

Working Paper # 9
Review of 1st year Common for all UG Engineering Programmes
Sponsored by CEME

1. **Background.** Working paper for a common first year curriculum for all undergraduate engineering programmes of NUST was approved in the 50th ACM. The same was implemented from Fall 2018 onwards. The first-year curriculum by each school is designed to give the students a solid foundation and introduce them to the vast opportunities available in engineering. These courses provide the foundation for the future as an engineer. The proposed revised first year curriculum provides the common basics of Mathematics, Programming, Workshop Practices, Engineering Drawing, English and Physics for all engineers. To cater for programme specific requirements three course slots were allocated in the first year curriculum. The common first year courses being followed are as shown below:

Semester-I		
Course Code	Subjects	Credit Hrs
HU-100	English	2-0
CS-110	Fundamentals of Programming	2-1
HU-107	Pakistan Studies	2-0
MATH-101	Calculus and Analytical Geometry	3-0
ME-105	Workshop Practice	0-1
PHY-102	Applied Physics	2-1
XX-XXX	Program Specific	2 to3-1
Total CHs		13 to 14-4

Semester-II		
Course Code	Subjects	Credit Hrs
HU-101	Islamic Studies	2-0
MATH-121	Linear Algebra & ODEs	3-0
ME-109	Engineering Drawing	0-2
HU-109	Communication Skills	2-2
XX-XXX	Program Specific	3-2
XX-XXX	Program Specific	2to3-1
Total CHs		12 to 13-3 to 4

2. **Rationale.** Apart from other allied benefits, the main idea of common first year was to facilitate NUST students looking for a change of programme after undergoing first year studies. However after completion of first year when the option of change of programme was availed by students in Summer 2019, some of them faced difficulties in taking up the courses of the new programme they joined. The main issue was the 3x programme-specific-subjects of first year, which were pre-requisites for other courses. In addition, no clear pathway was defined for the transfer students joining new programme for clearing their deficient courses. This Working Paper is the result of review carried out for the first year common after one year of implementation for all UG engineering programmes and addresses the issues that emerged.

3. **Issues after one year of Implementation**

- a. Some of the programme-specific-courses (3) chosen were pre-requisites for other courses.
- b. No margin given in the 3rd semester (CHs) for transferred students to take deficient courses.

4. **Guidelines followed for the Review.** Complete scheme of studies (from first to last semester) was revisited by lead institution of each programme keeping in view the following:

- a. Preferably no pre-requisite course included in 1st year.
- b. The changes were incorporated with minimal disturbance to later semesters.
- c. Third semester CHs were kept low (preferably less than 17 CHs) with minimal or no pre requisite from 3x programme-specific-courses.
- d. A clear pathway has been defined for transfer students for each UG programme to clear deficient 3x programme-specific-courses before fifth semester.
- e. Removal of non-essential pre-requisite courses, and adjustment of course CHs where required.
- f. Balancing of CHs of each semester (keeping it below 20).

3. **Proposed Changes.** After incorporation of changes, the proposed schemes of studies for all engineering programmes are given in Annex A attached.

- a. At the end of 3rd and 4th semester scheme of studies for each program, a clear pathway for transferred students is given to clear their deficient courses.

- b. At the end of each scheme of studies the shifting of courses done and summary of changes are mentioned.

Comments of Academics Dte

4. All UG Engineering Curricula modified in accordance with policy refinement guidelines.
5. A clear pathway for transferred students has been defined for each UG Engineering programme.
6. The proposal was deliberated and endorsed by UCRC held on 28 Jan 2020.

Recommendation of Academics Dte

7. Proposed refinements in 1st Year Common for all UG Engineering Curricula are recommended for approval w.e.f Spring 2020, except BE Mechanical Engineering Programme that is effective from Fall 2019.
8. Academic Council is requested for the approval.

1. **BE Electrical Engineering**

Semester-I			
Course Code	Subjects	Credit Hrs	Pre-Req
HU-100	English	2-0	
CS-114	Fundamentals of Programming	2-1	
HU-101	Islamic Studies	2-0	
MATH-101	Calculus and Analytical Geometry	3-0	
ME-105	Workshop Practice	0-1	
PHY-102	Applied Physics	2-1	
*EE-111	Linear Circuit Analysis	3-1	
Total CHs		14-4	

Semester-II			
Course Code	Subjects	Credit Hrs	Pre-Req
HU-107	Pakistan Studies	2-0	
MATH-121	Linear Algebra and ODEs	3-0	
ME-109	Engineering Drawing	0-2	
HU-109	Communication Skills	2-0	
*ME-100	Engineering Mechanics	3-0	
*EE-211	Electrical Network Analysis	3-1	EE-111
Total CHs		13-3	

Semester-III			
Course Code	Subjects	Credit Hrs	Pre-Req
*CS- 212	Object Oriented Programming (OOP)	3-1	CS-114
ME-102	Thermodynamics	2-0	
EE-221	Digital Logic Design	3-1	
HU-212	Technical & Business Writing	2-0	
MATH-243	Vector Calculus	3-0	MATH-101
Total CHs		13-2	
Note: Transfer students will take one additional course EE-111 Linear Circuit Analysis (3-1) in 3rd Semester			

Semester-IV			
Course Code	Subjects	Credit Hrs	Pre-Req
EE-215	Electronic Devices and Circuits	3-1	EE-111
EE-241	Electromagnetic Field Theory	3-0	PHY-102
EE-222	Microprocessor Systems	3-1	EE-221
MATH-232	Complex Variable and Transforms	3-0	
ECO-130	Engineering Economics	2-0	
	Total CHs	14-2	
Note: Transfer students will take one additional course (EE-211 Electrical Network Analysis (3-1) or ME-100 Engineering Mechanics (3-0)) in 4th Semester. 1x left over will be taken in next Summer.			

Semester-V			
Course Code	Subjects	Credit Hrs	Pre-Req
EE-383	Instrumentation and Measurements	3-1	EE-215
EE-260	Electrical Machines	3-1	EE-211
EE-313	Electronic Circuit Design	3-1	EE-215
EE-232	Signals and Systems	3-1	EE-211 & MATH-121
MATH-361	Probability & Statistics	3-1	
	Total CHs	15-4	

Semester-VI			
Course Code	Subjects	Credit Hrs	Pre-Req
EE-351	Communication Systems	3-1	EE-232
EE-371	Linear Control Systems	3-1	EE-232
EE-330	Digital Signal Processing	3-1	EE-232
MATH-351	Numerical Methods	3-0	
EC/EE- XXX	Elective-I	3-X	
	Total CHs	15-(3+X)	

Semester-VII			
Course Code	Subjects	Credit Hrs	Pre-Req
OTM-455	Engineering Project Management	2-0	
EE-498	Senior Design Project-I	0-2	MATH-121
EC/EE-XXX	Elective-II (Tfr from sem VI)	3-X	
EC/EE-XXX	Elective-III	3-X	
EC/EE-XXX	Elective-IV	3-X	
	Total CHs	11-(2+X)	

Note: One Elective transferred from 6th Semester for load balancing

Semester-VIII			
Course Code	Subjects	Credit Hrs	Pre-Req
HU-222	Professional Ethics	2-0	
MGT-271	Entrepreneurship	2-0	
XX-XXX	University Elective	3-X	
EC/EE-XXX	Elective-V	3-X	
EE-499	Senior Design Project-II	0-4	
	Total CHs	10-(4+X)	
	Grand Total	105+24+X (129+X)	

Summary of Changes

- a. ME-100 Engineering Mechanics moved from 3rd to 2nd Semester
- b. CS-212 Object Oriented Programming moved from 2nd to 3rd semester
- c. ECE/EE XXX Elective-II shifted from 6th to 7th semester

Impact on Credit Hours: Nil

2. BE Computer Engineering

Semester-I			
Course Code	Subjects	Credit Hrs	Pre-Req
HU-100	English	2-0	
CS-114	Fundamentals of Programming	2-1	
HU-107	Pakistan Studies	2-0	
MATH-101	Calculus and Analytical Geometry	3-0	
ME-105	Workshop Practice	0-1	
PHY-102	Applied Physics	2-1	
*EE-111	Linear Circuit Analysis	3-1	
Total CHs		14+4=18	

Semester-II			
Course Code	Subjects	Credit Hrs	Pre-Req
HU-101	Islamic Studies	2-0	
MATH 121	Linear Algebra & ODE	3-0	MATH-101
ME -104	Engineering Drawing	0-2	
HU-109	Communication Skills	2-0	
*EC-120	Computer Organization	2-1	
*EE 211	Electrical Network Analysis	3-1	EE-111
Total CHs		12+4=16	

Semester-III			
Course Code	Subjects	Credit Hrs	Pre-Req
MATH 161	Discrete Mathematics	3-0	
CS-212	Object Oriented Programming	3-1	CS-114
EC-210	Logic and Sequential Circuit Design	3-1	EC-120 Removed
EE-215	Electronic Devices and Circuits	3-1	EE-211
EC 301	Computer Graphics	2-1	
Total CHs		14+4=18	
Note: Transfer students will take EE-111 Linear Circuit Analysis (3-1) in place of EE-215 Electronic Devices & Circuits to be taken in next Summer			

Semester-IV			
Course Code	Subjects	Credit Hrs	Pre-Req

EC 220	Computer System Architecture	3-1	EC 210
EC 200	Data Structures	3-1	CS-114
MATH- 232	Complex Variables and Transforms	3-0	
EC 221	Operating Systems	3-0	
EC 103	Computer Application in Engg Design	2-1	CS-114
HU 212	Technical and Business Writing	2-0	
Total CHs		16+3=19	
Note: Transfer students will take EE-211 Network Analysis (3-1) / EC-120 Computer Organization (2-1). Left over will be taken in next Summer			

Semester-V			
Course Code	Subjects	Credit Hrs	Pre-Req
EC-310	Microprocessor and Microcontroller Based Design	3-1	EC 210
EC-330	Computer Networks	3-1	
MATH-351	Numerical Methods	3-0	MATH-121
EE-232	Signals & Systems	3-1	
ME-100	Engineering Mechanics	3-0	
Total CHs		15+3=18	

Semester-VI			
Course Code	Subjects	Credit Hrs	Pre-Req
EC-313	Digital Signal Processing (CE Depth Elective-I)	3-1	EE-231
EE-371	Linear Control Systems	3-1	EE-231
EC 312	Digital Image Processing	2-1	
HU 222	Professional Ethics	2-0	
MATH 361	Probability and Statistics	3-0	
CSL 401	Community Service Learning	1-1	
Total CHs		14+4=18	

Semester-VII			
Course Code	Subjects	Credit Hrs	Pre-Req
EC 350	AI and Decision Support System	3-1	
EC 431	Digital Communication	2-1	
OTM 455	Engineering Project Management	2-0	
EC-410	Digital System Design(CE Depth Elective-II)	3-1	EC-310
EC-240	Database Engineering	3-1	

EC 499	Final Project – I	0-2	
Total CHs		13+6=19	

Semester-VIII			
Course Code	Subjects	Credit Hrs	Pre-Req
MGT 271	Entrepreneurship	2-0	
ECO 130	Engineering Economics	2-0	
EC 430	Mobile Networks (CE Depth Elective-III)	2-1	EC-330
EC 499	Final Project-II	0-4	
EC-360	Software Engineering (CE Depth Elective-IV)	3-0	
Total CHs		9+5=14	
Grand Total		106+32=138	

Summary of Changes. Pre-Requisite removed for EC-210 Logic and Sequential Circuit Design course.

Impact on Credit Hours: Nil

3. BE Mechatronics Engineering

Semester I			
Course Code	Subjects	Credit Hrs	Pre Req
MATH- 101	Calculus and Analytical Geometry	3-0	
HU-100	English	2-0	
HU-107	Pakistan Studies	2-0	
ME-112	Engineering Statics	3-0	
EE-116	Electric Circuits Analysis	3-1	
ME-109	Engineering Drawing	0-2	
Total CHs		13-3	

Semester-II			
Course Code	Subjects	Credit Hrs	Pre Req
MATH-121	Linear Algebra & ODEs	3-0	MATH 101
CS-110	Fundamentals of Programing	2-1	
HU-101	Islamic Studies	2-0	
PHY-102	Applied Physics	2-1	
HU-109	Communication Skills	2-0	
ME-204	Thermodynamics	3-1	
ME-105	Workshop Practice	0-1	
Total CHs		14-4	

Semester-III			
Course Code	Subjects	Credit Hrs	Pre Req
MATH-243	Vector calculus	3-0	MATH 101
EE-231	Signals and Systems	3-0	
HU-212	Tech & Business Writing	2-0	
MTS-220	Solid Modeling	0-1	
EE-223	Digital Logic Design	2-1	
EC-204	Data Structures and Object Oriented Programming	3-1	CS-110
Total CHs		13-3	

Note: Transfer students will take ME-112 Engineering Statics (3-0) and EE-116 Electric Circuit Analysis (3-1) in 3rd Semester instead of HU-212 Tech & Business Writing which will be taken in next Summer

Semester-IV			
Course Code	Subjects	Credit Hrs	Pre Req
MATH-232	Complex Variables and Transforms	3-0	MATH-121
MTS-226	Materials and Manufacturing Processes	3-0	
EE-215	Electronic Devices and Circuits	3-1	EE-116
ME-206	Mechanics of Materials	2-1	ME-112
ME-210	Engineering Dynamics	3-0	ME-112
MTS-231	Actuating Systems	3-1	
Total CHs		17-3	
Note: Transfer students will take ME-204 Thermodynamics (3-1) in next Summer			

Semester-V			
Course Code	Subjects	Credit Hrs	Pre Req
MATH-361	Probability & Statistics	3-0	
MTS-311	Microcontroller and Embedded Systems	2-2	EE-223 CS-110
MTS-322	Design of Machine Elements	3-0	ME-206
MTS-336	Instrumentation and Measurements	3-1	MTS-231
EE-313	Electronics Circuit Design	3-1	EE-215
ECO-130	Engineering Economics	2-0	
Total CHs		16-4	

Semester-VI			
Course Code	Subject	Credit Hrs	Pre Req
MATH-351	Numerical Methods	3-0	MATH 121
XX-XXX	Engineering Elective I	3-0	
MTS-315	Mechatronics System Design	2-2	
ME-319	Theory of Machines	2-0	ME 210
OTM-455	Engineering Project Management	2-0	
M&S-3XX	Modeling and Simulation	2-1	
Total CHs		14-3	

Semester-VII			
Course Code	Subjects	Credit Hrs	Pre Req
MTS-417	Introduction to Robotics	3-11	ME-210
XX-XXX	Engineering Elective II	3-0	
EE-379	Linear Control Systems	3-1	
MGT-271	Entrepreneurship	2-0	
MTS-499	Senior Design Project I	0-2	
HU-222	Professional Ethics	2-0	
Total		13-4	

Semester-VIII			
Course Code	Subjects	Credit Hrs	Pre Req
XX-XXX	Elective III	3-0	
ME-407	Fluid Mechanics	2-1	
MTS-499	Senior Design Project II	0-4	
MTS-419	Manufacturing Automation	2-1	ME-105
		7-6	
		13	

Summary of Changes

- ME 204 Thermodynamics (3+1) shifted from Semester IV to Semester II.
- EE 231 Signals & Systems (3+0) shifted from Semester V to Semester III.
- ME 210 Engineering Dynamics (3+0) shifted from Semester III to Semester IV.
- MTS 220 Solid Modeling (0+1) shifted from Semester IV to Semester III.
- EE 215 Electronic Devices & Circuits (3+1) shifted from Semester III to Semester IV.
- EE 313 Electronic Circuit Design (3+1) shifted from Semester IV to Semester V.

Impact on Credit Hours			
Existing		Revised	
Semester	CH	Semester	CH
1	16	1	16
2	18	2	18
3	19	3	16
4	18	4	20
5	19	5	20
6	17	6	17
7	17	7	17
8	13	8	13

Note: CH load has increased in semester 4 & 5 to 20 CH in the revised curriculum, however, total number of credit hours have not been changed.

4. BE Mechanical Engineering

Semester-I			
Course Code	Subjects	Credit Hrs	Pre-Req
MATH-101	Calculus & Analytical Geometry	3-0	
HU-100	English	2-0	
HU-107	Pakistan Studies	2-0	
CH-109	Applied Chemistry	2-0	
PHY-102	Applied Physics	2-1	
CS-114	Fundamentals of Programming	2-1	
ME-105	Workshop Practice	0-1	
	Total:	13-3=16	

Semester-II			
Course Code	Subjects	Credit Hrs	Pre-Req
MATH-121	Linear Algebra & ODEs	3-0	MATH-101
ME-221	Engineering Materials	3-0	
ME-113	Engineering Mechanics-I: Statics	3-0	
HU-101	Islamic Studies	2-0	
HU-109	Communication Skills	2-0	
ME-109	Engineering Drawing	0-2	
	Total:	13-2=15	

Semester-III			
Course Code	Subjects	Credit Hrs	Pre-Req
MATH-232	Complex Variables and Transforms	3-0	
ME-230	Fluid Mechanics-I	3-0	
ME-130	Thermodynamics-I	3-0	
ME-114	Engineering Mechanics-II: Dynamics	3-0	ME-113
EE-103	Electrical Engineering	2-1	
ME-223	Advanced Workshop Practice	1-1	ME-105
ME-211	Computer Aided Drawing	0-1	ME-109
ME-115	Engineering Mechanics Lab	0-1	
	Total:	15-4=19	

Note: Transfer student will take CH-109 Applied Chemistry (2-0) and ME-113 Engineering Mechanics-I (3-0) instead of ME-114 Engineering Mechanics-II (3-0) which will be taken in next Summer

Semester-IV			
Course Code	Subjects	Credit Hrs	Pre-Req
MATH-351	Numerical Methods	3-0	
ME-210	Mechanics of Materials-I	3-0	ME-113
ME-330	Fluid Mechanics-II	3-0	ME-230
ME-231	Thermodynamics-II	3-0	ME-130
EE-227	Electronics Engineering	2-1	
HU-212	Technical and Business Writing	2-0	
ME-337	Fluid Mechanics Lab	0-1	
ME-232	Thermodynamics Lab	0-1	
Total:		16-3=19	
Note: Transfer student will take ME-221 Engineering Materials (3-0) in next Summer			

Semester-V			
Course Code	Subjects	Credit Hrs	Pre-Req
ME-218	Machine Design-I	3-0	ME-210
ME-212	Mechanics of Materials-II	3-0	ME-210
ME-331	Heat & Mass Transfer	3-0	
ME-322	Manufacturing Processes	3-1	
ME-325	Engineering Economics	2-0	
ME-216	Mechanics of Materials Lab	0-1	
ME-339	Control Engineering	2-1	
Total:		16-3=19	

Semester-VI			
Course Code	Subjects	Credit Hrs	Pre-Req
ME-310	Mechanics of Machines	3-0	ME-114
ME-327	Instrumentation and Measurement	2-1	
ME-320	Machine Design-II	2-0	ME-218
MATH-361	Probability & Statistics	3-0	
XXX-	Technical Elective-1	2-0	
ME-326	Heating, Ventilating and Air Conditioning	3-0	
ME-332	Heat Transfer and HVAC Lab	0-1	
CSL-401	Community Service Learning	0-2*	
Total:		15-2=17+2*	

Semester-VII			
Course Code	Subjects	Credit Hrs	Pre-Req
MGT-271	Entrepreneurship	2-0	
ME-411	Introduction to Finite Element Analysis	2-1	
ME-421	Mechanical Vibrations	3-0	
ME-433	Mechanisms and Mechanical Vibrations Lab	0-1	
XXX	Technical Elective-2	2-0	
ME-430	Power Plants	3-0	
ME-499	Final Year Project-1	0-3	
Total:		12-5=17	
*CSL-401 (0-2) is not counted in CGPA calculation			

Semester-VIII			
Course Code	Subjects	Credit Hrs	Pre-Req
HU-222	Professional Ethics	2+0	
ME-420	Project Management (Management Elective)	2+0	
ME-424	Health, Safety and Environment	1+0	
XXX	Technical Elective-3	2+0	
ME-439	Internal Combustion Engines	3+0	
ME-431	IC Engines & Power Plants Lab	0+1	
ME-498	Internship (Pass/Fail basis)	-	
ME-499	Final Year Project-II	0+3	
Total:		10+4=14	
Grand Total		136+2*	

Mechanical Engineering-Fall 2018

Deleted Courses Fall 2018 and onwards

- XXX-000 Foreign Language course (2-0) 4th Semester Course
- EE-106 Introduction to Engineering (1-0) 1st Semester Course

5. BE Civil Engineering

Semester-I			
Course Code	Subjects	Credit Hrs	Pre-Req
HU-100	English	2-0	
CS-114	Fundamentals of Programming	2-1	
HU-107	Pakistan Studies	2-0	
MATH-101	Calculus and Analytical Geometry	3-0	
PHY-102	Applied Physics	2-1	
ME-105	Workshop Practice	0-1	
CE-102	Civil Engineering Materials	3-0	
Total		14-3	

Semester-II			
Course Code	Subjects	Credit Hrs	Pre-Req
		Th	
HU-101	Islamic Studies	2-0	
MATH-121	Linear Algebra and ODE	3-0	
ME-109	Engineering Drawing	0-2	
HU-109	Communication Skills	2-0	
CE-121	Engineering Geology	3-0	
ME-XXX	Engineering Mechanics	2-1	CH Change
Total		12-3	

Semester-III			
Course Code	Subjects	Credit Hrs	Pre-Req
MATH-352	Numerical Methods	3-1	
CE-203	Mechanics of Solids-I	2-1	(ME-106)
CE-251	Fluid Mechanics-I	2-1	
CE-182	Surveying-I	2-1	
CE-222	Soil Mechanics - I	2-1	
CE-241	Transportation Engineering-I	3-0	
Total		14-5	
Note: Transfer student will take all 3x program-specific-courses in next Summer			

Semester-IV			
Course Code	Subjects	Credit Hrs	Pre-Req
MATH-361	Probability and Statistics	3-0	

CE-206	Structural Analysis-I	3-0	
CE-XXX	Environmental Engineering-I (New Course)	2-0	
CE-252	Fluid Mechanics-II	2-1	CE-251
CE-205	Mechanics of Solids-II	2-1	CE-203
CE-286	Surveying-II	1-2	CE-182
CE-342	Transportation Engineering-II	2-1	CE-241
Total		15-5	

Semester-V			
Course Code	Subjects	Credit Hrs	Pre-Req
CE-371	Construction Project Management	2-1	
CE-XXX	Structural Analysis-II (CHs Change)	3-0	CE-206
CE-XXX	Engineering Hydrology (CHs Change)	2-1	
CE-308	Plain & Reinforced Concrete-I	3-1	
CE-324	Soil Mechanics-II	2-1	CE-222
CE-372	Quantity Surveying and cost Estimation	3-0	
Total		15-4	

Semester-VI			
Course Code	Subjects	Credit Hrs	Pre-Req
CE-388	Computer Aided Civil Engineering Design and Graphics	1-2	
CE-309	Structural Analysis-III	3-0	CE-307
CE-310	Plain & Reinforced Concrete-II	3-1	CE-308
CE-XXX	Geo-Informatics (CHs Change)	1-1	
CE-XXX	Environmental Engineering-II (New Course)	2-1	CE-XXX
CE-00	Elective-I	3-0	
ARCH-305	Architecture & Town Planning (Shifted from 7 th Semester)	2-0	
Total		15-5	

Semester-VII			
Course Code	Subjects	Credit Hrs	Pre-Req
CE-411	Steel Structures	3-0	
HU-212	Technical & Business Writing	2-0	
ECO-130	Engineering Economics	2-0	
CE-375	Construction Engineering	3-0	
CE-00	Elective-II	3-0	
CE-499	Project-I (CHs Change)	0-3	
		Total	13-3

Semester-VIII			
Code	Subjects	Credit Hrs	Pre-Req
MGT-271	Entrepreneurship	2-0	
CE-XXX	Irrigation Engineering (CHs Change)	2-1	
HU-222	Professional Ethics	2-0	
CE-	Elective-III	3-0	
CE-499	Project-II	0-3	
		Total	9-4
		Grand Total	139

Summary of Proposed Changes

Proposed Changes	No of Courses
Revision of CHs	8
Addition of new courses	3
Revision of course contents	2
Pre requisites removed	1

Revision of Credit Hrs - 8

Code	Course Title	Existing	Proposed
ME-106	Engineering Mechanics	2.5-0.5	2-1
CE-444	Traffic Engineering and Safety	2.5-0.5	3-0
CE-445	Road Construction, Material and Practices	2.5-0.5	3-0
CE-446	Geometric design of Highways	2.5-0.5	3-0
CE-354	Engineering Hydrology	1.5-0.5	2-1
CE-458	Irrigation Engineering	2.5-0.5	2-1
CE-459	Hydraulic Engineering	3-0	2-1
CE-XXX	Geo-Informatics	2-1	1-1

Addition of new courses – 3

Code	Course Title	CHs
CE-4XX	Environmental Engineering-I	2-0
CE-4XX	Environmental Engineering-II	2-1
CE-4XX	Hydrological Systems Modeling	3-0

Revision of course contents – 2

CE-251	Fluid Mechanics-I	2-1
CE-252	Fluid Mechanics-II	2-1

9. BE Chemical Engineering

Semester I			
Course Code	Subjects	Credit Hrs	Pre Req
HU-107	Pakistan Studies	2-0	
PHY-102	Applied Physics	2-1	
CHE-101	Chemical Process Principles-I	3-0	
CS-100	Fundamentals of ICT	2-1	
ME-105	Workshop Practice	0-1	
MATH-101	Calculus and Analytical Geometry	3-0	
HU-100	English	2-0	
Total:		14-3	

Semester II			
Course Code	Subjects	Credit Hrs	Pre Req
CS-114	Fundamentals of Programming	2-1	
CH-102	Inorganic & Analytical Chemistry	3-1	
HU-101	Islamic Studies	2-0	
ME-109	Engineering Drawing	0-2	
MATH-121	Linear Algebra and ODEs	3-0	MATH-101
HU-109	Communication Skills	2-0	
Total:		12-4	

Semester III			
Course Code	Subjects	Credit Hrs	Pre Req
CH-202	Organic & Biochemistry	3-1	
CHE-221	Fluid Mechanics-I	3-0	
CHE-231	Chemical Engineering Thermodynamics-I	3-0	
CHE-202	Advanced Chemical Process Principles	3-0	CHE-101
MATH-112	Calculus-II	3-0	MATH-101
MSE-101	Fundamentals of Engg Materials	3-0	Nil
Total:		18-1	

Note: Transfer Student will take CHE-101 Chemical Process Principles-I instead of CHE-202 Advanced Chemical Process Principles which will be taken in next Summer

Semester IV			
Course Code	Subjects	Credit Hrs	Pre Req
CHE-211	Chemical Process Technology	3-0	
CHE-241	Mass Transfer	2-0	

CHE-242	Heat Transfer	3-1	
EE-103	Electrical Engineering	2-1	
HU-212	Technical & Business writing	2-0	
CHE-224	Fluid Mechanics –II	2-1	CHE-221
Total:		14-3	
Note: Transfer student will take CH-102 Inorganic & Analytical Chemistry (3-1). CS-100 Fundamentals of ICT (2-1) will be taken in next Summer			

Semester V			
Course Code	Subjects	Credit Hrs	Pre Req
CHE-346	Particulate Technology	3-1	
CHE-343	Simultaneous Heat & Mass Transfer-I	3-1	(CHE-242) Heat Transfer, (CHE-241) Mass Transfer, (MATH-121) Linear Algebra & ODES
MATH-351	Numerical Methods	3-0	(MATH-101) Calculus & Analytical Geometry (MATH-121) Linear Algebra & ODES
CHE-332	Chemical Engineering Thermodynamics-II	3-1	(CHE-231) Chemical Engg Thermodynamics-1
MGT-271	Entrepreneurship	2-0	
Total:		14-3	

Semester VI			
Course Code	Subjects	Credit Hrs	Pre Req
CHE-348	Simultaneous Heat & Mass Transfer-II	3-1	CHE-343
CHE-323	Instrumentation & Process Control	3-1	
CHE-347	Chemical Reaction Engineering	3-1	
CHE-345	Transport Phenomena	3-0	CHE-221 CHE-343
ECO-130	Engineering Economics	2-0	
		Total:	14-3
		Industrial Training (Non Credit)	

Semester VII			
Course Code	Subjects	Credit Hrs	Pre Req
CHE-422	Fuels & Combustion	3-1	
CHE-451	Chemical Engineering Plant Design	3-0	CHE-343 CHE-345 CHE-348
CHE-499	Final Year Project	0-3	
XXX-XXX	Elective-I (Technical)	3-0	
CHE-452	Chemical Process Design & Simulation	2-1	CHE-348 CHE-345
		Total:	11-5

Semester VIII			
Course Code	Subjects	Credit Hrs	Pre-Req
CHE-425	Maintenance & Process Safety	3-0	Nil
CHE-499	Final Year Project	0-3	Nil
OTM-456	Production & Operational Management	3-0	Nil
XXX-XXX	Elective – II (Technical)	3-0	Nil
XX-XXX	Elective – III (social)	3-0	Nil
		Total:	12-3
		Grand Total:	134

10. BE Metallurgy & Materials Engineering

Semester I			
Course Code	Subjects	Credit Hrs	Pre-Req
EE-103	Electrical Engineering	2-1	
HU-100	English	2-0	
MATH-101	Calculus and Analytical Geometry	3-0	
ME-105	Workshop Practice	0-1	
PHY-102	Applied Physics	2-1	
HU-107	Pakistan Studies	2-0	
CS-114	Fundamentals of Programming	2-1	
Total CHs		13-4	

Semester II			
Course Code	Subjects	Credit Hrs	Pre Req
MATH-121	Linear Algebra and ODEs	3-0	
ME-109	Engineering Drawing	0-2	
HU-109	Communication skills	2-0	
CS-100	Fundamentals of ICT	2-1	
HU-101	Islamic Studies	2-0	
MSE-101	Fundamentals of Engineering Materials	3-0	
Total CHs		12-3	

Semester III Course Title			
Course Code	Subjects	Credit Hrs	Pre Req
MSE-101	Fundamentals of Engineering Materials	3-0	
EE-103	Electrical Engineering	2-1	
CH-108	Applied Chemistry	3-1	
MATH-112	Calculus II	3-0	MATH-101
MSE-201	Materials Engineering Lab-1	0-1	
MSE-241	Polymer Science	3-0	
MSE-221	Materials Thermodynamics & Kinetics	3-0	
MSE-231	X-ray Diffraction & Crystallography	3-0	MSE-101
Total CHs		17	

Note: Transfer students will take MSE-101 Fundamentals of Engineering Materials (3-0) & EE-103 Electrical Engineering (2-1).

MSE-231 X-ray Diffraction & Crystallography (3-0) will be taken in next Summer

Semester IV			
Course Code	Subjects	Credit Hrs	Pre-Req
ECO-130	Engineering Economics	2-0	
MATH-351	Numerical Methods	3-0	MATH-121
MSE-202	Materials Engineering Lab 2	0-1	
MSE-224	Deformation & Fracture	3-0	MSE-101
MSE-222	Phase Transformation & Equilibria	3-0	MSE-221
HU-212	Technical & Business Writing	2-0	
PHY-213	Physics of Materials	2-0	PHY-102
Total CHs		15-1	
Note: Transfer Student will take CS-100 Fundamentals of ICT (2-1)			

Semester V			
Course Code	Subjects	Credit Hrs	Pre Req
MSE-303	Materials Engineering Lab 3	0-2	
MSE-313	Welding & Joining	2-0	MSE-101
MSE-316	Foundry Engineering	3-0	
MSE-333	Materials Testing Techniques	3-0	
MSE-342	Polymer Engineering	3-0	MSE-241
MSE-213	Metals and Alloys-1	3-0	MSE-101
MGT-271	Entrepreneurship	2-0	
Total CHs		16-2	

Semester VI			
Course Code	Subjects	Credit Hrs	Pre Req
MSE-314	Manufacturing Processes	3-0	ME-105
MSE-304	Materials Engineering Lab 4	0-2	
MSE-326	Corrosion & Protection	3-0	MSE-213
MSE-317	Metals and Alloys-2	3-0	MSE-213
MSE-351	Ceramics & Glasses	3-0	MSE-101
MSE-3XX	Technical Elective - I	3-0	
Total CHs		17	

Semester VII			
Course Code	Subjects	Credit Hrs	Pre Req
MSE-461	Composite Materials	3-0	MSE-101
OTM-454	Project Management	3-0	
MSE-405	Materials Engineering Lab 5	0-1	
MSE-474	Surface Engineering of Materials	3-0	
MSE-325	Heat Treatment of Materials	3-0	MSE-222

MSE-499	Final Year Project -I	0-2	
MSE/MGT-XXX	Technical Elective -II	3-0	
Total CHs		15-3	

Semester VIII			
Course Code	Subjects	Credit Hrs	Pre Req
MSE-483	Plant Design	3-0	
HU-222	Professional Ethics	2-0	
ME-312	Measurement & Instrumentation	2-0	
MSE-463	Nano-materials	2-0	PHY-213
MSE-499	Final Year Project-II	0-4	
MSE-4XX	Technical Elective-III	3-0	
Total CHs		12-4	
Grand Total		134	

11. BE Geo-informatics Engineering

Semester I			
Course Code	Subjects	Credit Hrs	Pre Req
HU-100	English	2-0	
ME-109	Engineering Drawing	0-2	
HU-101	Islamic Studies	2-0	
MATH-101	Calculus & Analytical Geometry	3-0	
ME-105	Workshop Practice	0-1	
PHY-102	Applied Physics	2-1	
GIE-100	Geography	3-0	
Total CHs		12-4	

Semester II			
Course Code	Subjects	Credit Hours	Pre Req
GIE-101	Introduction to GIS	2-1	
HU-107	Pakistan Studies	2-0	
MATH-121	Linear Algebra and Ordinary Differential Equations	3-0	MATH-101
CS-114	Fundamentals of Programming	2-1	
HU-109	Communication Skills	2-0	
CE-182	Surveying-I	2-1	
Total CHs		13-3	

Semester III			
Course Code	Subjects	Credit Hours	Pre Req
GIE-102	Introduction to Remote Sensing	2-1	
ECO-130	Engineering Economics	2-0	
CS-212	Object Oriented Programming	3-1	CS-114
MATH-222	Linear Algebra	3-0	MATH-121
GIE-111	Computer Aided Drawing	1-2	
HU-212	Technical & Business Writing	2-0	
Total CHs		13-4	
Note: Transfer student will take GIE-100 Geography (3-0)			

Semester IV			
Course Code	Subjects	Credit Hours	Pre Req
CS-250	Data Structures and Algorithms	3-1	
GIE-203	Digital Mapping & Image Processing	2-1	GIE-102
GIE-204	Photogrammetry	2-1	
MATH-361	Probability & Statistics	3-0	
CE-223	Soil Mechanics	3-1	
Total CHs		13-4	
Note: Transfer student will take GIE-101 Intro to GIS (2-1) / CE-182 Surveying-I (2-1); left over will be taken in next Summer			

Course Code	Subjects	Credit Hours	Pre Req
GIE-306	Cartography and Map Production	2-1	
GIE-312	Geodesy and Map Projections	2-1	
GIE-321	Database Management Systems	2-1	
GIE-205	Spatial Data Analysis	2-1	MATH-361
GIE-342	GIS Applications	2-1	GIE-101
GIE-	Elective I	3-0	
Total CHs		13-5	

Semester VI			
Course Code	Subjects	Theory Credit Hours	Pre Req
GIE-409	Spatial Databases	2-1	GIE-321
GIE-413	GPS Surveying	1-2	CE-182
GIE-341	Geosciences	3-0	
GIE-474	Web GIS	2-1	
GIE-	Elective II	3-0	
GIE	Elective III	3-0	
Total CHs		14-4	

Semester VII			
Course Code	Subjects	Credit Hrs	Pre Req
HU-222	Professional Ethics	2-0	
GIE-419	Spatial Decision Support Systems	2-1	GIE-409
GIE-499	Project I (GI Design Project)	0-3	
GIE-	Elective IV	3-0	
GIE-	Elective V	3-0	
GIE-414	Land use Planning	2-1	GIE-101
Total CHs		12-5	

Semester VIII			
Course Code	Subjects	Credit Hrs	Pre Req
MGT-471	Entrepreneurship	2-0	
GIE-xxx	Geospatial Project Management	2-0	
GIE-499	Project II (GI Design Project)	0-3	
GIE-	Elective VI	3-1	
GIE-	Elective VII	3-0	
	Community Service	0-2	
Total CHs		10-4	

12. BE Environmental Engg

Semester I			
Course Code	Subjects	Credit Hrs	Pre Req
HU-101	Islamic Studies	2-0	
HU-100	English	2-0	
MATH-101	Calculus & Analytical Geometry	3-0	
*ENE-213	Environmental Chemistry	2-1	
ME-105	Workshop Practice	0-1	
*CE-183	Surveying	1-2	
CS-114	Fundamentals of Programming	2-1	
Total CHs		12-5	

Semester II			
Course Title		Credit Hrs	Pre-Req
PHY-102	Applied Physics	2-1	
ME-109	Engineering Drawing	0-2	
HU-107	Pakistan Studies	2-0	
HU-109	Communication Skills	2-0	
*EE-101	Electrical Technology	2-1	
MATH-121	Linear Algebra and Ordinary Differential Equations	3-0	
Total CHs		11-4	

Semester III			
Course Title		Credit Hrs	Pre-Req
ENE-101	Introduction to Environmental Engineering	3-0	
ENE-251	Ecological Management	2-0	
MATH-361	Probability & Statistics	3-0	
ENE-262	Computer Aided Design and Drafting	2-2	
ENE-111	Introduction to Microbiology	3-0	
Total CHs		13-2	

Semester IV			
Course Title		Credit Hrs	Pre-Req
CE-253	Fluid Mechanics	3-1	
ENE-212	Environmental Microbiology	2-1	
MATH-331	Numerical Analysis	3-0	
ME-204	Thermodynamics	3-1	
ME-100	Engineering Mechanics	3-0	
Total CHs		14-3	

Semester V			
Course Title		Credit Hrs	Pre-Req
ENE-302	Water Treatment and Supply Network Design	3-1	
GIE-201	Introduction to GIS and Remote Sensing	2-1	
CE-223	Soil Mechanics	3-1	
CE-356	Engineering Hydrology	3-1	
ENE-435	Cleaner Production Techniques	2-0	
ENE-421	Solid Waste Management	3-0	
Total CHs		16-4	

Semester VI			
Course Title		Credit Hrs	Pre-Req
ENE-353	Project Planning & Management	2-0	
ENE-303	Wastewater Collection & Treatment	3-1	
XXX	Elective - I	3-0	
ENE-304	Environmental Engineering Lab Techniques	2-2	
MGT-271	Entrepreneurship	2-0	
ENE-332	Environmental Impact Assessment	2-0	
ENE-252	Environmental Economics	2-0	
Total CHs		16-3	

Semester VII			
Course Title		Credit Hours	Pre-Req
HU-222	Professional Ethics	2-0	
ENE-434	Environmental Health & Safety	2-0	
HU-212	Technical and Business Writing	2-0	
ENE-442	Water Pollution Control	3-0	

ENE-441	Air & Noise Pollution Control	3-1	
ENE-499	Final Year Project - I	0-3	
Total CHs		12-4	

Semester VIII			
Course Title		Credit Hours	Pre-Requisite
CE-454	Water Resources & Irrigation Engineering	2-1	
ENE-454	Energy Resources and Management	3-0	
XXX	Elective – II	3-0	
XXX	Elective – III	3-0	
CSL-401	Community Service Learning Course	0-2	
ENE-499	Final Year Project – II	0-3	
Total CHs		11-6	

Course Title		Credit Hours	Pre-Requisite
Electives		Theory	
CHE-441	Fermentation Technology	3-0	-
CHE-442	Membrane Technology	3-0	-
GOE-341	Geosciences	3-0	-
ENE-422	Industrial Waste Management	3-0	-
ENE-455	Environmental Modelling	3-0	-
CE-207	Structural Analysis	3-0	-
CE-242	Transportation Engineering	3-0	-
CE-372	Quantity Surveying and Cost Estimation	3-0	-