



SECOND-YEAR DIPLOMA ENGINEERING SYLLABUS

Semester: 3RD

Course CodeLab:002206302

Type of Course:PCC-LC-1

Course Name:Mechanical Operation

Course Prerequisites:The course content should be taught and implemented with the aim to develop different types of skills so that students are able to acquire following competencies. Plan and supervise operation of mechanical operation equipment

COURSE OBJECTIVE(S):

The operations of chemical plants require use of material handling and size reduction equipment, screens, agitator, mixers, centrifuges, cyclones, filters, storage & conveying of solids and other mechanical separation equipment. Therefore, students must have information about the principles, construction, working and application of these equipment so that they can plan for their efficient use in plants. In this course the students would also learn simple calculations to judge the performance of these equipment.

TEACHING & EXAMINATION SCHEME:

Teaching Scheme (Hrs/Week)				Examination Scheme				
Theory	Tutorial	Practical	Credit	SEE		CA		
				Th	Pr	MSE	PLE	LA
0	0	4	2	0	50	0	0	50
				Total				
				100				

SEE: Semester End Examination; CA: Continuous Assessment; Th: Theory; Pr: Practical; MSE: Mid Semester Examination; PLE: Participatory Learning Experience; LA: Laboratory Assessment

TOTAL Practical Hours: No. of Pr. and Prt.Hrs/Week*15 = 60

LIST OF PRACTICALS: (sample for 4 hrs/week)*15 weeks

Sr. No.	Content	Unit No.	Time Duration
1	Measure volume surface mean diameter, mass mean diameter, number of particles using a sieve shaker.	1	4
2	Perform differential and cumulative screen analysis.	3	4
3	Test Kicks law for crushing in Jaw crusher.	2	4
4	Test Bond's law for crushing in a Roll crusher.	2	4
5	Test Rittinger's law for grinding in a Ball mill and measure critical speed.	2	4
6	Measure efficiency and cut diameter of Cyclone Separator.	4	4
7	Determine rate of settling by Sedimentation.	4	4
8	Measure rate of filtration, filter medium & cake resistance in Gravity filtration.	4	4



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9	Measure rate of filtration, filter medium & cake resistance in Vacuum filtration.	4	4
10	Measure cake resistance, filter media resistance in Pressure filtration.	4	4
11	Measure rate of filtration, cake resistance, filter media resistance in Centrifuge.	4	4
12	Measure efficiency of separation in froth flotation cell.	3	4
13	Measure efficiency of separation in Magnetic separator.	3	4
14	Measure efficiency of separation in Electrostatic separator.	3	4
15	Evaluate mixing index in mixer.	5	4
		TOTAL	60

Text Book(s):

Title of the Book	Author(s)	Publication
Unit Operation -1	Gavhane K. A.	NiraliPrakashan, Pune

Reference Book(s):

Title of the Book	Author(s)	Publication
Unit Operations of Chemical Engineering	McCabe and Smith	McGraw Hill Publications, New Delhi
introduction to Chemical Engineering	Badger W. L. and Banchero J. T	McGraw Hill Publications, New Delhi
Chemical Engineering' Vol.- II	J.M. Coulson & J.F. Richardson 'Chemical Engineering' Vol.- II	6th Ed. Elsevier, 2003

Web Material Link(s):

- a) <https://ndl.iitkgp.ac.in>
- b) <https://onlinecourses.nptel.ac.in>
- c) www.cheresources.com

Equivalent/Corresponding Course on NPTEL (SWAYAM):

PRACTICAL EVALUATION:

Sr. No.	Activity	Marks	Weightage
1	Semester End Examination (External Practical)	25	60%
2	Continuous Assessment Practical (CAP)	25	40%
	Semester End Examination (External Practical)		



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1(a)	Lab Experiment/Exercise		30%
1(b)	Viva-voce		20%
1(c)	Certified Record		10%
	Continuous Assessment Practical (CAP)		
2(a)	Day to day Laboratory Work & Attendance		15%
2(b)	Submission of Laboratory Work/Journal		10%
2(c)	Exam		15%

* For 4 Credit Subjects

1 Credit = 25 Marks

Theory: 3 Credits = 75 Marks

Practicals: 1 Credit = 25 Marks

SEE Evaluation will be of 100 marks and converted to 50 Marks (75 Th + 25 Pr)

CA Evaluation will be of 100 Marks and converted to 50 Marks. (75 Th + 25 Pr)

Distribution of Marks for Theory Evaluation as per Bloom's Taxonomy Level:

Level	Remember	Understand	Apply	Analyze	Evaluate	Create
% Weightage	18%	24%	28%	10%	10%	10%

COURSE OUTCOMES:

CO1	Use fundamental of mechanical operation.
CO2	Apply concept of size reduction, separation, agitation mixing, Storage and Conveying of solid and Fluid
CO3	Operate size reduction equipment, separators, agitators, mixers and conveyors.
CO4	Calculate properties of solid particles, power consumption, and resistance, crushing law constants, efficiency and material balance