLOGY AND IMMUNOLOGY	4.5	-	3.0	BIO152-1		CHE-CHM
		BIO136-2L	MICROBIOLOGY AND IMMUNOLOGY LABORATORY	-	4.5	1.0	BIO152-1	BIO136-2	CHE-CHM
		BIO23P	BIOLOGICAL ENGINEERING CALCULATIONS 1	1.5	4.5	2.0	CHM13-2P, MATH22-1		CHE-CHM
		FIL11	FILIPINO 2	4.5	-	3.0			SLHS
		PHY12	GENERAL PHYSICS 3	3.0	-	2.0	PHY11, PHY11L		PHYSICS
		PHY12L	GENERAL PHYSICS LABORATORY 3	-	4.5	1.0	PHY11, PHY11L	PHY12	PHYSICS
		SSE01	SOCIOLOGY WITH POPULATION EDUCATION	4.5	-	3.0			SLHS
Total				18.0	13.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	4	BIO140-1	INDUSTRIAL MICROBIOLOGY	4.5	-	3.0	BIO136-2		CHE-CHM
		BIO170-1L	MOLECULAR TECHNIQUES IN BIOENGINEERING LABORATORY 1	-	4.5	1.0	BIO136-2		CHE-CHM
		BIO24P	BIOLOGICAL ENGINEERING CALCULATIONS 2	1.5	4.5	2.0	BIO23P		CHE-CHM
		CHM145	ORGANIC CHEMISTRY 1	4.5	-	3.0	CHM13-2P		CHE-CHM
		CHM145L	ORGANIC CHEMISTRY LABORATORY 1	-	9.0	2.0	CHM13-2P	CHM145	CHE-CHM
		PHY13	GENERAL PHYSICS 4	3.0	-	2.0	PHY12, PHY12L		PHYSICS
		PHY13L	GENERAL PHYSICS LABORATORY 4	-	4.5	1.0	PHY12, PHY12L	PHY13	PHYSICS
Total			13.5	22.5	14.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	1	BIO165-1	MOLECULAR CELL BIOLOGY 1	4.5	-	3.0	BIO162-2		CHE-CHM
		BIO170-2L	MOLECULAR TECHNIQUES IN BIOENGINEERING LABORATORY 2	-	4.5	1.0	BIO170-1L		CHE-CHM
		BIO25	TRANSPORT PROCESSES IN BIOENGINEERING 1	3.0	-	2.0	BIO24P, MATH24-1		CHE-CHM
		CHM146	ORGANIC CHEMISTRY 2	4.5	-	3.0	CHM145, CHM145L		CHE-CHM
		CHM146L	ORGANIC CHEMISTRY LABORATORY 2	-	9.0	2.0	CHM145, CHM145L	CHM146	CHE-CHM

	CHM170L	PHYSICAL CHEMISTRY LABORATORY 1	-	4.5	1.0	CHM112, CHM112L, MATH22-1	CHM170P	CHE-CHM
	CHM170P	PHYSICAL CHEMISTRY 1	3.0	4.5	3.0	CHM112, CHM112L, MATH22-1	CHM170L	CHE-CHM
Total			15.0	22.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	2	BIO172-1	PRINCIPLES OF ENVIRONMENTAL BIOTECHNOLOGY	4.5	-	3.0	BIO23P		CHE-CHM
		BIO188-1	BIOMATERIAL SCIENCE AND ENGINEERING	4.5	-	3.0	BIO153-2		CHE-CHM
		CHM115	ANALYTICAL CHEMISTRY 2	4.5	-	3.0	CHM146, CHM112, CHM112L, CHM146L		CHE-CHM
		CHM115L	ANALYTICAL CHEMISTRY LABORATORY 2	-	9.0	2.0	CHM146, CHM112, CHM112L, CHM146L	CHM115	CHE-CHM
		ECE20	BASIC ELECTRONICS	3.0	-	2.0	PHY12, PHY12L, MATH24-1	ECE20L	EECE
		ECE20L	BASIC ELECTRONICS LABORATORY	-	4.5	1.0	PHY12, PHY12L, MATH24-1	ECE20	EECE
			STS ELECTIVE	4.5	-	3.0			CHE-CHM
			Total	21.0	13.5	17.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	3	BIO188-2	STEM CELL AND TISSUE ENGINEERING	4.5	-	3.0	BIO165-1		CHE-CHM
		BIO25-1	TRANSPORT PROCESSES IN BIOENGINEERING 2	3.0	-	2.0	BIO25		CHE-CHM
		CHE40	ENGINEERING ECONOMY	4.5	-	3.0	MATH24-1		CHE-CHM
		CHM171L	PHYSICAL CHEMISTRY LABORATORY 2	-	4.5	1.0	CHM170L, CHM170P	CHM171P	CHE-CHM
		CHM171P	PHYSICAL CHEMISTRY 2	3.0	4.5	3.0	CHM170P, CHM170L		CHE-CHM
		ENG12	ENGLISH FOR THE WORKPLACE 1	4.5	-	3.0	ENG11		SLHS
			Total	19.5	9.0	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	4	BIO182P	BIOINFORMATICS 1	1.5	4.5	2.0	BIO153-2, CS10-1L		CHE-CHM

CHE143-1	CHEMICAL REACTION ENGINEERING 1	3.0	-	2.0	CHM171P, MATH24-1		CHE-CHM
CHE27	CHEMICAL THERMODYNAMICS	4.5	-	3.0	CHM170P		CHE-CHM
CHM160-1	BIOCHEMISTRY 1	3.0	-	2.0	CHM146, CHM112		CHE-CHM
CHM160L	BIOCHEMISTRY 1 LABORATORY	-	4.5	1.0	CHM146, CHM112	CHM160-1	CHE-CHM
CHM198-1	RESEARCH METHODS AND EXPERIMENTAL DESIGN	3.0	-	2.0	CHM146, BIO153-2		CHE-CHM
EE21	BASIC ELECTRICAL ENGINEERING	3.0	-	2.0	PHY12, PHY12L, MATH24-1		EECE
EE21L	BASIC ELECTRICAL ENGINEERING LABORATORY	-	4.5	1.0	PHY12, PHY12L, MATH24-1	EE21	EECE
Total		18.0	13.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co- requisites	Caretaker
4	1	BIO197L	BIOINFORMATICS 2 LABORATORY	-	4.5	1.0	BIO182P		CHE-CHM
		BIO198-1	GENE BIOTECHNOLOGY	4.5	-	3.0	BIO165-1		CHE-CHM
		BIO200-0L	THESIS 1	-	4.5	1.0	CHM198-1		CHE-CHM
		BIO30	BIOSEPARATIONS	3.0	-	2.0	BIO25, CHE27, CHM171P		CHE-CHM
		CHE144	REACTION ENGINEERING FOR HETEROGENEOUS SYSTEMS	3.0	-	2.0	CHE143-1		CHE-CHM
		CHM161	BIOCHEMISTRY 2	3.0	-	2.0	CHM160L, CHM160-1		CHE-CHM
		CHM161L	BIOCHEMISTRY 2 LABORATORY	-	4.5	1.0	CHM160L, CHM160-1	CHM161	CHE-CHM
		HME03	HUMANITIES ELECTIVE	4.5	-	3.0			SLHS
Total			18.0	13.5	15.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co- requisites	Caretaker
4	2	BIO129-1	BIOMEDICAL ENGINEERING	4.5	-	3.0	BIO165-1, ECE20		CHE-CHM
		BIO186	BIOENTREPRENEURSHIP AND ISSUES IN BIOTECHNOLOGY	4.5	-	3.0			CHE-CHM
		BIO190-1	BIOMECHANICS 1	3.0	-	2.0	BIO162-2, PHY13		CHE-CHM
		BIO26	MATHEMATICAL METHODS IN BIOENGINEERING	4.5	-	3.0	MATH15-1, MATH24-1		CHE-CHM
		BIO27	BIOPROCESS ENGINEERING	3.0	-	2.0	BIO30, CHE143-1		CHE-CHM
		ENG13	ENGLISH FOR THE WORKPLACE 2	4.5	-	3.0			SLHS
			Total	24.0	0.0	16.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
4	3	BIO165-2	MOLECULAR CELL BIOLOGY 2	4.5	-	3.0	BIO165-1		CHE-CHM
		BIO185-1	BIOETHICS	3.0	-	2.0			CHE-CHM
		BIO190-2	BIOMECHANICS 2	3.0	-	2.0	BIO190-1		CHE-CHM
		BIO192-1	MOLECULAR BIOMIMETICS	3.0	-	2.0	BIO165-1		CHE-CHM
		BIO200-1L	THESIS 2	-	4.5	1.0	BIO200-0L		CHE-CHM
		BIO27-1	BIOREACTOR ENGINEERING	3.0	-	2.0	BIO27		CHE-CHM
		SSE02	SOCIAL SCIENCE ELECTIVE	4.5	-	3.0			SLHS
			Total	21.0	4.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
4	4	BIO198R	BIOLOGICAL ENGINEERING PRACTICE	-	16.0	2.0	BIO27-1, BIO190-2		CHE-CHM
		BIO92D	PROCESS DESIGN FOR BIOLOGICAL ENGINEERING	3.0	4.5	3.0	BIO25-1, BIO27-1, CHE40, CHE144		CHE-CHM
			STS ELECTIVE	4.5	-	3.0			CHE-CHM
			Total	7.5	20.5	8.0			

SCIENCE, TECHNOLOGY AND SOCIETY ELECTIVES : 6.0 UNITS

	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
	BIO99	SOCIAL STUDIES OF BIOSCIENCE AND BIOTECHNOLOGY	4.5	-	3.0			CHE-CHM
	CHE99	ENVIRONMENTAL CONFLICTS AND SOCIAL CHANGE	4.5	-	3.0			CHE-CHM
	BIO99-1	CONFLICTS AND EVOLUTION OF MODERN MEDICINE	4.5	-	3.0			CHE-CHM
	CHM99	DEVELOPMENT AND RISE OF MODERN SCIENCE	4.5	-	3.0			CHE-CHM

Total Academic Units : 232.00

BACHELOR OF SCIENCE IN BIOLOGICAL ENGINEERING AND CHEMISTRY (DOUBLE DEGREE)

(Curriculum applicable to students who entered as freshmen beginning academic year 2015-2016)

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	1	BIO16	BIOMOLECULES, CELL AND TISSUES	4.5	-	3.0			CHE-CHM
		BIO16L	GENERAL BIOLOGY LABORATORY	-	4.5	1.0		BIO16	CHE-CHM
		DRAW10W	ENGINEERING DRAWING	-	4.5	1.0			MVA
		HME01	HUMANITIES ELECTIVE	4.5	-	3.0			SLHS
		MATH10-3	ALGEBRA	4.5	-	3.0			MATH
		MATH12-1	PLANE AND SPHERICAL TRIGONOMETRY	4.5	-	3.0			MATH
		NSTP1	NATIONAL SERVICE TRAINING PROGRAM 1	-	4.5	(1.5)			SOCIP
		PE11-1	PHYSICAL EDUCATION 1 (PHYSICAL FITNESS AND GROUP GAMES)	-	3.0	(2.0)			ATHLETICS
Total			18.0	16.5	14.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	2	BIO152-1	FUNDAMENTALS OF GENETICS AND BIOTECHNOLOGY	4.5	-	3.0	BIO16		CHE-CHM
		BIO152-1L	FUNDAMENTALS OF GENETICS AND BIOTECHNOLOGY LABORATORY	-	4.5	1.0	BIO16, BIO16L	BIO152-1	CHE-CHM
		CHM11-2	GENERAL CHEMISTRY 1	3.0	-	2.0			CHE-CHM
		CHM11-2L	GENERAL CHEMISTRY LABORATORY 1	-	4.5	1.0		CHM11-2	CHE-CHM
		HME02	HUMANITIES ELCTIVE	4.5	-	3.0			SLHS
		MATH10-4	ADVANCED ALGEBRA	4.5	-	3.0	MATH10-3		MATH
		MATH13-1	SOLID MENSURATION	3.0	-	2.0	MATH12-1		MATH
		NSTP2	NATIONAL SERVICE TRAINING PROGRAM 2	-	4.5	(1.5)	NSTP1		SOCIP
		PE12	PHYSICAL EDUCATION 2 (DANCE, MARTIAL ARTS AND BOARD GAMES)	-	3.0	(2.0)			ATHLETICS
Total			19.5	16.5	15.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	3	BIO153-2	FUNDAMENTALS OF BIOENGINEERING	4.5	-	3.0	BIO152-1		CHE-CHM
		CAD10L	COMPUTER-AIDED DRAFTING	-	4.5	1.0	DRAW10W		MVA
		CHM12-2	GENERAL CHEMISTRY 2	3.0	-	2.0	CHM11-2, CHM11-2L		CHE-CHM
		CHM12-2L	GENERAL CHEMISTRY LABORATORY 2	-	4.5	1.0	CHM11-2, CHM11-2L	CHM12-2	CHE-CHM
		ENG10	ENGLISH FOR ACADEMIC PURPOSES 1	4.5	-	3.0			SLHS

	MATH21-1	CALCULUS 1	7.5	-	5.0	MATH13-1, MATH10-4		MATH
	NSTP3	NATIONAL SERVICE TRAINING PROGRAM 3	-	4.5	(1.5)	NSTP2		SOCIP
	PE13-2	PHYSICAL EDUCATION 3 (INDIVIDUAL / DUAL SPORTS)	-	3.0	(2.0)			ATHLETICS
Total			19.5	16.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co- requisites	Caretaker
1	4	CHM13-2P	GENERAL CHEMISTRY 3	3.0	4.5	3.0	CHM12-2, CHM12-2L		CHE-CHM
		CHM13L	GENERAL CHEMISTRY LABORATORY 3	-	4.5	1.0	CHM12-2, CHM12-2L	CHM13-2P	CHE-CHM
		CHM13X	GENERAL CHEMISTRY EXIT EXAM	-	-	0.0	CHM12-2	CHM13-2P	CHE-CHM
		CS10-1L	COMPUTER FUNDAMENTALS AND PROGRAMMING LABORATORY	-	9.0	2.0	MATH10-3		SOIT
		ENG11	ENGLISH FOR ACADEMIC PURPOSES 2	4.5	-	3.0	ENG10		SLHS
		MATH22-1	CALCULUS 2	7.5	-	5.0	MATH21-1		MATH
		NSTP4	NATIONAL SERVICE TRAINING PROGRAM 4	-	4.5	(1.5)	NSTP3		SOCIP
		PE14	PHYSICAL EDUCATION 4 (TEAM SPORTS)	-	3.0	(2.0)			ATHLETICS
			Total	15.0	25.5	14.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co- requisites	Caretaker
2	1	BIO162-2	PHYSIOLOGY FOR BIOENGINEERS	4.5	-	3.0	BIO153-2		CHE-CHM
		MATH23-1	CALCULUS 3	4.5	-	3.0	MATH22-1		MATH
		PHY10	GENERAL PHYSICS 1	3.0	-	2.0	MATH22-1		PHYSICS
		PHY10L	GENERAL PHYSICS LABORATORY 1	-	4.5	1.0	MATH22-1	PHY10	PHYSICS
		RZL10	RIZAL'S WORKS & WRITINGS OF OTHER FILIPINO HEROES	4.5	-	3.0			SLHS
			STS ELECTIVE	4.5	-	3.0			CHE-CHM
			Total	21.0	4.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co- requisites	Caretaker
2	2	CHM112	ANALYTICAL CHEMISTRY 1	4.5	-	3.0	CHM13-2P, CHM13X		CHE-CHM
		CHM112L	ANALYTICAL CHEMISTRY LABORATORY 1	-	9.0	2.0	CHM13-2P, CHM13L	CHM112	CHE-CHM
		FIL10	FILIPINO 1	4.5	-	3.0			SLHS
		MATH16-1L	INTRODUCTION TO SCIENTIFIC COMPUTING	-	4.5	1.0	MATH22-1, CS10-1L		MATH

	MATH24-1	DIFFERENTIAL EQUATIONS	4.5	-	3.0	MATH23-1		MATH
	PHY11	GENERAL PHYSICS 2	3.0	-	2.0	PHY10, PHY10L		PHYSICS
	PHY11L	GENERAL PHYSICS LABORATORY 2	-	4.5	1.0	PHY10, PHY10L	PHY11	PHYSICS
Total			16.5	18.0	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	3	BIO136-2	MICROBIOLOGY AND IMMUNOLOGY	4.5	-	3.0	BIO152-1		CHE-CHM
		BIO136-2L	MICROBIOLOGY AND IMMUNOLOGY LABORATORY	-	4.5	1.0	BIO152-1	BIO136-2	CHE-CHM
		BIO23P	BIOLOGICAL ENGINEERING CALCULATIONS 1	1.5	4.5	2.0	CHM13-2P, MATH22-1		CHE-CHM
		FIL11	FILIPINO 2	4.5	-	3.0			SLHS
		PHY12	GENERAL PHYSICS 3	3.0	-	2.0	PHY11, PHY11L		PHYSICS
		PHY12L	GENERAL PHYSICS LABORATORY 3	-	4.5	1.0	PHY11, PHY11L	PHY12	PHYSICS
		SSE01	SOCIAL SCIENCE ELECTIVE	4.5	-	3.0			SLHS
			Total	18.0	13.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	4	BIO140-1	INDUSTRIAL MICROBIOLOGY	4.5	-	3.0	BIO136-2		CHE-CHM
		MATH15-1	LINEAR ALGEBRA	3.0	-	2.0	MATH13-1, MATH10-4		MATH
		BIO170-1L	MOLECULAR TECHNIQUES IN BIOENGINEERING LABORATORY 1	-	4.5	1.0	BIO136-2		CHE-CHM
		BIO24P	BIOLOGICAL ENGINEERING CALCULATIONS 2	1.5	4.5	2.0	BIO23P		CHE-CHM
		CHM145	ORGANIC CHEMISTRY 1	4.5	-	3.0	CHM13X, CHM13L, CHM13-2P		CHE-CHM
		CHM145L	ORGANIC CHEMISTRY LABORATORY 1	-	9.0	2.0	CHM13L, CHM13-2P	CHM145	CHE-CHM
		PHY13	GENERAL PHYSICS 4	3.0	-	2.0	PHY12, PHY12L		PHYSICS
		PHY13L	GENERAL PHYSICS LABORATORY 4	-	4.5	1.0	PHY12, PHY12L	PHY13	PHYSICS
Total			16.5	22.5	16.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	1	BIO165-1	MOLECULAR CELL BIOLOGY 1	4.5	-	3.0	BIO162-2		CHE-CHM
		BIO170-2L	MOLECULAR TECHNIQUES IN BIOENGINEERING LABORATORY 2	-	4.5	1.0	BIO170-1L		CHE-CHM

	BIO25	TRANSPORT PROCESSES IN BIOENGINEERING 1	3.0	-	2.0	BIO24P, MATH24-1		CHE-CHM
	CHM146	ORGANIC CHEMISTRY 2	4.5	-	3.0	CHM145, CHM145L		CHE-CHM
	CHM146L	ORGANIC CHEMISTRY LABORATORY 2	-	9.0	2.0	CHM145, CHM145L	CHM146	CHE-CHM
	CHM170L	PHYSICAL CHEMISTRY LABORATORY 1	-	4.5	1.0	CHM112, CHM112L, MATH22-1	CHM170P	CHE-CHM
	CHM170P	PHYSICAL CHEMISTRY 1	3.0	4.5	3.0	CHM112, CHM112L, MATH22-1		CHE-CHM
Total			15.0	22.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	2	BIO172-1	PRINCIPLES OF ENVIRONMENTAL BIOTECHNOLOGY	4.5	-	3.0	BIO23P		CHE-CHM
		BIO188-1	BIOMATERIAL SCIENCE AND ENGINEERING	4.5	-	3.0	BIO153-2		CHE-CHM
		CHM115	ANALYTICAL CHEMISTRY 2	4.5	-	3.0	CHM146, CHM112, CHM112L, CHM146L		CHE-CHM
		CHM115L	ANALYTICAL CHEMISTRY LABORATORY 2	-	9.0	2.0	CHM146, CHM112, CHM112L	CHM115	CHE-CHM
		CHM115X	ANALYTICAL CHEMISTRY EXIT EXAM	-	-	0.0	CHM146, CHM112, CHM146L	CHM115	CHE-CHM
		ECE20	BASIC ELECTRONICS	3.0	-	2.0	PHY12, PHY12L, MATH24-1		EECE
		ECE20L	BASIC ELECTRONICS LABORATORY	-	4.5	1.0	PHY12, PHY12L, MATH24-1		EECE
Total				16.5	13.5	14.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	3	BIO188-2	STEM CELL AND TISSUE ENGINEERING	4.5	-	3.0	BIO165-1		CHE-CHM
		BIO25-1	TRANSPORT PROCESSES IN BIOENGINEERING 2	3.0	-	2.0	BIO25		CHE-CHM
		CHE40	ENGINEERING ECONOMY	4.5	-	3.0	MATH24-1		CHE-CHM
		CHM147	ORGANIC CHEMISTRY 3	4.5	-	3.0	CHM146, CHM146L		CHE-CHM
		CHM147X	ORGANIC CHEMISTRY EXIT EXAM	-	-	0.0	CHM146, CHM146L	CHM147	CHE-CHM

	CHM171L	PHYSICAL CHEMISTRY LABORATORY 2	-	4.5	1.0	CHM170L, CHM170P	CHM171P	CHE-CHM
	CHM171P	PHYSICAL CHEMISTRY 2	3.0	4.5	3.0	CHM170P, CHM170L		CHE-CHM
Total			19.5	9.0	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	4	BIO182P	BIOINFORMATICS 1	1.5	4.5	2.0	BIO153-2, CS10-1L		CHE-CHM
		CHE143-1	CHEMICAL REACTION ENGINEERING 1	3.0	-	2.0	CHM171P, MATH24-1		CHE-CHM
		CHE27	CHEMICAL THERMODYNAMICS	4.5	-	3.0	CHM170P		CHE-CHM
		CHM130	INORGANIC CHEMISTRY	4.5	-	3.0	CHM145, CHM115X, CHM147X, CHM112		CHE-CHM
		CHM160-1	BIOCHEMISTRY 1	3.0	-	2.0	CHM146, CHM112, CHM147X		CHE-CHM
		CHM160L	BIOCHEMISTRY 1 LABORATORY	-	4.5	1.0	CHM146, CHM112	CHM160-1	CHE-CHM
		ENG12	ENGLISH FOR THE WORKPLACE 1	4.5	-	3.0	ENG11		SLHS
			Total	21.0	9.0	16.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
4	1	BIO197L	BIOINFORMATICS 2 LABORATORY	-	4.5	1.0	BIO182P		CHE-CHM
		BIO198-1	GENE BIOTECHNOLOGY	4.5	-	3.0	BIO165-1		CHE-CHM
		BIO30	BIOSEPARATIONS	3.0	-	2.0	BIO25, CHE27, CHM171P		CHE-CHM
		CHE144	REACTION ENGINEERING FOR HETEROGENEOUS SYSTEMS	3.0	-	2.0	CHE143-1		CHE-CHM
		CHM161	BIOCHEMISTRY 2	3.0	-	2.0	CHM160L, CHM160-1		CHE-CHM
		CHM161L	BIOCHEMISTRY 2 LABORATORY	-	4.5	1.0	CHM160L, CHM160-1	CHM161	CHE-CHM
		CHM161X	BIOCHEMISTRY EXIT EXAM	-	-	0.0	CHM160L, CHM160-1	CHM161	CHE-CHM
		CHM198-1	RESEARCH METHODS AND EXPERIMENTAL DESIGN	3.0	-	2.0	CHM146, BIO153-2		CHE-CHM
		Total	16.5	9.0	13.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
4	2	BIO129-1	BIOMEDICAL ENGINEERING	4.5	-	3.0	BIO165-1, ECE20		CHE-CHM
		BIO186	BIOENTREPRENEURSHIP AND ISSUES IN BIOTECHNOLOGY	4.5	-	3.0			CHE-CHM
		BIO190-1	BIOMECHANICS 1	3.0	-	2.0	PHY13		CHE-CHM
		BIO200-0L	THESIS 1	-	4.5	1.0	CHM198-1		CHE-CHM
		BIO26	MATHEMATICAL METHODS IN BIOENGINEERING	4.5	-	3.0	MATH15-1, MATH24-1		CHE-CHM
		BIO27	BIOPROCESS ENGINEERING	3.0	-	2.0	BIO30, CHE143-1		CHE-CHM
Total			19.5	4.5	14.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
4	3	BIO165-2	MOLECULAR CELL BIOLOGY 2	4.5	-	3.0	BIO165-1		CHE-CHM
		BIO185-1	BIOETHICS	3.0	-	2.0			CHE-CHM
		BIO190-2	BIOMECHANICS 2	3.0	-	2.0	BIO190-1		CHE-CHM
		BIO192-1	MOLECULAR BIOMIMETICS	3.0	-	2.0	BIO165-1		CHE-CHM
		BIO27-1	BIOREACTOR ENGINEERING	3.0	-	2.0	BIO27		CHE-CHM
		CHM70	CHEMISTRY LAWS AND ETHICS	1.5	-	1.0	CHM145, CHM112		CHE-CHM
		HME03	HUMANITIES ELCTIVE	4.5	-	3.0			SLHS
			Total	22.5	0.0	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
4	4	BIO200-1L	THESIS 2	-	4.5	1.0	BIO200-0L		CHE-CHM
		CHM148P	FOOD CHEMISTRY AND ANALYSIS	3.0	4.5	3.0	CHM146, CHM146L		CHE-CHM
		CHM149	ENVIRONMENTAL CHEMISTRY	4.5	-	3.0	CHM146, CHM112		CHE-CHM
		CHM175	QUANTUM CHEMISTRY	4.5	-	3.0	CHM171P		CHE-CHM
		CHM175X	QUANTUM CHEMISTRY EXIT EXAM	-	-	0.0	CHM171P	CHM175	CHE-CHM
		CHM180X	ALLIED CHEMISTRY EXIT EXAM	-	-	0.0	CHM130, CHM171P		CHE-CHM
		EE21	BASIC ELECTRICAL ENGINEERING	3.0	-	2.0	PHY12, PHY12L		EECE
		EE21L	BASIC ELECTRICAL ENGINEERING LABORATORY	-	4.5	1.0	PHY12, PHY12L	EE21	EECE
			STS ELECTIVE	4.5	-	3.0			CHE-CHM
Total			19.5	13.5	16.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
5	1	BIO92D	PROCESS DESIGN FOR BIOLOGICAL ENGINEERING	3.0	4.5	3.0	BIO25-1, CHE40, CHE144		CHE-CHM
		CHM198D	APPLIED CHEMISTRY (CORRELATION COURSE)	-	9.0	2.0	CHM130, CHM161X, CHM175X, CHM180X, CHM160-1		CCESC
		CHM199R	CHEMISTRY PRACTICE	-	16.0	2.0	CHM130, CHM160-1		CHE-CHM
		ENG13	ENGLISH FOR THE WORKPLACE 2	4.5	-	3.0	ENG12		SLHS
		SSE02	SOCIAL SCIENCE ELECTIVE	4.5	-	3.0			SLHS
		Total	12.0	29.5	13.0				

SCIENCE, TECHNOLOGY AND SOCIETY ELECTIVES : 6.0 UNITS

	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
	BIO99	SOCIAL STUDIES OF BIOSCIENCE AND BIOTECHNOLOGY	4.5	-	3.0			CHE-CHM
	CHE99	ENVIRONMENTAL CONFLICTS AND SOCIAL CHANGE	4.5	-	3.0			CHE-CHM
	BIO99-1	CONFLICTS AND EVOLUTION OF MODERN MEDICINE	4.5	-	3.0			CHE-CHM
	CHM99	DEVELOPMENT AND RISE OF MODERN SCIENCE	4.5	-	3.0			CHE-CHM

Total Academic Units : 250.00

BACHELOR OF SCIENCE IN MATERIALS SCIENCE AND ENGINEERING

(Curriculum applicable to students who entered as freshmen beginning academic year 2015-2016)

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	1	FIL10	FILIPINO 1	4.5	-	3.0			SLHS
		HME01	HUMANITIES ELECTIVE	4.5	-	3.0			SLHS
		MATH10-3	ALGEBRA	4.5	-	3.0			MATH
		MATH12-1	PLANE AND SPHERICAL TRIGONOMETRY	4.5	-	3.0			MATH
		MSE10	ORIENTATION TO MATERIALS SCIENCE AND ENGINEERING	1.5	-	1.0			CHE-CHM
		NSTP1	NATIONAL SERVICE TRAINING PROGRAM 1	-	4.5	(1.5)			SOCIP
		PE11-1	PHYSICAL EDUCATION 1 (PHYSICAL FITNESS AND GROUP GAMES)	-	3.0	(2.0)			ATHLETICS
			Total	19.5	7.5	13.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	2	CS10-1L	COMPUTER FUNDAMENTALS AND PROGRAMMING LABORATORY	-	9.0	2.0	MATH10-3		SOIT
		DRAW10W	ENGINEERING DRAWING	-	4.5	1.0			MVA
		FIL11	FILIPINO 2	4.5	-	3.0			SLHS
		MATH10-4	ADVANCED ALGEBRA	4.5	-	3.0	MATH10-3		MATH
		MATH13-1	SOLID MENSURATION	3.0	-	2.0	MATH12-1		MATH
		RZL10	RIZAL'S WORKS & WRITINGS OF OTHER FILIPINO HEROES	4.5	-	3.0			SLHS
		NSTP2	NATIONAL SERVICE TRAINING PROGRAM 2	-	4.5	(1.5)	NSTP1		SOCIP
		PE12	PHYSICAL EDUCATION 2 (DANCE, MARTIAL ARTS AND BOARD GAMES)	-	3.0	(2.0)			ATHLETICS
			Total	16.5	21.0	14.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	3	CAD10L	COMPUTER-AIDED DRAFTING	-	4.5	1.0	DRAW10W		MVA
		CHM11-2	GENERAL CHEMISTRY 1	3.0	-	2.0			CHE-CHM
		CHM11-2L	GENERAL CHEMISTRY LABORATORY 1	-	4.5	1.0		CHM11-2	CHE-CHM
		ENG10	ENGLISH FOR ACADEMIC PURPOSES 1	4.5	-	3.0			SLHS
		MATH21-1	CALCULUS 1	7.5	-	5.0	MATH13-1, MATH10-4		MATH
		HME02	HUMANITIES ELECTIVE	4.5	-	3.0			SLHS
		NSTP3	NATIONAL SERVICE TRAINING PROGRAM 3	-	4.5	(1.5)	NSTP2		SOCIP
		PE13-2	PHYSICAL EDUCATION 3 (INDIVIDUAL / DUAL SPORTS)	-	3.0	(2.0)			ATHLETICS
			Total	19.5	16.5	12.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
1	4	CHM12-2	GENERAL CHEMISTRY 2	3.0	-	2.0	CHM11-2, CHM11-2L		CHE-CHM
		CHM12-2L	GENERAL CHEMISTRY LABORATORY 2	-	4.5	1.0	CHM11-2, CHM11-2L		CHE-CHM
		ENG11	ENGLISH FOR ACADEMIC PURPOSES 2	4.5	-	3.0	ENG10		SLHS
		HUM03	HUMANITIES ELECTIVE	4.5	-	3.0			SLHS
		MATH22-1	CALCULUS 2	7.5	-	5.0	MATH21-1		MATH
		NSTP4	NATIONAL SERVICE TRAINING PROGRAM 4	-	4.5	(1.5)	NSTP3		SOCIP
		PE14	PHYSICAL EDUCATION 4 (TEAM SPORTS)	-	3.0	(2.0)			ATHLETICS
			Total	19.5	12.0	14.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	1	CHM111-1	ANALYTICAL CHEMISTRY 1	3.0	-	2.0	CHM12-2		CHE-CHM
		CHM111-1L	ANALYTICAL CHEMISTRY LABORATORY 1	-	4.5	1.0	CHM12-2, CHM12-2L	CHM111-1	CHE-CHM
		GEO100	PRINCIPLES OF GEOLOGY	3.0	-	2.0	CHM12-2		CEGE
		GEO100L	PRINCIPLES OF GEOLOGY LABORATORY	-	4.5	1.0	CHM12-2	GEO100	CEGE
		MATH23-1	CALCULUS 3	4.5	-	3.0	MATH22-1		MATH
		MATH23-1X	ENGINEERING MATHEMATICS EXIT EXAM	-	-	0.0	MATH22-1	MATH23-1	MATH
		PHY10	GENERAL PHYSICS 1	3.0	-	2.0	MATH22-1		PHYSICS
		PHY10L	GENERAL PHYSICS LABORATORY 1	-	4.5	1.0	MATH22-1	PHY10	PHYSICS
Total			13.5	13.5	12.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	2	ENG12	ENGLISH FOR THE WORKPLACE 1	4.5	-	3.0	ENG11		SLHS
		GEO101P	MINERALOGY	3.0	4.5	3.0	GEO100, GEO100L		CEGE
		MATH15-1	LINEAR ALGEBRA	3.0	-	2.0	MATH13-1, MATH10-4		MATH
		MATH16-1L	INTRODUCTION TO SCIENTIFIC COMPUTING	-	4.5	1.0	MATH22-1		MATH
		MATH24-1	DIFFERENTIAL EQUATIONS	4.5	-	3.0	MATH23-1, MATH23-1X		MATH
		PHY11	GENERAL PHYSICS 2	3.0	-	2.0	PHY10, PHY10L		PHYSICS
		PHY11L	GENERAL PHYSICS LABORATORY 2	-	4.5	1.0	PHY10, PHY10L	PHY11	PHYSICS
Total			18.0	13.5	15.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	3	GEO111P	OPTICAL MINERALOGY	3.0	4.5	3.0	GEO101P		CEGE
		MATH30-7	PROBABILITY AND STATISTICS	4.5	-	3.0	MATH23-1		MATH
		MEC30	STATICS OF RIGID BODIES	4.5	-	3.0	PHY11, PHY11L		CEGE
		PHY12	GENERAL PHYSICS 3	3.0	-	2.0	PHY11, PHY11L		PHYSICS
		PHY12L	GENERAL PHYSICS LABORATORY 3	-	4.5	1.0	PHY11, PHY11L		PHYSICS
			STS ELECTIVE	4.5	-	3.0			CHE-CHM
			Total	19.5	9.0	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
2	4	EMG20	ENGINEERING MANAGEMENT	4.5	-	3.0			IE-EMG
		MEC31-1	DYNAMICS OF RIGID BODIES	3.0	-	2.0	MEC30		MME
		PHY13	GENERAL PHYSICS 4	3.0	-	2.0	PHY12, PHY12L		PHYSICS
		PHY13L	GENERAL PHYSICS LABORATORY 4	-	4.5	1.0	PHY12, PHY12L	PHY13	PHYSICS
		PHY13X	GENERAL PHYSICS EXIT EXAM	-	-	0.0	PHY12, PHY12L	PHY13, PHY13L	PHYSICS
		SSE01	SOCIAL SCIENCE ELECTIVE	4.5	-	3.0			SLHS
			STS ELECTIVE	4.5	-	3.0			
Total			19.5	4.5	14.0				

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	1	CHM140	BASIC ORGANIC CHEMISTRY 1	3.0	-	2.0	CHM12-2		CHE-CHM
		ENV20	INTRODUCTION TO ENVIRONMENTAL ENGINEERING	3.0	-	2.0	CHM12-2		CHE-CHM
		MSE104-1	PRINCIPLES OF METALLURGY	4.5	-	3.0	CHM111-1, CHM111-1L		CHE-CHM
		MSE20	FUNDAMENTALS OF MATERIALS SCIENCE AND ENGINEERING	4.5	-	3.0	PHY13, PHY13L, PHY13X, CHM12-2		CHE-CHM
		MSE21L	MEASUREMENTS IN MATERIALS SCIENCE AND ENGINEERING	-	9.0	2.0	PHY13, CHM12-2	MSE20	CHE-CHM
			SPECIALIZATIONS			3.0			CHE-CHM
			Total	15.0	9.0	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	2	EE20	ELEMENTARY ELECTRICAL ENGINEERING	4.5	-	3.0	PHY12, PHY12L, MATH24-1		EECE
		MEC32	MECHANICS OF DEFORMABLE BODIES	4.5	-	3.0	MEC30		CEGE
		MSE101	SEMICONDUCTOR MATERIALS AND PROCESSES	4.5	-	3.0	MSE20		CHE-CHM
		MSE102-0	THERMODYNAMICS AND PHASE EQUILIBRA OF MATERIALS	4.5	-	3.0	MSE20, CHM111-1		CHE-CHM
		MSE102L	THERMODYNAMICS AND PHASE EQUILIBRA OF MATERIALS LABORATORY	-	4.5	1.0			CHE-CHM
		MSE103-1	ANALYTICAL TECHNIQUES IN MATERIALS SCIENCE AND ENGINEERING	1.5	-	1.0	MSE20, MSE21L		CHE-CHM
		MSE103-1L	ANALYTICAL TECHNIQUES IN MATERIALS SCIENCE AND ENGINEERING LABORATORY	-	4.5	1.0	MSE20, MSE21L	MSE103-1	CHE-CHM
Total				19.5	9.0	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	3	BIO20	INTRODUCTION TO BIOMIMETICS ENGINEERING AND COMPONENT DESIGN	4.5	-	3.0	MATH22-1		CHE-CHM
		MSE105-1	PHYSICAL METALLURGY 1	4.5	-	3.0	MEC32, MSE102-0		CHE-CHM
		MSE105-1L	PHYSICAL METALLURGY LABORATORY 1	-	4.5	1.0	MEC32, MSE102-0	MSE105-1	CHE-CHM
			SPECIALIZATIONS			7.0			CHE-CHM
			Total	9.0	4.5	14.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	4	MSE108L	COMPUTER APPLICATIONS IN MATERIALS SCIENCE AND ENGINEERING	-	9.0	2.0	CS10-1L		CHE-CHM
		RES100-7	METHODS OF RESEARCH	3.0	-	2.0	MATH30-7		CHE-CHM
			SPECIALIZATIONS			11.0			CHE-CHM
			Total	3.0	9.0	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
4	1	CE140-1P	MECHANICS OF FLUIDS	3.0	4.5	3.0	MEC31-1, PHY12, PHY12L		CEGE

	MSE114-1	POWDER METALLURGY	4.5	-	3.0	MSE104-1		CHE-CHM
	MSE40	ECONOMIC ANALYSIS OF MATERIALS SCIENCE AND ENGINEERING	4.5	-	3.0			CHE-CHM
		SPECIALIZATIONS			6.0			CHE-CHM
Total			12.0	4.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
4	2	ENG13	ENGLISH FOR THE WORKPLACE 2	4.5	-	3.0	ENG12		SLHS
		MSE116	CERAMIC MATERIALS	4.5	-	3.0	MSE20		CHE-CHM
		MSE117	PLANT DESIGN 1	3.0	-	2.0	MSE40		CHE-CHM
		MSE200L	THESIS 1	-	4.5	1.0	RES100-7		CHE-CHM
		MSE70	LAWS, CONTRACTS AND ETHICS	3.0	-	2.0			CHE-CHM
			SPECIALIZATIONS			4.0			CHE-CHM
			Total	15.0	4.5	15.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co- requisites	Caretaker
4	3	MSE117L	PLANT DESIGN LABORATORY 1	-	9.0	2.0	MSE117		CHE-CHM
		MSE200-1L	THESIS 2	-	4.5	1.0	MSE200L		CHE-CHM
		MSE60	NUMERICAL METHODS	4.5	-	3.0	MATH24-1		CHE-CHM
		SFTY100	SAFETY ENGINEERING MANAGEMENT	1.5	-	1.0			CCESC
		SSE02	SOCIAL SCIENCE ELECTIVE	4.5	-	3.0			SLHS
			Total	10.5	13.5	10.0			

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co- requisites	Caretaker
4	4	MSE199R	ON-THE-JOB TRAINING	-	24.0	3.0	MSE117L		CHE-CHM
		MSE200-2L	THESIS 3	-	4.5	1.0	MSE200-1L		CHE-CHM
			Total	0.0	28.5	4.0			

SPECIALIZATIONS : 31 UNITS

ADVANCED MATERIALS

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker	
3	1	MSE100-0	ELECTRICAL AND MAGNETIC MATERIALS	4.5	-	3.0	PHY13, PHY13L, CHM12-2		CHE-CHM	
	3	MSE106-2	PRINCIPLES OF SEMICONDUCTOR DEVICES	4.5	-	3.0	MSE101		CHE-CHM	
		MSE107-0	THIN FILM PROCESSING	4.5	-	3.0	MSE102-0	MSE106-2	CHE-CHM	
		MSE107-0L	THIN FILM PROCESSING LABORATORY	-	4.5	1.0	MSE102-0	MSE107-0, MSE106-2	CHE-CHM	
	4	MSE109-0	FAILURE ANALYSIS AND MATERIALS TESTING	4.5	-	3.0	MSE107-0, MSE107-0L		CHE-CHM	
		MSE109-0L	FAILURE ANALYSIS AND MATERIALS TESTING LABORATORY	-	4.5	1.0	MSE107-0, MSE107-0L	MSE109-0	CHE-CHM	
		MSE110-0	INTRODUCTION TO NANOTECHNOLOGY	4.5	-	3.0	MSE107-0, MSE107-0L		CHE-CHM	
		MSE111-2	POLYMER MATERIALS AND PROCESSES	4.5	-	3.0	CHM140, MSE20		CHE-CHM	
		MSE111-2L	POLYMER MATERIALS AND PROCESSES LABORATORY	-	4.5	1.0	CHM140, MSE20	MSE111-2	CHE-CHM	
		1	MSE112-0	SPECIAL TOPICS IN MSE	3.0	-	2.0	MSE109-0, MSE109-0L		CHE-CHM
	MSE113-2		RATE PROCESSES IN MSE	4.5	-	3.0	MSE102-0, MSE102L		CHE-CHM	
	MSE113-2L		RATE PROCESSES IN MSE LABORATORY	-	4.5	1.0	MSE102-0, MSE102L	MSE113-2	CHE-CHM	
	2		MSE115	COMPOSITE MATERIALS	4.5	-	3.0	MSE112-0	MSE116	CHE-CHM
			MSE115L	COMPOSITE MATERIALS LABORATORY	-	4.5	1.0	MSE112-0	MSE115, MSE116	CHE-CHM
Total			39.0	22.5	31.0					

METALLURGY

Yr	Qtr	Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co-requisites	Caretaker
3	1	GEO107	PRINCIPLES OF MINING	4.5	-	3.0	GEO100		CHE-CHM
	3	MSE106-1	METALLURGICAL ANALYSIS	1.5	-	1.0	CHM12-2		CHE-CHM
		MSE106-1L	METALLURGICAL ANALYSIS LABORATORY	-	9.0	2.0	CHM111-1L, CHM111-1	MSE106-1	CHE-CHM
		MSE107-1	MINERAL PROCESSING 1	4.5	-	3.0	MSE104-1, GEO111P		CHE-CHM
		MSE107-1L	MINERAL PROCESSING LABORATORY 1	-	4.5	1.0	MSE104-1, GEO111P	MSE107-1	CHE-CHM
	4	MSE109-1	PHYSICAL METALLURGY	4.5	-	3.0	MSE105-1, MSE105-1L		CHE-CHM

4	1	MSE109-1L	PHYSICAL METALLURGY LABORATORY	-	4.5	1.0	MSE105-1, MSE105-1L	MSE109-1	CHE-CHM
		MSE110-1	FUELS AND REFRACTORIES	4.5	-	3.0	CHM111-1L, CHM111-1		CHE-CHM
		MSE111-1	MINERAL PROCESSING 2	4.5	-	3.0	MSE107-1, MSE107-1L		CHE-CHM
		MSE111-1L	MINERAL PROCESSING LABORATORY 2	-	4.5	1.0	MSE107-1, MSE107-1L	MSE111-1	CHE-CHM
		MSE112-1	FOUNDRY SCIENCE	3.0	-	2.0	MSE109-1, MSE109-1L		CHE-CHM
	2	MSE113-1	EXTRACTIVE METALLURGY 1	4.5	-	3.0	MSE111-1, MSE111-1L		CHE-CHM
		MSE113-1L	EXTRACTIVE METALLURGY LABORATORY 1	-	4.5	1.0	MSE111-1, MSE111-1L	MSE113-1	CHE-CHM
		MSE115-1	EXTRACTIVE METALLURGY 2	4.5	-	3.0	MSE113-1, MSE113-1L		CHE-CHM
		MSE115-1L	EXTRACTIVE METALLURGY LABORATORY 2	-	4.5	1.0	MSE113-1, MSE113-1L	MSE115-1	CHE-CHM
Total			36.0	31.5	31.0				

SCIENCE, TECHNOLOGY AND SOCIETY ELECTIVES : 6.0 UNITS

		Code	Title	Lec Hrs	Lab Hrs	Credit Units	Prereq.	Co- requisites	Caretaker
		BIO186	BIOENTREPRENEURSHIP AND ISSUES IN BIOTECHNOLOGY	4.5	-	3.0			CHE-CHM
		BIO99	SOCIAL STUDIES OF BIOSCIENCE AND BIOTECHNOLOGY	4.5	-	3.0			CHE-CHM
		CHE99	ENVIRONMENTAL CONFLICTS AND SOCIAL CHANGE	4.5	-	3.0			CHE-CHM
		BIO99-1	CONFLICTS AND EVOLUTION OF MODERN MEDICINE	4.5	-	3.0			CHE-CHM
		CHM99	DEVELOPMENT AND RISE OF MODERN SCIENCE	4.5	-	3.0			CHE-CHM

Total Academic Units : 215.00

SCHOOL OF CHEMICAL ENGINEERING AND CHEMISTRY

ABT190P. INDUSTRIAL MICROBIOLOGY

The course focuses in the identification, production, and purification of microbial metabolites which are important in the food industry, agriculture, medicine, and environmental bioremediation.

Credit : 3 units

Prerequisite : BIO149

ABT191P. MOLECULAR BIOLOGY AND BIOTECHNOLOGY

The course introduces basic concepts in molecular genetics, cell physiology and biochemical mechanisms involved in living systems with specific applications in medicine, agriculture and food industries.

Credit : 3 units

Prerequisite : ABT190P

ABT192. GENE BIOTECHNOLOGY

This course focuses on molecular biotechnology which includes genomics, transcriptomics, proteomics and metabolomics approaches, with special emphasis on their applications to health and environment.

Credit : 3 units

Prerequisite : ABT191P

ABT193P. BIOINFORMATICS

The course covers topics on computational models of the biological systems and mechanisms. Specifically, it involves creating algorithms, databases, systems, and web applications to solve problems in molecular biology.

Credit : 3 units

Prerequisite : ABT191P

BIO10. FUNDAMENTALS OF BIOLOGY

A general introduction to the principles and foundation of life science, the course includes topics on origin and diversity of living things; molecular, cellular, and genetic basis of life; structure and function of organisms; evolution; and ecology.

Credit : 3 units

BIO10L. FUNDAMENTALS OF BIOLOGY LABORATORY

A laboratory course to accompany BIO10, the course will cover experiments on cell biology, ecology, botany, and basic animal physiology.

Credit : 1 unit

Corequisite : BIO10

BIO15. GENERAL BIOLOGY

A general introduction to the principles and foundation of life science, the course includes topics on origin and diversity of living things; molecular, cellular, and genetic basis of life; structure and function of organisms; evolution; and ecology.

Credit : 3 units

BIO15L. GENERAL BIOLOGY LABORATORY

A laboratory course to accompany BIO15, the course will cover experiments on cell biology, ecology, botany, and basic animal physiology.

Credit : 1 unit

Corequisite : BIO15

BIO16. BIOMOLECULES, CELLS AND TISSUES

A general introduction to the principles and foundation of life science, the course includes topics on origin and diversity of living things; molecular, cellular, and genetic basis of life.

Credit : 3 units

BIO16L. GENERAL BIOLOGY LABORATORY

A laboratory course to accompany BIO16, the course will cover experiments on cell biology, ecology, botany, and basic animal physiology.

Credit : 1 unit

Corequisite : BIO16

BIO20. INTRODUCTION TO BIOMIMETICS ENGINEERING AND COMPONENT DESIGN

This course deals with the basic principles of recombinant DNA technology and physicochemical principles involved in various life processes. The course will cover biomaterials, molecular motors, biomechanics, and physiological and mathematical modeling of various biological systems

Credit : 3 units

Prerequisite : CHM12-3, MATH22-1

: CHM12-2 for GSE

BIO20-1. INTRODUCTION TO BIOELECTRONICS AND BIOINFORMATION ENGINEERING

This course deals with the basic principles of recombinant DNA technology and biological databases needed to study genomics and proteomics. The course also introduces basic principles and applications of biosensors, nanotechnology, bioelectronics, microfluidics, and biomedical engineering

Credit : 3 units

Prerequisite : CHM12-3

BIO22-1. HUMAN BIOLOGY 1

The course covers the basic principles of life sciences such as cell biology, homeostasis, and physiology. Emphasis will be on the biological principles involved in the normal functioning of skeletal, muscular, and integumentary system.

Credit : 3 units

Prerequisite : BIO10

BIO22-1L. HUMAN BIOLOGY LABORATORY 1

This laboratory course provides basic background on the principles of human biology.

Credit : 1 unit
Prerequisite : BIO10L
Corequisite : BIO22-1

BIO23-1. HUMAN BIOLOGY 2

This course emphasizes the other functional systems in humans such as endocrine, immune, digestive, nervous, cardiovascular, respiratory and excretory systems.

Credit : 3 units
Prerequisite : BIO22-1

BIO23-1L. HUMAN BIOLOGY LABORATORY 2

A course that exposes students to various laboratory protocols in the study of human physiology.

Credit : 1 unit
Corequisite : BIO23-1
Prerequisites : BIO22-1, BIO22-1L

BIO23P. BIOLOGICAL ENGINEERING CALCULATIONS 1

This is an introductory course on material and energy balances for both reactive and nonreactive processes commonly encountered in bioengineering.

Credit : 2 units
Prerequisites : CHM13-2P, MATH22-1

BIO24P. BIOLOGICAL ENGINEERING CALCULATIONS 2

This is an introductory course on material and energy balances with specific applications in bioengineering

Credit : 2 units
Prerequisites : BIO23P

BIO25. TRANSPORT PROCESSES IN BIOENGINEERING 1

This course discusses the theoretical and practical bases to understand and quantify transport phenomena (mass, energy and momentum) motivated by relevant examples in chemical and biochemical engineering.

Credit : 2 units
Prerequisite : BIO24P, MATH24-1

BIO25-1. TRANSPORT PROCESSES IN BIOENGINEERING 2

This course covers specific applications of transport processes involved in bioengineering. This includes drug transport, diffusion in cells and tissues and heat transfer in animal kingdoms.

Credit : 2 units
Prerequisite : BIO25

BIO26. MATHEMATICAL METHODS IN BIOENGINEERING

The course covers a blend of analytical and numerical techniques for solving problems in diverse areas of bioengineering. The course emphasizes on curve-fitting and solving problems which require numerical methods for solving common and special ODE's and PDE's.

Credit : 3 units
Prerequisite : MATH24-1, MATH15-1

BIO27. BIOPROCESS ENGINEERING

The course deals with calculations and design of bioprocesses, bioreactors, enzyme kinetics and fermentation.

Credit : 2 units
Prerequisites : BIO30, CHE143-1

BIO27-1. BIOREACTOR ENGINEERING

Analyses and design of bioreactors of batch, fed-batch, and continuous flow types are covered in this course.

Credit : 2 units
Prerequisites : BIO27

BIO30. BIOSEPARATIONS

A course that introduces to the students the various processes used by industries in the separation of proteins and other biological compounds. The course will also cover topics on the principles underlying the following unit operations such as adsorption, absorption, and extraction processes.

Credit : 2 units
Prerequisite : BIO25, CHE27, CHM171P

BIO92D. PROCESS DESIGN FOR BIOLOGICAL ENGINEERING

The course deals extensively with the application of rules-of-thumb or heuristics in the design of processes in the various fields of biological engineering.

Credit : 3 units
Prerequisites : BIO25-1, BIO27-1, CHE40, CHE144

BIO99. SOCIAL STUDIES OF BIOSCIENCE AND BIOTECHNOLOGY

Credited as *Science, Technology, and the Society* course, this discusses the social, ethical, and clinical issues associated with the development of new biotechnologies and their integration into practice. To be discussed are readings on changing political economy of biotech research, problems associated with new biotechnologies and findings from molecular biology for clinical settings, the ethical issues that emerge from clinical research and clinical use of new technologies, and the broader social ethics of access and inequality.

Credit : 3 units

BIO99-1. CONFLICTS AND EVOLUTION OF MODERN MEDICINE

Credited as *Science, Technology, and the Society* course, this presents profound knowledge of past and present paradigms in the development of medicine. It also covers topics on the cultural, geographical and philosophical conflicts in the development of modern medicine and the role of the multibillion-dollar pharmaceutical companies.

Credit : 3 units

BIO105. BIOLOGICAL PRINCIPLES FOR THE COMPUTATIONAL SCIENCES

The course deals with the basic principles of life sciences such as cell biology, ecology, and physiology. The emphasis of this course will be on acquisition and retrieval of biological databases.

Credit : 3 units

BIO106L. INTRODUCTION TO BIOINFORMATICS

LABORATORY

This laboratory course introduces the basic principles of bioinformatics with emphasis on the usage of various software for genomic and proteomic analyses.

Credit : 1 unit

Prerequisite : BIO105

BIO129-1. BIOMEDICAL ENGINEERING

This course covers basic principles of physiology, bioelectronics, design of biosensors and biomedical devices and their applications.

Credit : 3 units

Prerequisite : BIO165-1, ECE20

BIO136-2. MICROBIOLOGY AND IMMUNOLOGY

The course deals with the biology of major groups of bacteria, and viruses. This also includes topics in basic immunology.

Credit : 3 units

Prerequisite : BIO152-1

BIO136-2L. MICROBIOLOGY AND IMMUNOLOGY LABORATORY

A laboratory course to accompany BIO151, this covers the basic techniques in the isolation, characterization, and handling of microorganisms.

Credit : 1 unit

Prerequisites : BIO152-1

Corequisite : BIO136-2

BIO140-1. INDUSTRIAL MICROBIOLOGY

This subject deals with the study of microorganisms that are of industrial importance. This course also includes microbial and fungal biotechnology and genetics, large scale fermentation processes, and processing of products obtained from microorganisms.

Credit : 3 units

Prerequisite : BIO136-2

BIO149. BIOTECHNOLOGY

A course that provides basic knowledge on the commercial applications of living organisms or of substances derived from living organisms involving the deliberate manipulation of their DNA molecules. Emphasis on the following key areas of biotechnology: human health biotechnology, animal biotechnology, industrial biotechnology, plant biotechnology, and environmental biotechnology.

Credit : 3 units

Prerequisite : CHM143 or CHM146

BIO152-1. FUNDAMENTALS OF GENETICS AND BIOTECHNOLOGY

This course provides introductory concepts in Mendelian and non-Mendelian genetics and the basic aspects of molecular biotechnology.

Credit : 3 units

Prerequisite : BIO16

BIO152-1L. FUNDAMENTALS OF GENETICS AND BIOTECHNOLOGY LABORATORY

This laboratory course exposes students to the basic concepts of genetics of *Drosophila*, yeasts, and bacteria.

Credit : 1 unit

Prerequisites : BIO16, BIO16L

Corequisite : BIO152-1

BIO153-2. FUNDAMENTALS OF BIOENGINEERING

This is an introductory course in bioengineering which covers topics on biomaterials, biomimetics, bioprocesses and tissue engineering

Credit : 3 units

Prerequisite : BIO152-1

BIO162-2. PHYSIOLOGY FOR BIOENGINEERS

The course covers basic concepts in the study of function of various organ systems of selected organisms.

Credit : 3 units

Prerequisite : BIO153-2

BIO165-1. MOLECULAR CELL BIOLOGY 1

The topic covers chemical foundations of the living cell, cellular respiration, bioelectricity, photosynthesis, membrane physiology, signal transduction, organelle biology and different techniques in studying cell structure and function.

Credit : 3 units

Prerequisite : BIO162-2

BIO165-2. MOLECULAR CELL BIOLOGY 2

The course covers gene expression in prokaryotes, eukaryotes and viruses. Other topics include techniques to study gene expression, cancer and developmental biology.

Credit : 3 units

Prerequisite : BIO165-1

BIO170-1L. MOLECULAR TECHNIQUES IN BIOENGINEERING LABORATORY 1

A course designed to provide students hands-on experience in the basic laboratory techniques used in biological engineering.

Credit : 1 unit

Prerequisite : BIO136-2

BIO170-2L. MOLECULAR TECHNIQUES IN BIOENGINEERING LABORATORY 2

A course that exposes students to the various techniques employed in fermentation, bioseparations and other advanced techniques employed in biological engineering.

Credit : 1 unit

Prerequisite : BIO170-1L

BIO172-1. PRINCIPLES OF ENVIRONMENTAL BIOTECHNOLOGY

The course will cover microbial ecology, bioremediation, bio-film kinetics, environmental microbiology and applications of recombinant DNA technology in environmental sciences.

Credit : 3 units

Prerequisite : BIO23P

BIO182P. BIOINFORMATICS 1

This course provides the students the basic principles of computing and their application in organizing, comparing, and analyzing biological data generated at all levels from molecular to the macro. It exposes and trains students in the various computer programs and biological database, and in the use of the internet in the study and practice of biotechnology.

Credit : 2 units

Prerequisites : BIO153-2, CS10-1L

BIO185-1. BIOETHICS

The course studies the reasonableness of human choices which are relevant to medical practice, biotechnology and bioengineering research and practice.

Credit : 2 units

BIO186. BIOENTREPRENEURSHIP AND ISSUES IN BIOTECHNOLOGY

Credited as *Science, Technology and the Society* course, this the principles and processes in business and management focusing on bio-industries. It emphasizes the applications of these principles by assisting students conceptualize, develop, and implement entrepreneurial projects. It also includes technology scanning, venture capital, and start-up companies which are characteristic of biotechnology industries. Current issues in biotechnology will also be covered in this course.

Credit : 3 units

BIO188-1. BIOMATERIAL SCIENCE AND ENGINEERING

The course covers the applications and uses of biomaterials in the field of engineering.

Credit : 3 units

Prerequisite : BIO153-2

BIO188-2. STEM CELL AND TISSUE ENGINEERING

This is an introductory course on the study and application of stem cells for organ and tissue transplants and includes the biology, tools, and theoretical information needed to design tissues and organs, medical applications as well as economic, regulation, and ethical issues.

Credit : 3 units

Prerequisite : BIO165-1

BIO190-1. BIOMECHANICS 1

This is the application of physics principles to the field of bioengineering with emphasis on mammalian and human systems.

Credit : 2 units

Prerequisite : PHY13, BIO162-2

BIO190-2. BIOMECHANICS 2

This is the application of physics principles to the field of bioengineering with emphasis on invertebrates and lower forms of animal species.

Credit : 2 units

Prerequisite : BIO190-1

BIO192-1. MOLECULAR BIOMIMETICS

This course presents the various advances in molecular bioengineering which involves biologically inspired components.

Credit : 2 units

Prerequisite : BIO165-1

BIO197L. BIOINFORMATICS 2 LABORATORY

This second Bioinformatics course covers topics on Perl programming, statistical methods, and various modeling tools in the study of bioinformatics.

Credit : 1 unit

Prerequisite : BIO182P

BIO198-1. GENE BIOTECHNOLOGY

A course that deals with the detailed processes involved in genetic engineering such as isolation, cloning, characterization of gene function, gene expression, and protein interactions. The course also covers the current molecular techniques used in gene manipulation and analysis.

Credit : 3 units

Prerequisite : BIO165-1

BIO198R. BIOLOGICAL ENGINEERING PRACTICE

A course that is designed for students to undergo training in various fields of biological engineering in existing industries or consultancy and research institutions in the Philippines (or abroad). It involves 1 quarter-term of fieldwork (minimum of 240 hours) in selected industrial, consultancy, or research firm.

Credit : 2 units

Prerequisite : BIO25-1, CHM161

BIO27-1, BIO190-2 (BE)

BIO200-0L. THESIS 1

In this course, the student performs the experimental part of the research proposal and is expected to have performed at least half of the activities in the methodology.

Credit : 1 unit

Prerequisite : CHM198-1

Credit : 3 units

Prerequisites : CHE28, CHE143-1

BIO200-1L. THESIS 2

In this course, the student completes the experimental part of the research and is required to submit documentation of the results and present observations, interpretations, conclusions and recommendations before a faculty panel.

Credit : 1 unit

Prerequisite : BIO200-0L

CHE21-1P. CHEMICAL AND BIOCHEMICAL PROCESS CALCULATIONS

This is an introductory course on material and energy balances for both reactive and nonreactive processes commonly encountered in chemical and biochemical processes.

Credit : 3 units

Prerequisites : CHM13-2P, MATH22

CHE25. FUNDAMENTALS OF TRANSPORT PROCESSES 1

This course discusses the theoretical and practical bases to understand and quantify transport phenomena (mass, energy and momentum) motivated by relevant examples in chemical and biochemical engineering.

Credit : 2 units

Prerequisite : CHE21-1P, MATH24-1

CHE26. FUNDAMENTALS OF TRANSPORT PROCESSES 2

This course is a continuation of CHE 25 which emphasizes applications of transport processes in various chemical and biological engineering.

Credit : 2 units

Prerequisite : CHE25

CHE27. CHEMICAL THERMODYNAMICS

The course deals with the applications of the laws of thermodynamics in steady- and unsteady-state systems with some emphases on biochemical systems.

Credit : 3 units

Prerequisite : CHM170P

CHE28. BIOSEPARATIONS

A course that introduces to the students the various processes used by industries in the separation of proteins and other biological compounds. The course will also cover topics on the principles underlying the following unit operations such as adsorption, absorption, and extraction processes.

Credit : 2 units

Prerequisite : CHE25, CHE27, CHM171P

CHE29. PRINCIPLES OF BIOCHEMICAL ENGINEERING

The course deals with bioreactor design for processing of biological materials and processing using biological agents such as microbial cells and enzymes.

CHE38. FUNDAMENTALS OF BIOREACTOR DESIGN

Analyses and design of bioreactors of batch, fed-batch, and continuous flow types. Microbial reactors with and without cell recycles. Bioreactor operations for industrial-important biological products and for biological treatment of wastewater

Credit : 3 units

Prerequisites : CHE29

CHE40. ENGINEERING ECONOMY

This is a course that deals with the study of the principles of time-value of money, capital investment decisions, cost accounting, comparison of alternatives and optimization of unit operations equipment for plant design.

Credit : 3 units

Prerequisite : MATH24-1

CHE50P. MATHEMATICAL METHODS IN CHEMICAL ENGINEERING

The course covers a blend of analytical and numerical techniques for solving problems in diverse areas of chemical engineering. The course emphasizes on curve-fitting and solving problems which require numerical methods for solving common and special ODE's and PDE's.

Credit : 3 units

Prerequisite : MATH24-1, MATH15-1, MATH16-1L

CHE70-1. CHE LAWS AND ETHICS

The course deals with the legal and ethical issues pertaining to the practice of chemical engineering. Topics include ethics in research, intellectual property, patents, environmental regulations, contracts, and a detailed discussion of the implementing guidelines of the Chemical Engineering Law of 2004.

Credit : 2 units

Prerequisites : CHE101 for CCE

Corequisites : CHE181-1D for CHE
ENV110-1 for CCE

CHE99. ENVIRONMENTAL CONFLICTS AND SOCIAL CHANGE

Credited as *Science, Technology, and the Society* course, this explores the complex interrelationships among humans and the natural environment. It uses environmental conflict to draw attention to competing understandings and uses of "nature" as well as the local, national and transnational power relationships in which environmental interactions are embedded. In addition to utilizing a range of theoretical perspectives, this subject draws upon a series of ethnographic case studies of environmental conflicts in various parts of the world.

Credit : 3 units

CHE101. INTRODUCTION TO CHEMICAL ENGINEERING

The course introduces the students to different aspects of chemical engineering and to the roles of chemical engineers in different industries, in the preservation of environment and in research and development through exposure to plant visits, seminars, interaction with practicing professional chemical engineers and senior chemical engineering students.

Credit : 1 unit

Prerequisite : CHM13-2P

CHE111P. CHEMICAL ENGINEERING CALCULATIONS 1

This is a course that introduces the students to units and dimensions of measures of physical and chemical properties of materials commonly encountered in chemical engineering calculations and, more importantly, to material and energy balances for non-reactive processes.

Credit : 3 units

Prerequisites : CHM111 or CHM112, CHE101, MATH15-1

CHE112P. CHEMICAL ENGINEERING CALCULATIONS 2

A continuation of CHE111P, this course covers material and energy balances for reactive processes with emphases on combustion of fuels and reactions in common chemical process industries.

Credit : 3 units

Prerequisite : CHE111P

CHE121-1P. CHEMICAL ENGINEERING THERMODYNAMICS 1

This course deals with the applications of first and second laws of thermodynamics to close and open systems, volumetric properties of pure substances, the use of thermodynamic diagrams and tables, and application of equations of state for ideal and non-ideal fluids.

Credit : 3 units

Prerequisites : CHE112P, CHM170P

CHE122-1. CHEMICAL ENGINEERING THERMODYNAMICS 2

This course deals with thermodynamic analysis of power plants and refrigeration cycles. It also introduces the students to statistical thermodynamics, thermodynamics of solutions, and chemical equilibrium.

Credit : 3 units

Prerequisite : CHE121-1P

CHE122-1X. MATERIAL BALANCES AND PROCESS THERMODYNAMICS EXIT EXAM

This examination is a generalized knowledge test administered to show proficiency of chemical engineering students in Chemical Engineering Calculations and Chemical Engineering Thermodynamics.

Prerequisite : CHE112P, CHE121-1P

Corequisite : CHE122-1

CHE123-2. THERMODYNAMICS OF MATERIALS

This course involves treatment of the laws of thermodynamics and their applications to equilibrium and the properties of materials, electrochemical equilibrium and surface thermodynamics. It provides a foundation to treat general phenomena in materials science and engineering, including chemical reactions, magnetism, polarizability, and elasticity.

Credit : 3 units

Prerequisite : CHE194-2

CHE130-1P. PRINCIPLES OF TRANSPORT PROCESSES

This course discusses the theoretical and practical bases to understand and quantify transport phenomena (mass, energy, and momentum) motivated by examples and applications relevant to chemical engineering. Both molecular and macroscopic principles will be covered highlighting the unifying principles underlying transport processes and properties.

Credit : 3 units

Prerequisites : CHE121-1P, MATH24-1

Corequisite : CHE134-1P

CHE133-1P. HEAT AND MASS TRANSFER APPLICATIONS

This course discusses the applications of heat and mass transfer in the design of process and equipment employing heat exchange, mass exchange, and simultaneous heat and mass exchange. To be covered are evaporation, crystallization, humidification / dehumidification operations (e.g., water-cooling, air-conditioning, and drying), and the operations of heat exchangers and packed columns.

Credit : 3 units

Prerequisite : CHE130-1P, CHE134-1P

Corequisite : CHE134-1P

CHE134-1P. FLOW OF FLUIDS

This course deals with the fundamental concepts of the two branches of fluid mechanics (statics and dynamics) which are important in unit operations. The combined Mass, Energy and Momentum balances are applied in compressible or incompressible fluid flow, branching of fluids in transport, steady or unsteady flow, including metering of fluids that are important in the design of fluid flow piping network. The course ends with the discussion on the design of different types of filtration equipment operated at constant pressure, constant rate or combined constant pressure and constant rate. Design of continuous rotary vacuum filter is also discussed.

Credit : 3 units

Prerequisite : CHE121-1P

Corequisite : CHE130-1P

CHE135-1P. SEPARATION PROCESSES

This course covers discussions on principles of equilibrium separation (distillation, extraction, absorption and adsorption) and membrane separation processes (microfiltration, gas permeation, reverse osmosis and pervaporation).

Credit : 3 units
Prerequisites : CHE122-1, CHE133-1P,
CHE122-1X for CCE

**CHE135-1X. TRANSPORT AND SEPARATION PROCESSES
EXIT EXAM**

This examination is a generalized knowledge test administered to show proficiency of chemical engineering students in Momentum, Heat, and Mass Transfer, Fluid and Particle Mechanics, and Separation Processes.

Prerequisite : CHE133-1P, CHE134-1P for CCE
Corequisite : CHE135-1P, CHE136-1 for CCE

CHE136-1. INTRODUCTION TO PARTICLE TECHNOLOGY

This course is intended to provide background material in particle technology, focusing on characterization, behavior, production, separation, and modeling of particulate systems and surveying engineering processes that involve particulates and powders. Multiphase transport phenomena and fluidization are also discussed.

Credit : 2 units
Prerequisite : CHE134-1P

CHE142-1. BIOCHEMICAL ENGINEERING

The course deals with bioreactor design for processing of biological materials and processing using biological agents such as microbial cells and enzymes.

Credit : 3 units
Prerequisites : BIO149, CHE143-1

**CHE142-1X. PROCESS INDUSTRIES AND ENVIRONMENTAL
ENGINEERING EXIT EXAM**

This examination is a generalized knowledge test administered to show proficiency of chemical engineering students Chemical Reaction Engineering, Environmental Engineering and Environmental Safety, and Biochemical Engineering.

Prerequisite : BIO149, CHE143-1, ENV110-1
Corequisite : CHE142-1

CHE143-1. CHEMICAL REACTION ENGINEERING 1

This course covers discussions on ideal reactor models, chemical kinetics, and interpretation and analysis of kinetic data from homogeneous reactions for use in isothermal reactor design.

Credit : 2 units
Prerequisites : CHM171P, MATH24-1 for BE, BECM
CHE50P for CHE, CCE

**CHE144. REACTION ENGINEERING FOR HETEROGENEOUS
SYSTEMS**

The course deals with kinetics and reactor design for heterogeneous systems.

Credit : 2 units
Prerequisite : CHE143-1

CHE145-1. CHEMICAL REACTION ENGINEERING 2

This course covers topics on reactor design for complex reactions, non-isothermal reactions and heterogeneous reactions.

Credit : 2 units
Prerequisites : CHE130-1P, CHE143-1

CHE150-1L. CHEMICAL ENGINEERING LABORATORY 1

This laboratory course gives hands-on experience to chemical engineering undergraduates on the application of chemical engineering principles in the operation and design of equipment in particulates handling and fluid flow. The principles involved in some of the experiments (size reduction, screening, centrifugation, etc.) will also be emphasized before the corresponding experiments or exercises.

Credit : 1 unit
Prerequisite : CHE134-1P

CHE151-1L. CHEMICAL ENGINEERING LABORATORY 2

A continuation of CHE150L, this laboratory course covers the use of equipment for heat and mass transfer operations, chemical reaction, and separation.

Credit : 1 unit
Prerequisites : CHE135-1P, CHE150-1L

**CHE160-1L. COMPUTER APPLICATIONS IN CHEMICAL
ENGINEERING**

This laboratory course is designed to make students solve some chemical engineering problems by creating computer programs or use of available software, or both.

Credit : 1 unit
Prerequisites : CHE133-1P, CHE50P

CHE170-1. CHEMICAL PROCESS INDUSTRIES

The course covers a comprehensive review of the industrial processing of naturally-occurring raw materials into base chemicals, intermediate chemicals, and consumer products. There will be an emphasis on the various manufacturing operations and processes involved in selected organic and inorganic chemical process industries, particularly those existing in the Philippines and the region.

Credit : 3 units
Prerequisites : CHE112P, CHM144

CHE180-1. PROCESS AND EQUIPMENT DESIGN

The course deals extensively with the application rules-of-thumb or heuristics in the design of processes and equipment industrial plants, particularly on piping, pumps, pressure vessels, heat and mass transfer equipment, materials handling, and selection of materials of construction.

Credit : 2 units
Prerequisites : CHE135-1P, CHE136-1, CHE135-1X
Corequisite : CHE181-1D

CHE181-1D. PLANT DESIGN 1

The course describes the different strategies in the design of chemical products and processes, which utilize the students' theoretical knowledge of chemical engineering

principles (material and energy balances, transport phenomena, thermodynamics, kinetics, and separation processes), fundamentals of process safety, and environmental concerns as applied to optimum design of a chemical process plant. Further, the course is designed to accustom the students to the kinds of designs and economic analyses which they may be called upon to perform when they enter industry.

Credit : 1 unit

Prerequisites : CHE135-1P, CHE136-1, CHE135-1X

Corequisite : CHE180-1

CHE182-1. PLANT DESIGN 2

A continuation of Plant Design 1 (CHE180-1), the course gives the students the opportunity to apply the strategies learned in CHE180 and CHE181D to a design project assigned to them.

Credit : 2 units

Prerequisites : CHE180-1, CHE181-1D, CHE183-1, CHE70-1

CHE183-1. CHEMICAL PROCESS SAFETY

The course covers discussions on the principles and applications of technical fundamentals of chemical process safety including toxicology, industrial hygiene, source models, toxic release and dispersion models, designs to prevent fires and explosions, reliefs, hazards identification, risk assessment, and accident investigations.

Credit : 3 units

Prerequisites : CHE170-1, ENV110-1

CHE184X. PROCESS DESIGN EXIT EXAM

This examination is a generalized knowledge test administered to show proficiency of chemical engineering students in Process and Equipment Design, Plant Design 1, and Process Dynamics and Control.

Prerequisite : CHE180-1, CHE181-1D, CHE184-1P

Corequisite : CHE182-1

CHE184-1P. PROCESS DYNAMICS AND CONTROL

The course covers process modeling based on material and energy balances for use in the design of process control systems. It also covers the study of principles and operations of a wide variety of process instruments and proper selection thereof for practical industrial application. A laboratory component of the course is essential to apply simulate industrial applications of some process control theories.

Credit : 3 units

Prerequisites : CHE50P, CHE170-1

CHE185-1. INDUSTRIAL WASTE MANAGEMENT AND CONTROL

This course covers the study of the different environmental management programs applied to the industry, which includes Environmental Impact Assessment, Environmental Management System, Risk Assessment, Life Cycle Analysis, Pollution Prevention and

Waste Treatment (wastewater, air pollutants, solid, and hazardous waste).

Credit : 3 units

Prerequisites : CHE170-1, ENV110-1

CHE188-1. QUANTITATIVE METHODS IN MANAGEMENT

The course introduces the students to quantitative decision-making tools. It covers decision models for planning, decision-making, resource allocation, and control. More specifically, these models are discussed in the context of linear programming, transportation and assignment, network models, queuing and waiting times, project control, and inventory management. These models are applied in solving decision problems to improve the efficiency of operations.

Credit : 3 units

Prerequisite : CHE40, CHE50P, EMG20

CHE189-1F. PLANT VISITS AND SEMINARS

The seminars to be conducted in this course are on important topics that are of immediate concern and are not formally covered in the required courses in the program. Plants visits are conducted to enhance the learning and experience of the students in the program.

Credit : 1 unit

Prerequisite : CHE182-1 for CHE

: CHE181-1D for CCE

CHE190-2. INTRODUCTION TO FOOD SCIENCE AND ENGINEERING

The scope of this course includes the following: food components, food decay and its prevention, unit operations in food processing, practical technologies, food quality, food safety, contemporary issues and ethics in food engineering.

Credit : 3 units

Prerequisites : CHE133-1P

CHE191-2. FOOD ENGINEERING UNIT OPERATIONS A

In this course the concept of food processing is introduced as a series of unit operations with emphasis on handling of food raw materials, characteristics of particulate materials, size reduction, mixing and agitation, and physical separation operations such as filtration, sedimentation, centrifugation, and crystallization.

Credit : 3 units

Prerequisite : CHE190 -2

CHE192-2. FOOD ENGINEERING UNIT OPERATIONS B

This course covers analysis and design of unit operations used in food processing such as pasteurization, sterilization, freezing, drying, and other novel food preservation methods.

Credit : 3 units

Prerequisite : CHE190-2

CHE193-2. FOOD PACKAGING

This course covers the essential functions of packaging, factors affecting food spoilage, properties, type and utilization of paper-, glass-, and plastic-based packaging materials, multilayer combinations, bar-code system in packaging and package recycling.

Credit : 3 units

Prerequisite : CHE190-2

CHE194-2. MECHANICAL PROPERTIES OF MATERIALS

This course deals with the basic concepts of solid mechanics and mechanical behavior of materials, stress-strain relationships, stress transformation, elasticity, plasticity, and fracture. Case studies will be discussed.

Credit : 3 units

Prerequisites : MSE20, CHE135-1X

CHE198-1. METHODS OF RESEARCH AND EXPERIMENTAL DESIGN

This course introduces the students to the methods of the research process such literature search and review, writing methodology and designing experiments. In this course, the students are required to submit a research proposal that they will present before an examination committee.

Credit : 2 units

Prerequisites : CHE133-1P, MATH30-7

CHE199-1R. CHEMICAL ENGINEERING PRACTICE

An internship course in which the is required to undergo training for a minimum of 240 contact-hours in any activities related to chemical engineering (design, research, consulting, process, technical service) in accredited institutions or organizations in the Philippines (or abroad).

Credit : 2 units

Prerequisite : CHE70-1, CHE180-1, CHE181-1D, CHE183-1

CHE200-1L. THESIS

In this course, the student performs and completes the experimental part of the research and is required to submit documentation of the results and present observations, interpretations, conclusions, and recommendations before an examination committee. The student is also required to present the research in a research colloquium.

Credit : 1 unit

Prerequisite : CHE198-1

CHM10. FUNDAMENTALS OF CHEMISTRY

A course designed for non-engineering and non-science students. Basic concepts on atomic structure, stoichiometry, gases, thermochemistry, kinetics, and equilibria are covered.

Credit : 3 units

CHM10L. FUNDAMENTALS OF CHEMISTRY LABORATORY

This is the laboratory course to accompany CHM10, which includes practice of laboratory skills.

Credit : 2units

Corequisite : CHM10

CHM11-2. GENERAL CHEMISTRY 1

Designed for students of chemistry, biological engineering, chemical engineering, and materials science and engineering, this course covers fundamental concepts of atoms and quantum theory, the periodic table and periodic properties, chemical bonding, chemical reactions, mole concept, and stoichiometry.

Credit : 2 units

CHM11-2L. GENERAL CHEMISTRY LABORATORY 1

A laboratory course that covers experiments and exercises to enhance the students' understanding of topics in CHM11-2, practical laboratory techniques, matter and its changes, types of chemical reactions, and stoichiometry.

Credit : 1 unit

Corequisite : CHM11-2

CHM11-3. GENERAL CHEMISTRY 1

Designed for general engineering students, this course covers fundamental concepts of atoms and quantum theory, the periodic table and periodic properties, chemical bonding, chemical reactions, mole concept, and stoichiometry.

Credit : 2 units

CHM11-3L. GENERAL CHEMISTRY LABORATORY 1

A laboratory course that covers experiments and exercises to enhance the students' understanding of topics in CHM11-3, practical laboratory techniques, matter and its changes, types of chemical reactions, and stoichiometry.

Credit : 1 unit

Corequisite : CHM11-3

CHM12-2. GENERAL CHEMISTRY 2

A continuation of CHM11-2, this course aims to provide the students an understanding of the basic principles of gases, liquids and solids, phase change, solutions, reactions in aqueous solution, and thermochemistry.

Credit : 2 units

Prerequisite : CHM11-2, CHM11-2L

CHM12-2L. GENERAL CHEMISTRY LABORATORY 2

A laboratory course that covers experiments and exercises to enhance the students' understanding of topics in CHM12-2, such as, gas laws, solutions and their properties, acid-base titration, chemical kinetics, electrochemistry and corrosion, and calorimetry.

Credit : 1 unit

Prerequisite : CHM11-2, CHM11-2L

Corequisite : CHM12-2

CHM12-3. GENERAL CHEMISTRY 2

A continuation of CHM11-3, this course aims to provide the students an understanding of the basic principles of gases, liquids and solids, phase change, solutions, reactions in aqueous solution, and thermochemistry.

Credit : 2 units
Prerequisite : CHM11-3, CHM11-3L

CHM12-3L. GENERAL CHEMISTRY LABORATORY 2

A laboratory course that covers experiments and exercises to enhance the students' understanding of topics in CHM12-2, such as, gas laws, solutions and their properties, acid-base titration, chemical kinetics, electrochemistry and corrosion, and calorimetry.

Credit : 1 unit
Prerequisite : CHM11-3, CHM11-3L
Corequisite : CHM12-3

CHM13-2P. GENERAL CHEMISTRY 3

A continuation of CHM12-2, the course covers topics on chemical kinetics, chemical equilibria, ionic equilibria, electrochemistry, nuclear chemistry, and detailed gravimetric analysis.

Credit : 3 units
Prerequisites : CHM12-2, CHM12-2L
Corequisite : CHM13L

CHM13L. GENERAL CHEMISTRY LABORATORY 3

A laboratory course to accompany CHM13-2P, this covers experiments designed to enhance students' understanding of the concepts of stoichiometry, chemical kinetics, chemical equilibria, thermodynamics, and electrochemistry.

Credit : 1 unit
Prerequisites : CHM12-2, CHM12-2L
Corequisite : CHM13-2P

CHM13X. GENERAL CHEMISTRY EXIT EXAM

This exam is a generalized knowledge test administered to show proficiency of chemical engineering, chemistry, and biological engineering students in the general chemistry course series.

Prerequisite : CHM12-2
Corequisite : CHM13-2P

CHM15. GENERAL CHEMISTRY: ORGANIC AND INORGANIC

A course designed for health-science students. Basic concepts on atomic structure, stoichiometry, gases, thermochemistry, kinetics, equilibrium and concepts of organic structural theory are covered.

Credit : 3 units

CHM15L. GENERAL CHEMISTRY: ORGANIC AND INORGANIC LABORATORY

This is the laboratory course to accompany CHM15, which includes practice of laboratory skills.

Credit : 2 units
Corequisite : CHM15

CHM22-1. PHYSIOLOGICAL BIOCHEMISTRY

The course introduces various functional groups in organic chemistry. Physiological functions of carbohydrates, lipids, proteins and nucleic acids are also covered in detail

Credit : 3 units
Prerequisites : CHM10 and BIO23-1

CHM22-1L. PHYSIOLOGICAL BIOCHEMISTRY LABORATORY

A laboratory course which covers identification and characterization of carbohydrates, lipids, and proteins.

Credit : 1 unit
Prerequisites : CHM10 and BIO23-1L
Corequisite : CHM22-1

CHM23-1. NEUROBIOLOGICAL CHEMISTRY

The course deals with the physiological and biochemical mechanisms involved in the learning process, behavior, and nervous system function

Credit : 3 units
Prerequisites : CHM22-1 and CHM22-1L

CHM23-1L. NEUROBIOLOGICAL CHEMISTRY LABORATORY

The course provides students background on the physiological and biochemical analysis of substances that affect the nervous system.

Credit : 1 unit
Prerequisites : CHM22-1 and CHM22-1L
Corequisite : CHM23-1

CHM40. ORGANIC AND BIOCHEMISTRY

The course deals with basic concepts of organic structural theory and the reactions of organic compounds and biomolecules in a biological system.

Credit : 3 units
Prerequisites : CHM10, CHM10L

CHM40L. ORGANIC AND BIOCHEMISTRY LABORATORY

Designed to accompany CHM40, this laboratory course covers experiments illustrating techniques used to study organic and biomolecules, and those that illustrate their reactivity in a biological setting.

Credit : 2 units
Prerequisites : CHM10, CHM10L
Corequisite : CHM40

CHM41. BIOCHEMISTRY

The course deals with the study of the structure and function of cellular components such as proteins, carbohydrates, lipids, nucleic acids and other biomolecules.

Credit : 3 units
Prerequisites : CHM15, CHM15L

CHM41L. BIOCHEMISTRY LABORATORY

Designed to accompany CHM41, this laboratory course covers experiments illustrating techniques used to study biological substances.

Credit : 2 units
Prerequisites : CHM15, CHM15L
Corequisite : CHM41

CHM70. CHEMISTRY LAWS AND ETHICS

The course covers the study of various legal and ethical issues affecting the practice of chemistry. It includes chemistry laws, environmental laws, intellectual property laws, and business and professional ethics.

Credit : 1 unit

Prerequisites : CHM112, CHM145 for BECM, CCE

: CHM115X, CHM147X, CHM175X for CHM

CHM99. DEVELOPMENT AND RISE OF MODERN SCIENCE

Credited as a *Science, Technology, and the Society* course, this will study the development of modern science from the seventeenth century to the present, focusing not on discoveries and their discoverers but on the examination of what science is, how science has been practiced and by whom, how discoveries were made and accepted, the nature of scientific progress, the impact of science on society, and the impact of society on science. Topics will be drawn from the histories of mathematics, physics, chemistry, biology, geology, medicine, psychology, computer science, and various engineering disciplines.

Credit : 3 units

CHM110-1L. ANALYTICAL CHEMISTRY LABORATORY 1

Designed to accompany CHM110 for non-chemistry and non-chemical engineering majors, this laboratory course covers basic quantitative analytical techniques such as gravimetry and volumetry.

Credit : 1 unit

Prerequisites : CHM 13P, CHM13L

Corequisite : CHM 110

CHM111. ANALYTICAL CHEMISTRY 1

Designed for chemical engineering students, the course covers topics on acid-base equilibria, acid-base titration, complexometric titration, precipitometry, potentiometric titration, redox titration, electroanalytical techniques, sampling analysis, calibration methods, and UV, IR and AA spectroscopy.

Credit : 3 units

Prerequisites : CHM13-2P, CHM13X

CHM111-1. ANALYTICAL CHEMISTRY 1

Designed for materials science and engineering students, the course covers topics on acid-base equilibria, acid-base titration, complexometric titration, precipitometry, potentiometric titration, and redox titration.

Credit : 2 units

Prerequisites : CHM13-2P or CHM12-2

CHM111L. ANALYTICAL CHEMISTRY LABORATORY 1

This laboratory component of CHM111 covers experiments and exercises to enhance the students' understanding of basic tools and operations of analytical chemistry, data handling, measurements and calibration, gravimetric analysis and calculations, standardization techniques, acid-base titration using double indicator and

EDTA, redox titration, potentiometric titration, electroanalytical techniques, UV, IR and AA spectroscopy.

Credit : 2 units

Prerequisites : CHM13-2P

Corequisite : CHM111

CHM111-1L. ANALYTICAL CHEMISTRY LABORATORY 1

This laboratory component of CHM111-1 covers experiments and exercises to enhance the students' understanding of basic tools and operations of analytical chemistry, data handling, measurements and calibration, gravimetric analysis and calculations, standardization techniques, acid-base titration using double indicator and EDTA, redox titration, and potentiometric titration.

Credit : 1 unit

Prerequisites : CHM13-2P, CHM13L or CHM12-2, CHM12-2L

Corequisite : CHM111-1

CHM112. ANALYTICAL CHEMISTRY 1

Designed for chemical engineering students, the course covers topics on acid-base equilibria, acid-base titration, complexometric titration, precipitometry, potentiometric titration, redox titration, electroanalytical techniques, sampling analysis, and calibration methods.

Credit : 3 units

Prerequisites : CHM13-2P, CHM13L, CHM13X

Corequisite : CHM112L

CHM112L. ANALYTICAL CHEMISTRY LABORATORY 1

This laboratory component of CHM112 covers experiments and exercises to enhance the students' understanding of basic tools and operations of analytical chemistry, data handling, measurements and calibration, gravimetric analysis and calculations, standardization techniques, acid-base titration using double indicator and EDTA, redox titration, potentiometric titration, and electroanalytical techniques.

Credit : 2 units

Prerequisites : CHM13-2P, CHM13L

Corequisite : CHM112

CHM115. ANALYTICAL CHEMISTRY 2

The course introduces the concepts and principles of modern analytical chemistry through the different techniques of analytical separation and instrumental analysis. The discussions will focus on the principles, applications capabilities and limitations of modern analytical methods.

Credit : 3 units

Prerequisites : CHM112, CHM112L, CHM146, CHM146L

CHM115L. ANALYTICAL CHEMISTRY LABORATORY 2

A laboratory course to accompany CHM115 and provides actual practice of modern analytical chemistry through exposure to the different techniques of analytical separation and instrumental analysis.

Credit : 2 units

Prerequisites : CHM112, CHM112L, CHM146, CHM146L
Corequisite : CHM115

CHM115X. ANALYTICAL CHEMISTRY EXIT EXAM

This examination is a generalized knowledge test administered to show proficiency of chemistry students in the analytical chemistry course series.

Prerequisite : CHM112, CHM146, CHM146L
Corequisite : CHM115

CHM130. INORGANIC CHEMISTRY

The course covers theoretical background of atomic structure and bonding concepts and also discusses the chemistry of elements.

Credit : 3 units
Prerequisites : CHM112, CHM145, CHM115X, CHM147X

CHM131. ADVANCE INORGANIC CHEMISTRY 1

The course covers on the principles and trends in the chemistry of elements and on the essentials of structure (atomic and molecular), bonding, reactivity of inorganic systems and solids and material chemistry.

Credit : 2 units
Prerequisites : CHM112, CHM146, CHM146L, CHM147X

CHM132. ADVANCE INORGANIC CHEMISTRY 2

A continuation of CHM131, this course includes the study of Coordination chemistry (structure, geometry and isomerism, bonding theories and reaction mechanisms), Inorganic spectroscopy, organometallic chemistry, and special topics that include catalysis, bioinorganic and inorganic materials, and environmental and atmospheric chemistry.

Credit : 2 units
Prerequisites : CHM131

CHM132X. ADVANCED INORGANIC CHEMISTRY EXIT EXAM

This examination is a generalized knowledge test administered to show proficiency of chemistry students in the advanced inorganic chemistry course series.

Prerequisite : CHM131
Corequisite : CHM132

CHM140. BASIC ORGANIC CHEMISTRY 1

The course covers the basic principles in organic structural theory and simple functional group transformation of organic compounds.

Credit : 2 units
Prerequisite : CHM13-2P or CHM12-2

CHM140L. BASIC ORGANIC CHEMISTRY LABORATORY 1

A laboratory course to accompany CHM 140 covering basic techniques in organic chemistry and chemical tests used to distinguish organic compounds.

Credit : 1 unit
Prerequisite : CHM13-2P
Corequisite : CHM140

CHM142. ORGANIC CHEMISTRY 1

This course deals with the structure and reactivity of organic compounds such as alkanes, alkenes, alkynes, and aromatic hydrocarbons. It also covers the structural theory of organic compounds.

Credit : 2 units
Prerequisites : CHM13-2P, CHM13X

CHM142L. ORGANIC CHEMISTRY LABORATORY 1

Designed to complement CHM142, this course covers semi-micro and macro techniques of synthesis, determination of the properties of organic compounds, and qualitative organic analysis.

Credit : 1 unit
Prerequisite : CHM13-2P
Corequisite : CHM142

CHM143. ORGANIC CHEMISTRY 2

A continuation of CHM142, this course includes the study of physical and chemical properties of the different classes of organic compounds and simple synthesis problems.

Credit : 2 units
Prerequisite : CHM142

CHM143L. ORGANIC CHEMISTRY LABORATORY 2

Designed to complement CHM143, this course covers experiments on various types of organic reactions involving different classes of organic compounds.

Credit : 1 unit
Prerequisites : CHM142, CHM142L
Corequisite : CHM143

CHM144. INDUSTRIAL CHEMISTRY

This course deals with the theoretical study of different chemical industries with emphasis on reaction mechanisms that serve the basis of the industrial chemical processes. Recommended industries for discussion are oils and fats, flavors and fragrances, sugar, fermentation, soap and detergents, hydrogen peroxide and inorganic peroxy compounds, industrial acids and bases, polymers petrochemicals, and paints, pigments and industrial coatings. Also included is a discussion of catalysis and its application in the chemical industry.

Credit : 2 units
Prerequisite : CHM142, CHM142L or CHM146, CHM146L

CHM144L. INDUSTRIAL CHEMISTRY LABORATORY

This is a laboratory course that involves actual preparation of industrial products commonly encountered in the chemical process industries such as manufacture of vegetable oil, refined vegetable oil, soap, wine, refined sugar, paper etc.

Credit : 1 unit
Prerequisites : CHM142, CHM142L or CHM146, CHM146L
Corequisite : CHM144

CHM145. ORGANIC CHEMISTRY 1

This course is designed for undergraduate science major students. It is the first of a series of an integrated study of

organic compounds based on the modern concepts of structure and reactivity. It covers covalent bonding, stereochemistry, alkyl halides, and aliphatic and aromatic hydrocarbons.

Credit : 3 units

Prerequisites : CHM13-2P

: CHM13L, CHM13X for BECM, CCE, CHM

CHM145L. ORGANIC CHEMISTRY LABORATORY 1

A laboratory course to accompany CHM145, this course covers the basic and advance semi-micro and macro techniques of synthesis and determination of the properties of organic compounds and qualitative organic analysis.

Credit : 2 units

Prerequisites : CHM13-2P, CHM13L

Corequisite : CHM145

CHM146. ORGANIC CHEMISTRY 2

This course is a continuation of CHM145. This includes the physical and chemical properties of the different functional classes of organic compounds, spectroscopy, and simple synthesis problems.

Credit : 3 units

Prerequisites : CHM145, CHM145L

CHM146L. ORGANIC CHEMISTRY LABORATORY 2

A laboratory course accompanying CHM146 covering experiments on various types of organic reactions involving different classes of organic compounds.

Credit : 2 units

Prerequisites : CHM145, CHM145L

Corequisite : CHM146

CHM147. ORGANIC CHEMISTRY 3

The course is a study of the mechanisms of more complicated organic reactions in organic chemistry and structure elucidation using spectroscopic techniques.

Credit : 3 units

Prerequisite : CHM146, CHM146L

CHM147X. ORGANIC CHEMISTRY EXIT EXAM

This examination is a generalized knowledge test administered to show proficiency of chemistry students in the organic chemistry course series.

Prerequisite : CHM146, CHM146L

Corequisite : CHM147

CHM148P. FOOD CHEMISTRY AND ANALYSIS

The course is an introduction to the chemistry of the major components of foods such as lipids, proteins, carbohydrates, and water. Emphasis will be given to the reactions and changes in food components which occur during processing, handling and storage. The laboratory component of the course covers methods of analysis used in typical food products, and the detection of colors, adulterants, and preservatives in foods

Credit : 3 units

Prerequisite : CHM146, CHM146L

CHM149. ENVIRONMENTAL CHEMISTRY

This course covers chemical nature of the environment and chemical characteristics, toxicology, and fate and transport of common chemical pollutants in the hydrosphere, atmosphere, and lithosphere.

Credit : 3 units

Prerequisites : CHM112, CHM146 for BECM

CHM115, CHM115L, CHM147 for CHM

CHM160-1. BIOCHEMISTRY 1

The course covers the chemistry of biological systems, particularly the structures and activity of major groups of biomolecules.

Credit : 2 units

Prerequisites : CHM111 or CHM112, CHM146, CHM115X, CHM147X

CHM160L. BIOCHEMISTRY 1 LABORATORY

Designed to accompany CHM160, this course covers laboratory activities involving experiments focusing on the chemistry of biological systems.

Credit : 1 unit

Prerequisites : CHM111 or CHM112, CHM146

Corequisite : CHM160-1

CHM161. BIOCHEMISTRY 2

A continuation of CHM160, the course particularly covers the metabolism of major groups of biomolecules.

Credit : 2 units

Prerequisites : CHM160-1, CHM160L

Corequisite : CHM161L

CHM161L. BIOCHEMISTRY 2 LABORATORY

Designed to accompany CHM161, this course covers continuation of laboratory activities in CHM160L.

Credit : 1 unit

Prerequisites : CHM160-1, CHM160L

Corequisite : CHM161

CHM161X. BIOCHEMISTRY EXIT EXAM

This examination is a generalized knowledge test administered to show proficiency of chemistry students in the biochemistry course series.

Prerequisite : CHM160-1, CHM160L

Corequisite : CHM161

CHM170P. PHYSICAL CHEMISTRY 1

This course covers discussions on the physical and chemical properties of the gaseous state of matter and an introduction to the laws of thermodynamics and its application to chemical systems.

Credit : 3 units

Prerequisites : CHM111 or CHM112; CHM111L or

CHM112L; MATH22-1

Corequisite : CHM170L

CHM170L. PHYSICAL CHEMISTRY LABORATORY 1

Designed to accompany CHM170, the course covers experimental determination of the physical properties of the liquid state and heat effects measurement.

Credit : 1 unit

Prerequisites : CHM111 or CHM112;

CHM111L or CHM112L;

MATH22-1 for BE, BECM, CHM

Corequisite : CHM170P

CHM171L. PHYSICAL CHEMISTRY LABORATORY 2

A laboratory course to accompany CHM171, this course covers experimental determination of electrical properties of solutions, phase equilibria, chemical equilibrium, and photochemistry.

Credit : 1 unit

Prerequisites : CHM170P, CHM170L

Corequisite : CHM171P

CHM171P. PHYSICAL CHEMISTRY 2

A continuation of CHM170P, the course covers topics on phase equilibria, electrochemical equilibria, transport processes, reaction kinetics and an introduction to quantum mechanics.

Credit : 3 units

Prerequisites : CHM170P, CHM170L

CHM171X. ADVANCED CHEMISTRY EXIT EXAM

This examination is a generalized knowledge test administered to show proficiency of chemical engineering students in the advanced chemistry course series.

Prerequisite : CHM170P, CHM144

Corequisite : CHM171P

CHM175. QUANTUM CHEMISTRY

The course includes a discussion of quantum theory, molecular spectroscopy, and transport phenomena.

Credit : 3 units

Prerequisite : CHM171P, CHM171L,

PHY13, PHY13L, MATH22-1

CHM175X. QUANTUM CHEMISTRY EXIT EXAM

This examination is a generalized knowledge test administered to show proficiency of chemistry students in the physical chemistry course series.

Prerequisite : CHM171P

Corequisite : CHM175

CHM177. COLLOID CHEMISTRY

The course deals with the basic principles of colloid chemistry: molecular, optical, and electrical properties of disperse systems; thermodynamics of surface phenomena; capillary phenomena; structure and stability of disperse systems; adsorption of surface active substances; micelle

formation; and colloidal methods of production and machining of materials.

Credit : 2 units

Prerequisite : CHM171-1

CHM180X. ALLIED CHEMISTRY EXIT EXAM

This examination is a generalized knowledge test administered to show proficiency of biological engineering-chemistry students in Inorganic Chemistry, Food Chemistry and Analysis, Physical Chemistry 2, and Environmental Chemistry.

Prerequisite : CHM130, CHM148P,

CHM171P, CHM149

Corequisite : CHM175

CHM198-1. RESEARCH METHODS AND EXPERIMENTAL DESIGN

This course introduces the students to the methods of the research process such literature search and review, writing methodology and designing experiments. In this course, the students are required to submit a research proposal that they will present before an examination committee.

Credit : 2 units

Prerequisites : CHM146, MATH30-7 or BIO153-2

CHM198P. RESEARCH METHODS AND EXPERIMENTAL DESIGN

This course introduces the students to the methods of the research process such literature search and review, writing methodology and designing experiments. In this course, the students are required to submit a research proposal that they will present before an examination committee.

Credit : 2 units

Prerequisites : CHM131, CHM146, MATH30-7 or BIO154-1

CHM199R. CHEMISTRY PRACTICE

Designed for students to undergo training in various chemical industries, the course requires a minimum of 240 hours of field work in selected chemical industries as well as plant visits.

Credit : 2 units

Prerequisites : CHM130, CHM160-1 for BECM

: CHM115X, CHM132X, CHM147X,
CHM161X, CHM175X for CHM

CHM200-0L. THESIS 1

In this course, the student performs the experimental part of the research proposal and is expected to have performed at least half of the activities in the methodology.

Credit : 1 unit

Prerequisite : CHE198 or CHM198P

CHM200-1L. THESIS 2

In this course, the student completes the experimental part of the research and is required to submit documentation of the results and present observations, interpretations, conclusions and recommendations before a faculty panel.

Credit : 1 unit
Prerequisite : CHM200-0L

CHM200-2L. THESIS 1

In this course, the student performs the experimental part of the research proposal and is expected to have performed at least half of the activities in the methodology.

Credit : 1 unit
Prerequisite : CHE198-1 or CHM198-1

CHM200-3L. THESIS 2

In this course, the student completes the experimental part of the research and is required to submit documentation of the results and present observations, interpretations, conclusions and recommendations before a faculty panel.

Credit : 1 unit
Prerequisite : CHM200-2L

ENV20. INTRODUCTION TO ENVIRONMENTAL ENGINEERING

The course covers the study of environmental systems and disturbances, sources of primary and secondary pollutants, technologies in water and wastewater treatment, air pollution control, solid and hazardous waste management, environmental regulations. Different threats to the environment, how the manufacturing and construction industry contribute to environmental problems, and how to develop an environmental management plan to prevent further deterioration of the environment will be given emphases.

Credit : 2 units
Prerequisite : CHM12-2, CHM12-3
for ECE, IE, SEM, EE, CpE
: CHM12-3 for MME

ENV110-1. ENVIRONMENTAL ENGINEERING AND ENVIRONMENTAL SAFETY

This is an introductory course on the study of environmental systems and disturbances, sources and control of primary and secondary pollutants, technologies in water and wastewater treatment, air pollution control, solid and hazardous waste management, and current environmental issues and regulations. It also includes discussions on the different man-made and natural threats to safety in the environment, how the manufacturing industry contributes to environment problems, and how to develop an environmental management plan to prevent further deterioration of the environment.

Credit : 3 units
Prerequisite : CHM13-2P

ENV190-2. ENVIRONMENTAL SCIENCE

This is a course that deals with discussions concerning natural processes occurring in the environment. Topics include the physical and chemical nature of environment, environment systems, disturbances, problems, and the scientific basis of technologies on environmental pollution control. The course also includes discussions on global

environmental change and its impact on population and ecology.

Credit : 3 units
Prerequisites : ENV110-1, CHE135-1X

MSE10. ORIENTATION TO MATERIALS SCIENCE AND ENGINEERING

The course introduces material science and engineering as a profession with emphasis on the requirements for professional practice and material science and engineering as a career focusing on the career opportunities. The course discusses developing scientific and engineering skills to succeed in engineering and science study.

Credit : 1 unit

MSE20. FUNDAMENTALS OF MATERIALS SCIENCE AND ENGINEERING

A study on the structure & composition of materials (metals, polymers, ceramics & composite materials) properties & behavior in service environments.

Credit : 3 units
Prerequisites : CHM12-2 or CHM12-3, PHY13, PHY13L, PHY13X

For Electrical, Electronics, Industrial and Mechanical Engineering Programs

MSE20-2. FUNDAMENTALS OF MATERIALS SCIENCE AND ENGINEERING

A study on the structure & composition of materials (metals, polymers, ceramics & composite materials), properties & behavior in service environments, and processing of these materials.

Credit : 3 units
Prerequisites : CHM12-3, PHY13, PHJY13L, PHY13X
: CHM12-3, PHY12, PHJY12L
: CHM12-3, PHY12, PHY12L for MME

For Civil Engineering

MSE20-4. FUNDAMENTALS OF MATERIALS SCIENCE AND ENGINEERING

A study on the structure & composition of materials (metals, polymers, ceramics & composite materials) properties & behavior in service environments, with emphasis on construction materials.

Credit : 3 units
Prerequisites : CHM12-3, PHY13, PHY13L, PHY13X

For Service Engineering and Management and Construction Engineering and Management Programs

MSE20-3. INTRODUCTION TO MATERIALS SCIENCE AND ENGINEERING

A study on the fundamental concepts of structure & composition of materials (metals, polymers, ceramics & composite materials), properties & behavior in service environments, and the economic aspect of materials' processing.

Credit : 3 units

Prerequisite : CHM12-3, PHY11-2/PHY11-2L

For Business Administration, Accountancy, and Entrepreneurship Programs

MSE001. INTRODUCTION TO MATERIALS SCIENCE AND ENGINEERING

This course familiarizes the students with the attributes of different materials and compounds commonly used in manufacturing and fabrication. It covers discussions on the materials' strengths, weaknesses, special properties, and common applications.

Credit : 3 units

Prerequisite : None

MSE21L. MEASUREMENTS IN MATERIALS SCIENCE AND ENGINEERING

Measurements of length, density, temperature, & particle size distribution routine hardness measurements (Rockwell, Brinell & Vickers) microstructure related measurements using surface morphology apparatus.

Credit : 2 units

Prerequisites : CHM12-2, PHY13

Corequisite : MSE20

MSE40. ECONOMIC ANALYSIS OF MATERIALS SCIENCE AND ENGINEERING

Introduction to economic analysis applied to materials engineering; cost estimation; overview of feasibility study preparation. This course is essentially equivalent to Engineering Economics but emphasis is given to Materials Engineering Processes.

Credit : 3 units

Prerequisite : 4th YEAR STANDING

MSE60. NUMERICAL METHODS

This course covers the detailed concepts of numerical analysis in solving engineering problems using a computer. It includes numerous techniques in finding roots of an equation, solving systems of linear and non-linear equations, matrix, Eigen value problems, polynomial approximation and interpolation, solving differential equations (Euler, Runge-Kutta formulas, matrix methods) as well as application of partial differential equations in various fields of engineering. Approximation of roots by the use of differentiation and integration, the Monte-Carlo methods and simulation, error propagation and analysis, the methods of least squares and goodness-of-fit tests are also essential part of this course.

Credit : 3 units

Prerequisite : MATH24-1

MSE70. LAWS, CONTRACTS AND ETHICS

Principles of laws, rules and regulations, and ethical standards affecting the practice of Materials Science and Engineering or Metallurgical Engineering including the elements of relevant contracts.

Credit : 2 units

Prerequisite : 4TH YEAR STANDING

MSE100-0. ELECTRICAL AND MAGNETIC MATERIALS

Electrical & magnetic materials & their properties; band theory of solids & lattice vibrations; periodic structures; lattice waves; electron states; static properties of solids; electron-electron interactions; dynamics of electrons in solids

Credit : 3 units

Prerequisites : CHM12-2, PHY13, PHY13L

MSE101. SEMICONDUCTOR MATERIALS AND PROCESSES

A course on basic semiconductor theories and fabrication processes of semiconductor devices.

Credit : 3 units

Prerequisite : MSE20

Prerequisite : MSE20-2, ME136P for ME

MSE102-0. THERMODYNAMICS AND PHASE EQUILIBRA OF MATERIALS

Basic thermodynamic quantities & laws; phase transformations & chemical reactions; phase of variable compositions; free energy of binary systems, surfaces & interfaces. Emphasis should be given to metals to satisfy equivalence with Metallurgical Thermodynamics.

Credit : 3 units

Prerequisites : CHM111-1, MSE20

MSE102-1. THERMODYNAMICS AND PHASE EQUILIBRA OF MATERIALS

Basic thermodynamic quantities & laws; phase transformations & chemical reactions; phase of variable compositions; free energy of binary systems, surfaces & interfaces. Emphasis should be given to electronic materials to satisfy needs of ECE students.

Credit : 3 units

Prerequisites : MSE20

MSE102L. THERMODYNAMICS AND PHASE EQUILIBRA OF MATERIALS LABORATORY

Includes laboratory exercises on demonstrative applications of thermodynamic principles relevant to materials engineering; determination of some thermodynamic quantities. Emphasis should be given to metals to satisfy equivalence with Metallurgical Thermodynamics.

Credit : 1 unit

Corequisite : MSE102-0

MSE103-1. ANALYTICAL TECHNIQUES IN MATERIALS SCIENCE AND ENGINEERING LABORATORY

X-ray diffractometry, stress analysis & chemical techniques (EDS, WDS); spectroscopy; surface analytical techniques (SIMS, ESCA, AUGER). The lecture is supplemented with laboratory exercises.

Credit : 1 unit

Prerequisites : MSE20, MSE21L

MSE103-1L. ANALYTICAL TECHNIQUES IN MATERIALS SCIENCE AND ENGINEERING LABORATORY

Laboratory component of MSE103-1.

Credit : 1 unit

Prerequisite : MSE20, MSE21L

Corequisite : MSE103-1

MSE104-1. PRINCIPLES OF METALLURGY

An introduction to mineral dressing to pyro-, hydro-, and electro-metallurgy, and to adaptive metallurgy. Terminology, principles and processes.

Credit : 3 units

Prerequisites : CHM111-1, CHM111-1L

MSE105-1. PHYSICAL METALLURGY 1

A study of elementary stress-strain relations; determination of the criteria for strength and plastic deformation of fracture materials; study of mechanical forming operations such as rolling, forging, drawing, die-forming, interpretation of basic mechanical test such as tensile, compression, hardness impact, fatigue test. This course will give emphasis to metals in order to satisfy equivalence with Physical Metallurgy 1.

Credit : 3 units

Prerequisites : MEC32, MSE102-0

MSE105-1L. PHYSICAL METALLURGY LABORATORY 1

To be taken simultaneously with MSE105-1. Includes laboratory exercises on stress-strain relations. Tensile and compressive strength measurements; heat treatment of steel; precipitation hardening; determination of the hardenability of steel.

Credit : 1 unit

Prerequisites : MEC32, MSE102-0

Corequisite : MSE105-1

MSE106-1. METALLURGICAL ANALYSIS

Classical and modern methods of metallurgical analysis.

Credit : 1 unit

Prerequisite : CHM12-2

MSE106-1L. METALLURGICAL ANALYSIS LABORATORY

Laboratory for MSE106-1. Includes fire assaying and other modern methods of metallurgical quantitative analysis.

Credit : 2 units

Prerequisites : CHM111-1, CHM111-1L

Corequisite : MSE106-1

MSE106-2. PRINCIPLES OF SEMICONDUCTOR DEVICES

Discussion on the basic concepts of the different semiconductor devices with emphasis on the applications in microelectronics.

Credit : 3 units

Prerequisite : MSE101

MSE107-0. THIN FILM PROCESSING

Lecture in vacuum technology & thin film deposition.

Credit : 3 units

Corequisite : MSE106-2

Prerequisites : MSE102-0

MSE107-0L. THIN FILM PROCESSING LABORATORY

Laboratory exercises for MSE107-0

Credit : 1 unit

Co requisite : MSE107-0, MSE106-2

Prerequisites : MSE102-0

MSE107-1. MINERAL PROCESSING 1

Size reduction and separation; gravity, magnetic and electrical concentration; dewatering, materials handling.

Credit : 3 units

Prerequisites : GEO111P, MSE104-1

MSE107-1L. MINERAL PROCESSING LABORATORY 1

Laboratory exercises for MSE107-1.

Credit : 1 unit

Prerequisites : GEO111P, MSE104-1

Co requisite : MSE107-1

MSE108L. COMPUTER APPLICATIONS IN MATERIALS SCIENCE AND ENGINEERING

Familiarization of common computer application software and computational tools for Materials analysis and evaluation.

Credit : 2 units

Prerequisites : CS10-1L

MSE109-0. FAILURE ANALYSIS AND MATERIALS TESTING

Failure analysis of materials; destructive & non-destructive testing methods related to failure analysis & reliability testing; industrial standards for materials.

Credit : 3 units

Prerequisite : MSE107-0, MSE107-0L

MSE109-0L. FAILURE ANALYSIS AND MATERIALS TESTING LABORATORY

Laboratory exercises for MSE109-0.

Credit : 1 unit

Co requisite : MSE109-0

Prerequisites : MSE107-0, MSE107-0L

MSE109-1. PHYSICAL METALLURGY 2

Continuation of MSE105-1/105-1L placing emphasis on the detailed study of the alloy series, Heat treatment practices, and Metal forming.

Credit : 3 units
Prerequisites : MSE105-1, MSE105-1L

MSE109-1L. PHYSICAL METALLURGY LABORATORY 2

Laboratory exercises in microstructure analysis, heat treatment of metals and metal forming methods.

Credit : 1 unit
Prerequisites : MSE105-1, MSE105-1L
Corequisite : MSE109-1

MSE110-0. INTRODUCTION TO NANOTECHNOLOGY

A course on the fundamental concepts of nanotechnology, including latest trends and developments in this field. Emphasis will be given to the role of materials science and engineering in nanotechnology.

Credit : 3 units
Prerequisites : MSE107-0, MSE107-0L
Prerequisites : MSE20-2

MSE110-1. FUELS AND REFRACTORIES

Fuel materials; mechanics and chemistry of combustion; heat transfer and combustion; design of burners and industrial furnaces; energy requirements of different metallurgical processes; classification of refractories; physical and chemical properties; pertinent phase equilibrium systems; applications to metallurgical industries.

Credit : 3 units
Prerequisites : CHM111-1, CHM111-1L

MSE111-1. MINERAL PROCESSING 2

Size reduction and separation; comminution; concentration; materials handling; gravity, magnetic and electrical concentration; dewatering; tailings disposal. Flotation.

Credit : 3 units
Prerequisites : MSE107-1, MSE107-1L

MSE111-1L. MINERAL PROCESSING LABORATORY 2

Laboratory exercises for MSE111-1.

Credit : 1 unit
Co requisite : MSE111-1
Prerequisites : MSE107-1, MSE107-1L

MSE111-2. POLYMER MATERIALS AND PROCESSES

The course covers the study of the structure- property relationship of polymers, processing and conversion to plastics, and application and performance of polymers.

Credit : 3 units
Prerequisite : CHM140, MSE20

MSE111-2L. POLYMER MATERIALS AND PROCESSES LABORATORY

Laboratory component of MSE111-2.

Credit : 1 unit
Pre-requisite : CHM140, MSE20
Corequisite : MSE111-2

MSE112-0. SPECIAL TOPICS IN MSE

Discussion on the latest trends and developments in materials science and engineering.

Credit : 2 units
Prerequisites : MSE109-0, MSE109-0L

MSE112-1. FOUNDRY SCIENCE

A detailed study of the theories of solid liquid transformation and principles of metal casting, giving thorough description and study of actual foundry works.

Credit : 2 units
Prerequisites : MSE109-1, MSE109-1L

MSE113-0. SEMICON DEVICE FABRICATION

A course which discusses the principles and techniques involved in the different processes and equipment used in the fabrication of semiconductor device; also, it includes quality and reliability aspects.

Credit : 3 units
Prerequisites : MSE111-0, MSE111-0L
MSE113-0L. SEMICON DEVICE FABRICATION LABORATORY

Laboratory Exercises for MSE113-0.

Credit : 1 unit
Co requisite : MSE113-0
Prerequisites : MSE111-0, MSE111-0L

MSE113-1. EXTRACTIVE METALLURGY 1

Basic principles on Hydrometallurgy, electrometallurgy and corrosion, energy and mass balance.

Credit : 3 units
Prerequisites : MSE111-1, MSE111-1L

MSE113-1L. EXTRACTIVE METALLURGY LABORATORY 1

Exercises in leaching, cementation, electrometallurgy, and solvent extraction.

Credit : 1 unit
Co requisite : MSE113-1
Prerequisites : MSE111-1, MSE111-1L

MSE113-2. RATE PROCESSES IN MSE

Reaction rates; application to nucleation, crystal growth, grain growth, recrystallization, precipitation, sintering, oxidation, and solid state reaction; role of kinetics in the development of microstructures.

Credit : 3 units
Prerequisite : MSE102-0, MSE102L

MSE113-2L. RATE PROCESSES IN MSE LABORATORY

Laboratory component of MSE113-2.

Credit : 1 unit
Prerequisite : MSE102-0, MSE102L
Corequisite : MSE113-2

MSE114-1. POWDER METALLURGY

The course covers the basic processes of blending fine metallic powder materials. This includes synthesis of

metallic powder, blending of these powders, compacting and sintering.

Credit : 3 units

Pre-requisite : MSE104-1

MSE115. COMPOSITE MATERIALS

Processing of important modern composite materials; structures & properties of fibers, matrices, & final composites.

Credit : 3 units

Corequisite : MSE116

Prerequisites : MSE112-0

: MSE20-2, ME136P for MfgE

MSE115L. COMPOSITE MATERIALS LABORATORY

Processing of important modern composite materials; structures & properties of fibers, matrices, & final composites.

Credit : 1 unit

Co requisite : MSE115, MSE116

Prerequisites : MSE112-0

MSE115-1. EXTRACTIVE METALLURGY 2

Discussion on the different pyrometallurgical extraction of ferrous and non-ferrous metals; energy and mass balance.

Credit : 3 units

Prerequisites : MSE113-1, MSE113-1L

MSE115-1L. EXTRACTIVE METALLURGY LABORATORY 2

Exercises for MSE115-1.

Credit : 1 unit

Co requisite : MSE115-1

Prerequisites : MSE113-1, MSE113-1L

MSE116. CERAMIC MATERIALS

An introductory course to the properties of ceramic and common fabrication techniques.

Credit : 3 units

Prerequisite : MSE20

MSE117. PLANT DESIGN 1

Plant design course including selection and integration of processes, equipment and materials, site and plant layout; sampling and control systems in plants; environmental regulations, compliance and considerations.

Credit : 2 units

Prerequisites : MSE40, 4TH Year Standing

MSE117L. PLANT DESIGN LABORATORY 1

Laboratory for PLANT DESIGN 1.

Credit : 2 units

Prerequisite : MSE117

MSE199R. ON-THE-JOB TRAINING

384 hours of hands-on training in a relevant manufacturing plant or government/private research facility.

Credit : 3 units

Prerequisites : MSE117L

MSE200L. THESIS 1

A continuation of RES100. Students are expected to conduct and complete the undergraduate research proposed in RES100-7.

Credit : 1 unit

Prerequisite : RES100-7

MSE200-1L. THESIS 2

A continuation of MSE200

Credit : 1 unit

Prerequisite : MSE200L

MSE200-2L. THESIS 3

A continuation of MSE200-1L.

Credit : 1 unit

Prerequisite : MSE200-1L

PRT190. INTRODUCTION TO PETROLEUM REFINING

This course focuses on the common hydrocarbons and by-products encountered in the petroleum refining industry. This course will also discuss the major fuel products of a typical refinery, major properties and applications of such, and the impact of paraffins, olefins, naphthenes and aromatics on fuel product properties. The connection between the refining industry and the allied industries will be discussed, as well as corrosion mechanisms in the refinery setting. A visit to the refinery is a requirement of this course.

Credit : 3 units

Prerequisite/s : CHM12/CHM12-3, CHM12-3L,
4th year standing

PRT191. OVERVIEW OF PETROLEUM REFINING PROCESS (WITH PROCESS FOCUS)

This course focuses on the major properties and applications of important fuel products of a typical refinery. The major refining processes are discussed, together with the refinery's facilities and utilities. A discussion on corrosion and corrosion control is also included. A visit to the refinery is a requirement of this course.

Credit : 3 units

Prerequisite/s : CHM144, CHE135, CHE170-1

PRT192. OVERVIEW OF PETROLEUM REFINING PROCESS (WITH ELECTRICAL FOCUS)

This course focuses on the major properties and applications of important fuel products of a typical refinery. The major refining processes are discussed, together with the refinery's power generation and distribution system, and emergency load shedding system. A visit to the refinery is a requirement of this course.

Credit : 3 units

Prerequisite/s : PRT190

**SET190. INTRODUCTION TO SUSTAINABLE
ENGINEERING**

The course focuses on the concepts behind Sustainable Engineering to broaden students' outlook on holistic potential engineering solutions centered on sustainability.

Credit : 3 units

Prerequisite : CHE133-1P

**SET191. GREEN CHEMISTRY AND GREEN PROCESS
ENGINEERING**

The course discusses the 12 principles of green chemistry and their applications in green process engineering.

Credit : 3 units

Prerequisite : SET190

**SET192. IMPACT ASSESSMENT, LIFE CYCLE
EVALUATIONS AND INDUSTRIAL ECOLOGY**

The course is centered on the central concept of "whole system thinking across the value chain/life cycle".

Credit : 3 units

Prerequisite : SET191

**SET193. CHALLENGES AND OPPORTUNITIES IN
SUSTAINABILITY AND CLIMATE CHANGE**

This is a course in which the students gain a comprehensive understanding of the sustainable engineering framework for practical sustainable solutions for Products, Processes and Infrastructure.

Credit : 3 units

Prerequisite : SET191