

**ANDHRA UNIVERSITY :: A.U.COLLEGE OF ENGINEERING(A)
SCHEME OF INSTRUCTION & EXAMINATION
I/IV B.TECH(FOUR YEAR COURSE)
&
I/VI B.TECH & M.TECH(SIX YEAR DOUBLE DEGREE COURSE)
(WITH EFFECT FROM 2015-16 ADMITTED BATCH ONWARDS)
UNDER CHOICE BASED CREDIT SYSTEM
BRANCH:CHEMICAL ENGINEERING
SEMESTER: FIRST**

Code No.	Course	Credits	Theory	Tutorial hrs	Lab hrs	Total contact Hrs/week	Sessional marks	Exam marks	Total marks
ENG 1101	English	4	3	1	--	4	30	70	100
ENG 1102	Mathematics-I	4	3	1	--	4	30	70	100
ENG 1103	Mathematics-II	4	3	1	--	4	30	70	100
ENG 1104	Chemistry	4	3	1	--	4	30	70	100
ENG 1106	Computer programming and numerical methods	4	3	1	3	4	30	70	100
ENG 1108	History of science and technology	2	2	--	--	2	30	70	100
ENG 1110	Chemistry lab	2	--	--	3	3	50	50	100
ENG 1112	Computer programming and numerical methods lab	2	--	--	3	3	50	50	100
ENG 1114	NCC/NSS/ Sports(Audit)	2	--	--	--	3	--	--	--
	TOTAL	28	17	5	9	31	280	520	800

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UNDER CHOICE BASED CREDIT SYSTEM
BRANCH:CHEMICAL ENGINEERING
SEMESTER: SECOND**

Code	Course	Credits	Theory	Tutorial hrs	Lab hrs	Total contact hrs/week	Sessional marks	Exam marks	Total marks
ENG 1201	Mathematics-III	4	3	1	--	4	30	70	100
ENG 1202	Physics	4	3	1	--	4	30	70	100
ENG 1204	Engineering graphics	4	2	--	3	5	30	70	100
ENG 1206	Ethics and moral values	2	2	--	--	2	30	70	100
DS 1208	Inorganic chemistry	4	3	1	--	4	30	70	100
ENG 1209	Physics lab	2	--	--	3	3	50	50	100
ENG 1211	Workshop	2	--	--	3	3	50	50	100
ENG 1213	English language lab	2	--	--	3	3	50	50	100
ENG 1214	NCC/NSS/Sports(Audit)	2	--	--	--	3	--	--	--
	Total	26	13	3	12	31	300	450	800

**ANDHRA UNIVERSITY :: A.U.COLLEGE OF ENGINEERING(A)
COMMON SCHEME OF INSTRUCTION & EXAMINATION
II/IV B.TECH(FOUR YEAR COURSE)**

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**II/VI B.TECH & M.TECH(SIX YEAR DOUBLE DEGREE COURSE)
(WITH EFFECT FROM 2015-16 ADMITTED BATCH ONWARDS)**

UNDER CHOICE BASED CREDIT SYSTEM

BRANCH:CHEMICAL ENGINEERING

SEMESTER: FIRST

Code No.	Course	Credits	Theory	Tutorial hrs	Lab hrs	Total contact hrs/week	Sessional marks	Exam marks	Total marks
CHE 2.1.1	Mathematics-IV	4	3	1	--	4	30	70	100
CHE 2.1.2	Physical Chemistry	4	3	1	--	4	30	70	100
CHE 2.1.3	Organic Chemistry	4	3	1	--	4	30	70	100
CHE 2.1.4	Mechanical Engineering	4	3	1	--	4	30	70	100
CHE 2.1.5	Basic Electrical Engineering	4	3	1	--	4	30	70	100
CHE 2.1.6	Strength of Materials	4	3	1	--	4	30	70	100
CHE 2.1.7	Physical and Analytical Chemistry lab	2	--	--	3	3	50	50	100
CHE 2.1.8	General Engineering lab	2	--	--	3	3	50	50	100
CHE 2.1.9	Organic Chemistry lab	2	--	--	3	3	50	50	100
	TOTAL	30	18	6	9	33	330	570	900

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UNDER CHOICE BASED CREDIT SYSTEM

BRANCH:CHEMICAL ENGINEERING

SEMESTER: SECOND

Code No.	Course	Credits	Theory hrs	Tutorial	Lab hrs	Total contact hrs/week	Sessional marks	Exam marks	Total marks
CHE 2.2.1	Fluid Mechanics	4	3	1	--	4	30	70	100
CHE 2.2.2	Mechanical operations	4	3	1	--	4	30	70	100
CHE 2.2.3	Chemical process calculations	4	3	1	--	4	30	70	100
CHE 2.2.4	Chemical Engineering Thermodynamics-I	4	3	1	--	4	30	70	100
CHE 2.2.5	Inorganic chemical technology	4	3	1	--	4	30	70	100
CHE 2.2.6	Environmental studies	2	2	--	--	2	30	70	100
CHE 2.2.7	Fluid mechanics lab	2	--	--	3	3	50	50	100
CHE 2.2.8	Mechanical Operations lab	2	--	--	3	3	50	50	100
	TOTAL	26	17	5	6	28	280	520	800

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UNDER CHOICE BASED CREDIT SYSTEM

BRANCH:CHEMICAL ENGINEERING

SEMESTER: FIRST

Code No.	Course	Credits	Theory hrs	Tutorial	Lab hrs	Total contact hrs/week	Sessional marks	Exam marks	Total marks
CHE 3.1.1	Mass transfer-I	4	3	1	--	4	30	70	100
CHE 3.1.2	Heat transfer	4	3	1	--	4	30	70	100
CHE 3.1.3	Chemical Engineering thermodynamics-II	4	3	1	--	4	30	70	100
CHE 3.1.4	Organic chemical technology	4	3	1	--	4	30	70	100
CHE 3.1.5	Material science and Engineering	4	3	1	--	4	30	70	100
CHE 3.1.6	Elective-I	4	3	1	--	4	30	70	100
CHE 3.1.7	Mass Transfer-I lab	2	--	--	3	3	50	50	100
CHE 3.1.8	Heat Transfer lab	2	--	--	3	3	50	50	100
CHE 3.1.9	Chemical Technology lab	2	--	--	3	3	50	50	100
	TOTAL	30	18	6	9	33	330	570	900

Elective-I: 1.Paper technology, 2. Fertilizer technology, 3. Petrochemicals, 4. Ceramic raw materials. 5. Fuel cell technology, 6. Polymer technology.

Massive online open courses (MOOCS):1.Numerical methods applied to Chemical Engineering, 2.Molecular aspects of Chemical Engineering, 3. Integrated Chemical Engineering -I, 4. Integrated Chemical Engineering-II,5. Biochemical Engineering, 6.Water and wastewater treatment Engineering. 7. Chemical and Biological Reaction Engineering, 8.Rocket propulsion. 9. Introduction to Chemical Engineering topics I: Process control by design, 10. Introduction to Chemical Engineering topics II: Introduction to Biocatalysis.

Student has to pass two courses (MOOCS) by choosing two among the above mentioned courses. Student can do the courses from 3rd Year first semester onwards and 2 credits will be given for each course. Also student can do two or more courses as add on courses from 3rd year first semester onwards and grading will be mentioned in the marks list.

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BRANCH:CHEMICAL ENGINEERING
SEMESTER: SECOND**

Code No.	Course	Credits	Theory hrs	Tutorial	Lab hrs	Total contact hrs/week	Sessional marks	Exam marks	Total marks
CHE 3.2.1	Mass transfer-II	4	3	1	--	4	30	70	100
CHE 3.2.2	Chemical Reaction Engineering-I	4	3	1	--	4	30	70	100
CHE 3.2.3	Process Instrumentation	4	3	1	--	4	30	70	100
CHE 3.2.4	Chemical Engineering Mathematics	4	3	1	--	4	30	70	100
CHE 3.2.5	Process dynamics and control	4	3	1	--	4	30	70	100
CHE 3.2.6	Elective-II	4	3	1	--	4	30	70	100
CHE 3.2.7	Mass transfer-II lab	2	--	--	3	3	50	50	100
CHE 3.2.8	Process dynamics and control lab	2	--	--	3	3	50	50	100
CHE 3.2.9	Soft skills lab	2	--	--	3	3	50	50	100
	TOTAL	30	18	6	9	33	330	570	900

Elective-II: 1. Computer applications in chemical Engineering , 2. Process modeling and simulation, 3.Petroleum refining, 4. Whiteware and heavy clayware, 5.Computational fluid dynamics , 6. Multicomponent separation processes

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UNDER CHOICE BASED CREDIT SYSTEM

BRANCH:CHEMICAL ENGINEERING

SEMESTER: FIRST

Code No.	Course	Credits	Theory hrs	Tutorial	Lab hrs	Total contact hrs/week	Sessional marks	Exam marks	Total marks
CHE 4.1.1	Transport phenomena	4	3	1	--	4	30	70	100
CHE 4.1.2	Industrial management	4	3	1	--	4	30	70	100
CHE 4.1.3	Chemical plant equipment design	4	3	1	--	4	30	70	100
CHE 4.1.4	Process Engineering Economics	4	3	1	--	4	30	70	100
CHE 4.1.5	Chemical Reaction Engg-II	4	3	1	--	4	30	70	100
CHE 4.1.6	Elective-III	4	4	--	--	4	30	70	100
CHE 4.1.7	Chemical Reaction Engg lab	2	--	--	3	3	50	50	100
CHE 4.1.8	CPED lab	2	--	--	3	3	50	50	100
CHE 4.1.9	Seminar	2	--	--	3	3	100	--	100
	TOTAL	30	19	5	9	33	380	520	900

Elective-III: 1. Computer aided design, 2. Industrial pollution control Engineering, 3. Process optimization, 4. Reservoir Engineering, 5. Fuels , Refractories and furnaces, 6. Biochemical Engineering

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UNDER CHOICE BASED CREDIT SYSTEM
BRANCH:CHEMICAL ENGINEERING
SEMESTER: SECOND**

Code No.	Course	Credits	Theory	Tutorial	Lab	Total hrs/week	Sessional marks	Exam marks	Total marks
CHE 4.2.1	Industrial Training report	20	--	--	--	--	--	100	100
	TOTAL	20	--	--	--	--	--	100	100

Note: 50% of the 4/4 & 4/6, 1st semester students will do course work in the first semester and the remaining 50% of the students will go for industrial training. The students who have gone for industrial training during first semester will do 1st semester course work in second semester and the students who have done course work in 1st semester will go for industrial training during second semester.

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SCHEME OF INSTRUCTION & EXAMINATION
V/VI B.TECH & M.TECH(SIX YEAR DOUBLE DEGREE COURSE)
(WITH EFFECT FROM 2015-16 ADMITTED BATCH ONWARDS)
UNDER CHOICE BASED CREDIT SYSTEM
BRANCH: CHEMICAL ENGINEERING
SEMESTER: FIRST**

Code No.	Course	Credits	Theory	Tutorial	Lab	Total	Sessional marks	Exam marks	Total marks
CHEM 5.1.1	Process modeling and simulation	4	3	1	--	4	30	70	100
CHEM 5.1.2	Process dynamics and control	4	3	1	--	4	30	70	100
CHEM 5.1.3	Chemical Reaction Engineering	4	3	1	--	4	30	70	100
CHEM 5.1.4	Transport phenomena	4	3	1	--	4	30	70	100
CHEM 5.1.5	Elective-I	4	4	--	--	4	30	70	100
CHEM 5.1.6	Elective lab	3	--	--	6	6	50	50*	100
CHEM 5.1.7	Seminar	3	--	--	6	6	100	--	100
	TOTAL	26	16	4	12	32	300	400	700

*Only internal evaluation.

Elective-I: 1. Petroleum Refinery Engineering, 2. Energy Engineering, 3. Electrochemical Engineering, 4. Corrosion Engineering, 5. Process dynamics and control, 6. Reaction Engineering.

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BRANCH:CHEMICAL ENGINEERING
SEMESTER: SECOND

Code No.	Course	Credits	Theory	Tutorial	Lab	Total	Sessional marks	Exam marks	Total marks
CHEM 5.2.1	Computer aided design	4	3	1	--	4	30	70	100
CHEM 5.2.2	Advanced Engineering maths and statistics	4	3	1	--	4	30	70	100
CHEM 5.2.3	Advanced mass transfer	4	3	1	--	4	30	70	100
CHEM 5.2.4	Pollution control	4	3	1	--	4	30	70	100
CHEM 5.2.5	Elective-II	4	4	--	--	4	30	70	100
CHEM 5.2.6	Elective lab	3	--	--	6	6	50	50	100
CHEM 5.2.7	Seminar	3	--	--	6	6	100	--	100
	TOTAL	26	16	4	12	32	300	400	700

Elective – II :

1. Petroleum Refinery Engineering
2. Energy Engineering
3. Electrochemical Engineering
4. Corrosion Engineering
5. Process Dynamics and Control
6. Reaction Engineering.

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UNDER CHOICE BASED CREDIT SYSTEM
BRANCH: CHEMICAL ENGINEERING
SEMESTER: FIRST & SECOND**

PROJECT WORK:

- Project guide will be allotted at the beginning of first semester and the student has to give presentation on his/her project work at the end of first semester and grading will be awarded as A,B,C or F.
- At the end of second semester final viva-voce examination will be conducted and grading will be awarded as A,B,C or F.

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I/IV B.TECH(FOUR YEAR COURSE)
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UNDER CHOICE BASED CREDIT SYSTEM
BRANCH: BIOTECHNOLOGY
SEMESTER: FIRST

Code No.	Course	Credits	Theory	Tutorial	Lab	Total	Sessional marks	Exam marks	Total marks
ENG 1101	English	4	3	1	--	4	30	70	100
ENG 1102	Mathematics-I	4	3	1	--	4	30	70	100
ENG 1103	Mathematics-II	4	3	1	--	4	30	70	100
ENG 1104	Chemistry	4	3	1	--	4	30	70	100
ENG 1106	Computer programming and numerical methods	4	3	1	--	4	30	70	100
ENG 1108	History of science and technology	2	2	--	--	2	30	70	100
ENG 1110	Chemistry lab	2	--	--	3	3	50	50	100
ENG 1112	Computer programming and numerical methods lab	2	--	--	3	3	50	50	100
ENG 1114	NCC/NSS/ Sports(Audit)	2	--	--	--	3	--	--	--
	TOTAL	28	17	5	6	31	280	520	800

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BRANCH: BIOTECHNOLOGY
SEMESTER: SECOND

Code	Course	Credits	Theory	Tutorial	Lab	Total	Sessional marks	Exam marks	Total marks
ENG 1201	Mathematics-III	4	3	1	--	4	30	70	100
ENG 1202	Physics	4	3	1	--	4	30	70	100
ENG 1204	Engg.Graphics	4	2	-	3	5	30	70	100
ENG 1206	Ethics and moral values	2	2	-	--	2	30	70	100
DS 1208	Inorganic chemistry	4	3	1	--	4	30	70	100
ENG 1209	Physics lab	2	--	--	3	3	50	50	100
ENG 1211	workshop	2	--	--	3	3	50	50	100
ENG 1213	English language lab	2	--	--	3	3	50	50	100
ENG 1214	NCC/NSS/Sports (Audit)	2	--	--	--	3	--	--	--
	Total	26	13	3	12	31	300	500	800

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BRANCH: BIOTECHNOLOGY
SEMESTER: FIRST

Code No.	Course	Credits	Theory	Tutorial	Lab	Total	Sessional marks	Exam marks	Total marks
BT 2.1.1	Microbiology	4	3	1	--	4	30	70	100
BT 2.1.2	Physical chemistry	4	3	1	--	4	30	70	100
BT 2.1.3	Organic chemistry	4	3	1	--	4	30	70	100
BT 2.1.4	Fundamentals of Biology	4	3	1	--	4	30	70	100
BT 2.1.5	Genetics	4	3	1	--	4	30	70	100
BT 2.1.6	Basic Electrical and Electronics Engineering	4	3	1	--	4	30	70	100
BT 2.1.7	Organic Chemistry lab	2	--	--	3	3	50	50	100
BT 2.1.8	Microbiology lab	2	--	--	3	3	50	50	100
	TOTAL	28	18	6	6	30	280	520	800

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BRANCH: BIOTECHNOLOGY
SEMESTER: SECOND

Code No.	Course	Credits	Theory	Tutorial	Lab	Total	Sessional marks	Exam marks	Total marks
BT 2.2.1	Biochemistry	4	3	1	--	4	30	70	100
BT 2.2.2	Bio analytical techniques	4	3	1	--	4	30	70	100
BT 2.2.3	Cell and molecular biology	4	3	1	--	4	30	70	100
BT 2.2.4	Process calculations	4	3	1	--	4	30	70	100
BT 2.2.5	Fluid Mechanics and Heat transfer	4	3	1	--	4	30	70	100
BT 2.2.6	Environmental studies	2	2	--	--	2	30	70	100
BT 2.2.7	Biochemistry and Bio analytical Techniques lab	2	--	--	3	3	50	50	100
BT 2.2.8	Fluid mechanics lab	2	--	--	3	3	50	50	100
BT 2.2.9	Cell and molecular biology lab	2	--	--	3	3	50	50	100
	TOTAL	28	17	5	9	31	330	570	900

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BRANCH: BIOTECHNOLOGY
SEMESTER: FIRST

Code No.	Course	Credits	Theory	Tutorial	Lab	Total	Sessional marks	Exam marks	Total marks
BT 3.1.1	Mass transfer	4	3	1	--	4	30	70	100
BT 3.1.2	Biostatistics	4	3	1	--	4	30	70	100
BT 3.1.3	Downstream processing	4	3	1	--	4	30	70	100
BT 3.1.4	Enzyme Engineering	4	3	1	--	4	30	70	100
BT 3.1.5	Thermodynamics	4	3	1	--	4	30	70	100
BT 3.1.6	Elective-I	4	3	1	--	4	30	70	100
BT 3.1.7	Unit operations lab	2	--	--	3	3	50	50	100
BT 3.1.8	Downstream Processing lab	2	--	--	3	3	50	50	100
	TOTAL	28	18	6	6	30	280	520	800

Elective-I: 1. Food technology, 2. Process optimization, 3. Energy Engineering, 4. Systems Biology.

Massive online open courses (MOOCS):1.Chemical and Biological Reaction Engineering, 2. Computation for biological Engineers, 3. Biochemical Engineering, 4.Water and wastewater treatment Engineering, 5.Cellular and Molecular Immunology, 6.Enzyme Science and Engineering, 7. Plant Biotechnology, 8.Proteomics and Genomics, 9.Tissue Engineering, 10. Metabolic Engineering,

Student has to pass two courses (MOOCS) by choosing two among the above mentioned courses. Student can do the courses from 3rd Year first semester onwards and 2 credits will be given for each course. Also student can do two or more courses as add on courses from 3rd year first semester onwards and grading will be mentioned in the marks list.

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SEMESTER: SECOND

Code No.	Course	Credits	Theory	Tutorial	Lab	Total	Sessional marks	Exam marks	Total marks
BT 3.2.1	Chemical Reaction Engineering	4	3	1	--	4	30	70	100
BT 3.2.2	Immunology	4	3	1	--	4	30	70	100
BT 3.2.3	Engineering economics and Bioprocess design	4	3	1	--	4	30	70	100
BT 3.2.4	Bioprocess Engg.	4	3	1	--	4	30	70	100
BT 3.2.5	Process control	4	3	1	--	4	30	70	100
BT 3.2.6	Elective-II	4	3	1	--	4	30	70	100
BT 3.2.7	Bioprocess and Reaction Engineering lab	2	--	--	3	3	50	50	100
BT 3.2.8	Process control lab	2	--	--	3	3	50	50	100
BT 3.2.9	Soft skills lab	2	--	--	3	3	50	50	100
	TOTAL	30	18	6	9	33	330	570	900

Elective-II: 1. Pharmaceutical Biotechnology, 2. Animal cell culture and Hybridoma technology, 3. Cancer Biology, 4. Stem cells in health care.

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BRANCH: BIOTECHNOLOGY
SEMESTER: FIRST

Code No.	Course	Credits	Theory	Tutorial	Lab	Total	Sessional marks	Exam marks	Total marks
BT 4.1.1	Environmental biotechnology	4	3	1	--	4	30	70	100
BT 4.1.2	Genetic Engineering	4	3	1	--	4	30	70	100
BT 4.1.3	Bioinformatics	4	3	1	--	4	30	70	100
BT 4.1.4	Industrial biotech products	4	3	1	--	4	30	70	100
BT 4.1.5	Plant cell and tissue culture	4	3	1	--	4	30	70	100
BT 4.1.6	Elective-III	4	3	1	--	4	30	70	100
BT 4.1.7	Bioinformatics lab	2	--	--	3	3	50	50	100
BT 4.1.8	Plant cell and tissue culture lab	2	--	--	3	3	50	50	100
BT 4.1.9	Seminar	2	--	--	3	3	100	--	100
	TOTAL	30	18	6	9	33	380	520	900

Elective-III: 1. Agriculture Biotechnology, 2. Industrial management and Entrepreneurship development, 3. Biomedical Engineering, 4. Metabolic Engineering.

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 UNDER CHOICE BASED CREDIT SYSTEM
 BRANCH: BIOTECHNOLOGY
 SEMESTER: SECOND**

Code No.	Course	Credits	Theory	Tutorial	Lab	Total	Sessional marks	Exam marks	Total marks
BT 4.2.1	Industrial Training report	20	--	--	--	--	--	100	100
	TOTAL	20	--	--	--	--	--	100	100

Note: 50% of the final year first semester students will do course work in the first semester and the remaining 50% of the students will go for industrial training. The students who have gone for industrial training during first semester will do first semester course work in second semester and the students who have done course work in first semester will go for industrial training during second semester.

B.Tech(Chemical Engg)(4yrs)	Credits			Subjects			Sessional marks	Exam marks	Total marks
	Theory	Lab	Total	Theory	Lab	Total			
1/4-first semester	22	6	28	6	2	8	280	520	800
1/4-second semester	18	8	26	5	3	8	300	450	800
2/4-first semester	24	6	30	6	3	9	330	570	900
2/4-second semester	22	4	26	6	2	8	280	520	800
3/4-first semester	24	6	30	6	3	9	330	570	900
3/4-second semester	24	6	30	6	3	9	330	570	900
4/4-first semester	24	6	30	6	3	9	380	520	900
4/4-second semester	--	--	20	--	--	--	--	100	100
Total	158	42	220	41	19	60	2230	3820	6100

B.Tech (Biotechnology)(4yrs)	Credits			Subjects			Sessional marks	Exam marks	Total marks
	Theory	Lab	Total	Theory	Lab	Total			
1/4-first semester	22	6	28	6	2	8	280	520	800
1/4-second semester	18	8	26	5	3	8	300	500	800
2/4-first semester	24	4	28	6	2	8	280	520	800
2/4-second semester	22	6	28	6	3	9	330	570	900
3/4-first semester	24	4	28	6	2	8	280	520	800
3/4-second semester	24	6	30	6	3	9	330	570	900
4/4-first semester	24	6	30	6	3	9	380	520	900
4/4-second semester	--	--	20	--	--	--	--	100	100
Total	158	40	218	41	18	59	2180	3820	6000

B.Tech+M.Tech(Che mical Engg)(6yrs)	Credits			Subjects			Sessional marks	Exam marks	Total marks
	Theory	Lab	Total	Theory	Lab	Total			
1/6-first semester	22	6	28	6	2	8	280	520	800
1/6-second semester	18	8	26	5	3	8	300	450	800
2/6-first semester	24	6	30	6	3	9	330	570	900
2/6-second semester	22	4	26	6	2	8	280	520	800
3/6-first semester	24	6	30	6	3	9	330	570	900
3/6-second semester	24	6	30	6	3	9	330	570	900
4/6-first semester	24	6	30	6	3	9	380	520	900
4/6-second semester	--	--	20	--	--	--	--	100	100
5/6-first semester	20	6	26	5	2	7	300	400	700
5/6-second semester	20	6	26	5	2	7	300	400	700
6/6-first semester	--	--	--	--	--	--	--	Grade	Grade
6/6-second semester	--	--	--	--	--	--	--	grade	Grade
Total	198	54	272	51	23	74	2830	4620	7500