



SARVAJANIK UNIVERSITY
Sarvajnik College of Engineering and Technology
Bachelor of Technology



Mechanical Engineering Department
Semester VII

Course Name: Compressors, Fans and Blowers **Course Code:** BTME14716
Type of course: Professional Elective Courses
Prerequisite: Fluid Mechanics and Basic Mechanical Engineering
Course Outline: The course's goal is to give a framework for discussing various types of Compressible flow turbomachinery in a coherent manner. The course covers fluid flow patterns, basic operating principles, and the importance of rotating parts in all sorts of Compressible flow turbo machines.

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	100
3	0	0	3	60	25	15	00	00	

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests **CA2:** Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems **TEE:** Term End Examination **TEP:** Term End Practical Exam (Performance and viva on practical skills learned in course) **CA3:** Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

Course Contents:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1.	Introduction: Introduction and Applications of turbo-machines, Compressible and Incompressible Flow machines, Basic laws and governing equations, Compressor and Fan Stages. Axial, Radial and Mixed flow stages. Impulse and Reaction Stages. Multi stage machines. Stage velocity triangles. Design and off design conditions, Aero-foil section, Drag and Lift coefficients, Cascade nomenclature, Flow through cascades.	8	20%
2.	Dimensional Analysis and Performance Parameters: Units and Dimensions. Buckingham's π theorem. Non dimensional numbers and specific speed, Principle of similarity. Performance of Compressors, Fans and Blowers.	6	15%
3.	Reciprocating and Rotary Compressors: Classifications, Construction and working with its applications	2	5%



SARVAJANIK UNIVERSITY
Sarvajani College of Engineering and Technology
Bachelor of Technology



Sr. No.	Topics	Teaching Hrs.	Module Weightage
4.	Centrifugal Compressors: Elements of centrifugal compressor, Static and total head properties, Velocity diagram, Slip factor, Degree of reaction, surging and choking, Losses in centrifugal compressor.	10	25%
5.	Axial Flow Compressors Fans and Propellers: Construction of an axial flow compressor fan and propeller, Fan Applications. Axial fans. Fan stage parameters. Types of axial fan stages. Propellers. Performance of Axial fans.	8	20%
6.	Centrifugal Fans and Blowers: Elements of centrifugal Fan and blower, Losses in centrifugal fan and blower, Dust erosion of fans, Simple design of centrifugal fan.	6	15%

Percentage Distribution of Marks as per Bloom's Taxonomy (Theory/Practical):

% Distribution of Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	20	20	25	10	5

Legends: R: Remembrance, **U:** Understanding; **A:** Application, **N:** Analyze, **E:** Evaluate **C:** Create

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

Sr. no.	Title of book /article	Author(s)	Publisher	Publication year	Publication edition
1.	Turbines, Compressors and Fans	S. M. Yahya	Tata McGraw-Hill	2017	4th
2.	Axial-Flow Compressors: A Strategy for Aerodynamic Design and Analysis	Ronald H Aungier	Khanna publishers	2003	2nd
3.	Centrifugal Compressors: A Strategy for Aerodynamic Design and Analysis	Ronald H Aungier	S. Chand & Co Ltd.	2000	1st
4.	Handbook of Fluid Movers: Pumps, Compressors, Fans And Blowers	Dr. Jonathan Moore	Tata McGraw Hill	2015	1st
5.	Fans	Dr. Ing Bruno Eck	Pergamon Press, Oxford	1972	1st



SARVAJANIK UNIVERSITY
Sarvajani College of Engineering and Technology
Bachelor of Technology



Course Outcomes (CO's):

CO No.	CO Statement After learning this subject, students will be able to	Marks % weightage
CO-1	Examine the application of different Compressible flow turbo machines	25
CO-2	Explain the working principles of Compressor, Fans and Blowers.	25
CO-3	Analyze the flow within Compressor, Fans and Blowers	25
CO-4	Recognize and express the importance of turbomachines for sustainable development.	25

Mapping of CO's with Program Outcomes (PO's) and Program Specific Outcomes (PSO's):

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO-1	3	2	1	1	0	0	1	0	1	1	1	1	3	2	2
CO-2	2	2	2	2	1	1	1	1	1	1	2	2	3	3	2
CO-3	3	3	3	2	1	1	1	1	1	1	3	3	3	3	2
CO-4	3	3	2	1	0	0	2	0	0	1	2	2	3	3	3
Rationale*	11	10	8	6	2	2	5	2	3	4	8	8	12	11	9

Rationale - Mapping of CO's with PO's and CO's with PSO's:

CO-PO's: As per CO's and PO's mapping, this course will provide a wide understanding of engineering associated to Compressible flow turbomachines. This course will help students work individually or in groups to develop problem-solving skills that will allow them to design and develop sustainable solutions for Compressible flow turbomachines through investigations, thus benefiting society and the environment.

CO-PSO's: According to the above CO's and PSO's mapping, students will be able to experiment and study Compressible flow turbomachines, as well as conduct their own research. They will be able to use their technical skills to create and develop Compressible flow turbomachines in futures.

Assignments to be given as per the requirement of the course.

List of Open learning websites:

1. <https://nptel.ac.in/courses/101101058>