

Department of Chemical Engineering

[Minimum Credits to be earned: 174 (for regular students)/132(for Lateral entry students)]

First Semester							
No	Course Code	Course	POs	Periods			
				L	T	P	C
1	16HSX01	English Communication Skills I	10	3	1	-	3
2	16MAX01	Engineering Mathematics I	1,2	3	1	-	3
3	16PYX01	Engineering Physics	1,2	3	1	-	3
4	16MEX01	Engineering Mechanics	1,2,3	3	1	-	3
5	16CSX01	Problem Solving using C	1,2,3	3	1	-	3
6	16PYX02	Engineering Physics Lab	4,9	-	-	3	2
7	16CSX02	Problem solving using C Lab	4,9	-	-	3	2
8	16MEX02	Engineering Drawing	4,9,10	-	-	3	2
Total				15	5	9	21
Second Semester							
1	16HSX03	English Communication Skills II	10	3	1	-	3
2	16MAX02	Engineering Mathematics II	1,2	3	1	-	3
3	16CYX01	Engineering Chemistry	1,2	3	1	-	3
4	16EEX01	Basic Electrical Engineering	1,2,3	3	1	-	3
5	16CHX01	Environmental Studies	1,3,6,7	3	1	-	3
6	16HSX02	English Communication Skills Lab	10	-	-	3	2
7	16CYX02	Engineering Chemistry Lab	4,9	-	-	3	2
8	16MEX03	Engineering Workshop	4,9	-	-	3	2
Total				15	5	9	21
Third Semester							
No	Course Code	Course	POs	Periods			
				L	T	P	C
1	16CY303	Physical & Analytical Chemistry	1,2,3	3	1	-	3
2	16CSX01	Object Oriented Programming	1,2,,4,5	3	-	2	4
3	16CH303	Chemical Engineering Thermodynamics	1,2,3,13	3	1	-	3
4	16CH304	Chemical Process Calculations	1,2,3,13	3	1	-	3
5	16CH305	Introduction to Chemical Engineering	1,13	3	1	-	3
6	16CH306	Process Instrumentation	1,2,13	3	1	-	3
7	16CH307	Computational Tools for Chemical Engineers	4,5,13	-	-	3	2
8	16CH308	Instrumentation Lab	4,9	-	-	3	2
9	16CY304	Physical & Analytical Chemistry Lab	4,9	-	-	3	2
10	16HSX05	CC&EC Activities I	9,10	-	-	3	-
11	16ESX1A	Employability Skills I		-	2	-	-
Total				18	6	12	25
Fourth Semester							
1	16MA303	Engineering Mathematics III	1,2,4,5,9	3	-	2	4
2	16CY405	Organic Chemistry	1,2	3	1	-	3
3	16CH403	Mechanical Unit Operations	1,2,3,13	3	1	-	3
4	16CH404	Momentum Transfer	1,2,3,13	3	1	-	3
5	16CH405	Phase and Chemical Equilibria	1,2,3,13	3	1	-	3
6	16CH406	Process Heat Transfer	1,2,3,13	3	1	-	3
7	16CH407	MUO Lab	4,9,13	-	-	3	2
8	16CH408	Momentum Transfer Lab	4,9,13	-	-	3	2
9	16CH409	Process Heat Transfer Lab	4,9,13	-	-	3	2
10	16HSX05	CC & EC Activities I	9,10	-	-	3	1
11	16ESX1B	Employability Skills II		-	2	-	1
Total				18	7	12	27

Fifth Semester							
No	Course Code	Course	POs	Periods			
				L	T	P	C
1	16HSX04	Engineering Economics & Project Management	1,2,3,11	3	1	-	3
2	16CH502	Chemical Technology	1,3,10,13	3	1	-	3
3	16CH503	Homogeneous Reaction Engineering	1,2,3,13	3	1	-	3
4	16CH504	Principles of Mass Transfer	1,2,3,4,13	3	-	2	4
5	16CH505	Process Dynamics & Control	1,2,3,13	3	1	-	3
6		Elective I/CC		3	1	-	3
7	16CH507	Process Control Lab	4,9,13	-	-	3	2
8	16CH509/ 16CH510	Term Paper/ Mini Project	All POs	-	-	3	2
9	16HSX06	CC & EC Activity II	9,10	-	-	3	-
10		Summer Internship	All POs	-	-	-	-
11	16ESX2A	Employability Skills III		-	2	-	-
Total				14	8	12	23
Sixth Semester							
1	16CH601	Applications of Mass Transfer	1,2,3,13	3	1	-	3
2	16CH602	Chemical Engineering Plant Design & Economics	3,11,13	3	1	-	3
3	16CH603	Chemical Process Equipment Design	1,2,3,4,5,6,7,8,10,13	3	-	2	4
4	16CH604	Heterogeneous Reaction Engineering	1,2,3,13	3	1	-	3
5		Elective II/CC	12	3	1	-	3
6		Elective III (Open Elective)		3	1	-	3
7	16CH607	Chemical Reaction Engineering Lab	4,9,13	-	-	3	2
8	16CH509/ 16CH510	Term Paper/ Mini Project	All POs	-	-	3	2
9		Audit Course		-	-	-	-
10	16HSX06	CC & EC Activity II	9,10	-	-	3	1
11	16ESX2B	Employability Skills IV		-	2	-	1
Total				15	6	12	25
Seventh Semester							
No	Course Code	Course	POs	Periods			
				L	T	P	C
1	16CH701	Process Modeling & Simulation	1,2,3,5,13	3	1	-	3
2		Elective IV/CC		3	1	-	3
3		Elective V/CC		3	1	-	3
4	16CH704	Mass Transfer Operations Lab	1,2,4,9,10,13	-	-	3	2
5	16CH705	Process Simulation Lab	4,5,9,10,13	-	-	3	2
6	16CH706	Full Semester Internship ¹	10,11	-	-	-	16
Total				9	-	6	13/16
Eighth Semester							
1	16CH801	Industrial Pollution Control Engineering	1,2,3,7	3	1	-	3
2	16CH802	Transport Phenomena	1,2,3	3	1	-	3
3		Elective VI/CC		3	1	-	3
4	16CH804	Project	9,10,11,12,13	-	-	-	10
5	16CH706	Full Semester Internship ²	10,11	-	-	-	16
Total				9	-	-	19/16

¹Student who opt for FSI-16CH706 during 7th semester, have to register one more additional elective and 16CH704 & 16CH705 as additional lab courses during 8th semester

²Student the who opt for FSI-16CH706 during 8th semester, have to register an additional course in consultation with HoD during 7th semester

List of Electives, Contemporary Courses, Audit Courses, Employability Skills and One Credit Courses

Elective I							
No	Course Code	Course	POs	Periods			
				L	T	P	C
1	16CH001	Fertilizer Technology	1,2, 3,13	3	1	-	3
2	16CH002	Pharmaceutical Technology	1,2,3,13	3	1	-	3
3	16CH003	Polymer Technology	1,2,3,13	3	1	-	3
4		MOOCs		-	-	-	3
Elective II							
1	16CH004	Material Science and Engineering	1,2,3, 13	3	1	-	3
2	16CH005	Petroleum Refining and Petrochemicals	1,2,3,13	3	1	-	3
3	16CH006	Energy Engineering	1,2,3,7	3	1	-	3
4		MOOCs		-	-	-	3
Elective III (Open Electives – Mathematics, Chemistry, Entrepreneurship Skills, Industrial Safety and Engineering & Technology)							
1	16CE007	Disaster Management	1,2,6,7,10	3	1	-	3
2	16EE004	Renewable Energy Sources	7,11,12	3	1	-	3
3	16ME007	Principles of Entrepreneurship	1,11	3	1	-	3
4	16EC004	Fundamentals of GPS	1,2,4,5,6	3	1	-	3
5	16CS006	Computational Intelligence	1, 2,3,4,5, 6	3	1	-	3
6	16CH007	Industrial Safety and Hazard Management	1,2,3,6,8	3	1	-	3
7	16IT005	Fundamentals of Cloud Computing	2,4,5,6,12	3	1	-	3
8	16PE006	Smart Grid Technology	4,7	3	1	-	3
9	16MA001	Computational Mathematics	1,2,9	3	1	-	3
10	16CY001	Nano Science & Technology	1,2,3,6,7,12	3	1	-	3
Elective IV							
1	16CH008	Biochemical Engineering	1,2,3,7	3	1	-	3
2	16CH009	Clean Process Technology	1,2,3,7	3	1	-	3
3	16CH010	Novel Separation Techniques	1,2,3,7	3	1	-	3
4	16ME011	Computational Fluid Dynamics	1,2,3,5	3	1	-	3
5		MOOCs		-	-	-	3
Elective V							
1	16CH011	Corrosion Engineering	1,2,3	3	1	-	3
2	16CH012	Fluidization Engineering	1,2,3	3	1	-	3
3	16CH013	Fuel Technology	1,2,3,7	3	1	-	3
4	16CH014	Introduction to Nanotechnology	1,2,3	3	1	-	3
5		MOOCs		-	-	-	3
Elective VI							
1	16CH015	Chemical Engineering Mathematics	1,2,3,5,13	3	1	-	3
2	16CH016	Design and Analysis of Experiments	1,2,3,5	3	1	-	3
3	16CH017	Integrated Solid Waste Mangement	1,2,3,7	3	1	-	3
4	16CH018	Process Intensification	1,2,3,5	3	1	-	3
5	16CH019	Process Optimization	1,2,3,5	3	1	-	3
6	16CH020	Scale-up Methods in Chemical Engineering	1,2,3,5	3	1	-	3
		MOOCs		-	-	-	3
Contemporary Courses (CC)							
1	16CH021	Bioprocess Engineering	1,2,3,13	3	1	-	3
2	16CH022	Green Engineering	2,3,6,7,11	3	1	-	3
3	16CH023	Chemical Process Safety	2,3,13	3	1	-	3
4	16CH024	Energy Audit in Process Utilities	2,3,11	3	1	-	3

Employability Skills							
1	16ESX01	Employability Skills I		1	-	-	1
2	16ESX02	Employability Skills II		1	-	-	1
3	16ESX03	Employability Skills III		1	-	-	1
4	16ESX04	Employability Skills IV		1	-	-	1
One Credit Course(15 Hours)							
1	16CHI01	Material and Energy Balance in Process Industry	1,2,3,13	1	0	0	1
2	16CHI02	Chemical Engineering Unit Operations	1,2,3,13	1	0	0	1
Audit Courses							
1	16AT001	Contemporary India: Economy, Polity and Society (ME)		-	-	-	-
2	16AT002	Indian Heritage and Culture (EEE)		-	-	-	-
3	16AT003	Intellectual Property Rights and Patents (ECE)		-	-	-	-
4	16AT004	Introduction to Journalism (CSE)		-	-	-	-
5	16AT005	Professional Ethics and Morals (CE)		-	-	-	-
6	16AT006	Science, Technology and Development (Chem)		-	-	-	-
7	16AT007	Industrial sociology (PE)		-	-	-	-
8	16AT008	Organizational Behavior (IT)		-	-	-	-
9	16AT009	Communication Etiquette in workplaces (BS & H)		-	-	-	-

Department of Chemical Engineering
Environmental Engineering

[Minimum Credits to be earned: 72]

First Semester							
No	Course Code	Course	POs	Periods			
				L	T	P	C
1	16MEX101	Advanced Optimization Techniques		4	-	-	4
2	16ENV102	Chemistry & Microbiology for Environmental Engineers		4	-	-	4
3	16ENV103	Water and Wastewater Treatment Processes		4	-	-	4
4		Elective I		4	-	-	4
5		Elective II		4	-	-	4
6	16ENV104	Environmental Quality Measurements Laboratory			-	3	2
7	16ENV105	Term Paper			-	-	2
Total				20	-	3	24
Second Semester							
1	16ENV201	Air Pollution Control & Management		4	-	-	4
2	16ENV202	Biological Process Design for Wastewater Treatment		4	-	-	4
3	16ENV203	Integrated Solid Waste Management		4	-	-	4
4		Elective III		4	-	-	4
5		Elective IV		4	-	-	4
6	16ENV204	Environmental Microbiology and Engineering Laboratory			-	3	2
7	16ENV205	Comprehensive Viva			-	-	2
Total				20	-	3	24
Third Semester							
No	Course Code	Course	POs	Periods			
				L	T	P	C
1	16ENV301	Internship		-	-	-	4
2	16ENV302	Project		-	-	-	-
Total				-	-	-	4
Fourth Semester							
1	16ENV302	Project		-	-	-	20

List of Elective Courses

Elective I							
No	Course Code	Course	POs	Periods			
				L	T	P	C
1	16ENV001	Environmental Impact Assessment		4	-	-	4
2	16ENV002	Environmental Legislation and Management		4	-	-	4
3	16ENV003	Principles of Environmental Management		4	-	-	4
Elective II							
1	16ENV004	Bioremediation Principles and Applications		4	-	-	4
2	16ENV005	Environmental Biotechnology – Principles and Applications		4	-	-	4
3	16ENV006	Transportation of Water and Waste water		4	-	-	4
Elective III							
1	16ENV007	Instrumental Methods for Chemical Analysis		4	-	-	4
2	16ENV008	Mathematical Modeling in Environmental Engineering		4	-	-	4
3	16CSE203	Soft Computing Techniques		4	-	-	4
Elective IV							
1	16ENV009	Industrial Ecology and Sustainable Engineering		4	-	-	4
2	16ENV010	Industrial Pollution Prevention and Clean Technologies		4	-	-	4
3	16ENV011	Waste water Reclamation and Reuse		4	-	-	4

6th BOS Meeting: Chemical Engineering Department

Venue: Dept. Computer Centre, Chemical Engineering

Date & Time: 20-11-2015; 10 AM to 6.30 PM

Sub: 1. UG and PG: AR-16 syllabus -Course Structure

External BOS Members Present:

Prof. (Dr). K. Krishnaiah (Special Invitee)

Emeritus Professor (Former Dean Academic Research), IIT., Chennai



Dr. M.Srinivasa Rao








Dy. Manager (R & D), Vizag Steel Plant



Prof.(Dr). V.V.Basava Rao, (through telephonic conversation) (040-27098472)

Principal-in-charge, College of Technology, Osmania University,
Hyderabad

Faculty members present:

- Dr. S. K. Behera (Professor & HOD) 
- Dr. M. Krishna Prasad (Professor) 
- Dr. R. Srikanth (Assoc. Professor) 
- Mr. V. Srinivasa Rao (Assoc. Professor) 
- Dr. P. Kalpana (Assoc. Professor) 
- Dr. S.N.Dash (Assoc. Professor) 
- Dr. M. Gangadhar (Sr.Asst. Professor) 

- Ms.G.Kalyani (Sr.Asst. Professor) 
- Mr. P. S. Sagar (Sr.Asst. Professor) 
- Mr. G. Babu Rao (Sr.Asst. Professor) 
- Mr. H. Joga Rao (Asst. Professor) 
- Mr. B. Niranjana Rao (Asst. Professor) 
- Ms. P. Mythili (Asst. Professor) 

Minutes of the BOS meeting

Agenda:

1. Discussion on Course Titles as per new course structure for UG/PG programmes:AR-16 Academic regulations.

Points of Discussion and Suggestions:

1. HOD appraised the members regarding New Courses being suggested for introduction in AR-16.
2. Titles discussed by considering the courses being offered by IIT's, NIT's, other deemed universities, along with GATE Syllabus.
3. Discussion held on 3rd, 4th, 5th, 6th, 7th and 8th semester structure based on (AR-13) syllabus and PG course titles/syllabus modification.

Discussion of course titles:

1. Regarding the 1st and 2nd semester courses and common courses, the approval of Joint Board meeting is adopted for B.Tech, Chemical Engineering also.
2. The members had detailed discussion in finalizing the new course titles so that the student will be able to meet the designed PEO's of Chemical engineering course and also able to compete for employment/higher studies.
3. The following new course titles are proposed by the faculty to be incorporated in AR-16 UG syllabus.

S.No.	Name of the (new course) Title to be introduced	Semester	Suggestions
1	Introduction to Chemical Engineering		
2	Numerical Methods & Computational Techniques		
3	Computational Techniques Lab		
4	OOPS through JAVA		
5	OOPS through JAVA Lab		
6	Process Instrumentation and Control		
7			
8	Chemical Process Design & Economics		
9	Chemical Process Equipment Design		

S.No.	Name of the new Elective course title to be introduced	Semester	Suggestions
1	Fuel Technology		
2	Energy Engineering		
3	Introduction to Nanotechnology		

B.Tech. 3rd semester

Code	Subject	Suggestions
CHE 2403	Physical & Analytical Chemistry	
CHEM 2402	Chemical Engineering Thermodynamics	
CHEM 2403	Chemical Process Calculations	<ul style="list-style-type: none"> Bifurcating CPC into two Subjects as Material Balance and Energy Balance (Also Introduction to solving problems through Excel is also good)
CHEM 2404	Introduction to Chemical Engineering	<ul style="list-style-type: none"> The course contents were discussed in detail and syllabus of IIT Chennai is also considered and suggested syllabus is being prepared and sent for External Board Members approval and the same will be adopted in AR16. Members suggested to cover first 4 units topics of the Text book
CHEM 2405	Numerical Methods and Computational Techniques	Unit-2 syllabus was discussed in detail, members suggested to reduce the content based on GATE syllabus. Syllabus modifications for other units has been adopted for other 3 units. Discussions held about text book and references; suggested to reduce nO. of references books.
	Oops through Java	
CHEM 2206	Oops through Java Lab	
CHE 2204	Physical & Analytical Chemistry Lab	
	Computational Techniques lab	

B.Tech. 4th semester

Code	Subject	Suggestions
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MATH 2405	Probability & Statistics	
CHE 2405	Organic Chemistry	
CHEM 2407	Mechanical Unit Operations	
CHEM 2408	Phase and Chemical Equilibria	
CHEM 2409	Process Heat Transfer	Discussions held on the syllabus and textbooks. Suggested to reduce the quantum of syllabus & NTU method can be shifted to 6 th semester. Equipment design to be used to make use of steam tables.
	Momentum Transfer	Outcomes needed to be changed. Unit operations and processes, basic concepts shall be removed. Remove rheological properties of fluids. Change the notation as friction factor for non-newtonian fluids. The chapter headings are good enough.
CHEM 2210	Mechanical Unit Operations Lab	
CHEM 2211	Process Heat Transfer Lab	
	Momentum Transfer Lab	
	CCEC Activities	

B.Tech. 5th semester

Code	Subject	Suggestions
CHEM 3412	Chemical Reactor Theory	<ul style="list-style-type: none"> • CRT can be renamed as Homogeneous reactors. •

CHEM 3413	Chemical Technology	Bioprocess is missing in the syllabus, Many chemical industries can be included.
CHEM 3414	Principles of Mass Transfer	Weldie wickson, fundamentals of mass and heat transfer. Unit-4 Should be renamed as membrane operations.
CHEM 3415	Process Instrumentation and Control	Members expressed satisfaction with proposed syllabus. Unit-1: Introduction to control and half part instrumentation 2,3,4 units dynamics IMC(Internal modal control) is to be elaborated for students view point.in Unit-3 Smith Predictor control is to be added, selective and override has to be removed.
	Engineering Economics & Project Management	
Elective-I		
CHEM 3416	Fertilizer Technology	
CHEM 3417	Pharmaceutical Technology	
CHEM 3418	Polymer Technology	
CHEM 3219	CACE Lab	
CHEM 3220	Process Dynamics & Control Lab	PDC lab can be renamed as Process Control Lab.
GMR 30206/ GMR 30204	Term Paper/ Mini Project	

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B.Tech. 6th Semester

Code	Name of the Subject	Suggestions
CHEM 3421	Applications of Mass Transfer	
CHEM 3422	Chemical & Catalytic Reaction Engineering	<ul style="list-style-type: none"> • CCRE can be renamed as Heterogeneous reactors. • Mixing of fluids is removed from unit-1 • Fogler as reference book and remove Ghavane from reference books
CHEM 3423	Chemical Process Equipment Design	
	Chemical Engineering Plant Design & Economics	Members reviewed the syllabus. Expressed satisfaction of the proposed syllabus.
	Elective-2	
CHEM 3424	Material Science and Engineering	
CHEM 3425	Petroleum Refining and Petrochemicals	
CHEM 3426	Energy Engineering	
Elective-3 (Open elective)		
IT 3418	Cloud Computing	
CE 3429	Disaster Management	
ECE 3424	Fundamentals of GPS	
CHEM 3427	Industrial Safety and Hazard Management	

ME 3432	Principles of Entrepreneurship (Mech)	
EEE 3427	Renewable Energy Resources	
PE 3409	Smart Grid Technologies	
CSE 3417	Soft Computing	
	Computational Fluid Dynamics	
CHEM 3228	Chemical Reaction Engineering Lab	
CHEM 3229	Mass Transfer Operations Lab	
GMR 30206/ GMR 30204	Term Paper /Mini Project	
	CCEC Activities	
GMR 30001	Audit Course	

B.Tech. 7th Semester

Code	Subject	Suggestions
HS3405	Process Modeling & Simulation	Restructuring of units and addition of unsteady state plug flow reactor topic is advised.
Elective-4		
ME 4450	Clean Process Technology	

CHEM 4430	Novel Separation Techniques	
CHEM 4431	Membrane Technology	
CHEM 4432	Biochemical Engineering	
Elective-5		
CHEM 4433	Fuel Technology	
CHEM 4434	Introduction to Nanotechnology	
CHEM 4435	Corrosion Engineering	
CHEM 4436	Fluidization Engineering	
CHEM 4237	Process Equipment Design and Drawing Lab	Actually this lab is not Required
CHEM 4238	Process Simulation Lab	

B.Tech. 8th Semester

Code	Subject	Suggestions
CHEM 4439	Transport Phenomena	<ul style="list-style-type: none"> • Reference 2 author name is misspelled • Wiley, wicks and _____ • Rearrangement • 4th unit is big and confusing • 1 and 2 units can be clubbed to 1st unit • 3 problems in MT unit-2 • 3 problems in Mass unit-3 • 3 Problems in Heat unit-4 will be good
CHEM 4440	Industrial Pollution Control	

	Engineering	
	Elective-6	
CHEM 4441	Design and Analysis of Experiments	
CHEM 4442	Process Optimization	
CHEM 4443	Process Intensification	Suggested to reduce the syllabus depth and to compare conventional process with intensification benefits, so that the student can appreciate the role of process intensification
CHEM 4444	Scale-up Methods in Chemical Engineering	
GMR 41205	Project Work	

CHEM 4445- Power Plant Pollution and Control-Offered to Power Engg.

Faculty Members Present:

- Dr. S. K. Behera (Professor & HOD)
- Dr. R. Srikanth (Assoc. Professor)
- Mr. V. SrinivasaRao (Assoc. Professor)
- Dr. P. Kalpana (Assoc. Professor) *P. Kalpana*
- Dr. M. Gangadhar (Asst. Professor)
- Mr. P. S. Sagar (Asst. Professor) *P. S. Sagar*
- Mr. G. Babu Rao (Asst. Professor)
- Mr. H. JogaRao (Asst. Professor) *H. Joga Rao*
- Mr. B. NiranjanaRao (Asst. Professor)
- Ms. P. Mythili (Asst. Professor)
- Ms.G.Kalyani *G. Kalyani*
- Dr. S.N.Dash *S.N. Dash*