

**NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI**

**DEPARTMENT OF ARCHITECTURE**

<b>COURSE PLAN – PART I</b>			
<b>Course Title</b>	<b>NATURAL VENTILATION</b>		
<b>Course Code</b>	<b>AR717</b>	<b>No. of Credits</b>	<b>2</b>
<b>Department</b>	<b>Architecture</b>	<b>Faculty</b>	<b>Dr.G.Subbaiyan</b>
<b>Session</b>	<b>January 2022</b>		
<b>Pre-requisites Course Code</b>	<b>Nil</b>		
<b>Course Coordinator(s) (if, applicable)</b>	<b>NA</b>		
<b>Course Teacher(s)/Tutor(s) E-mail</b>	<b>subbaiah@nitt.edu</b>	<b>Telephone No.</b>	<b>0431-2503557</b>
<b>Course Type</b>	<input type="checkbox"/> <b>Core course</b> <input checked="" type="checkbox"/> <b>Elective course</b>		

**SYLLABUS (approved in BoS)**

Natural ventilation & energy efficiency. Wind –its characteristics & significance. The atmosphere boundary layer. Wind pressure & wind pressure coefficient. Functions of ventilation –supply of fresh air, physiological cooling and nighttime cooling of buildings. Ventilation requirements of various buildings & spaces. Ventilation standards.

Ways of natural ventilation –single side ventilation, cross ventilation, stack effect and reverse stack effect. Dissipation of structural heat. Ventilation strategies for various climatic zones in India. Air movement around the buildings and air movement through the buildings. Effects of building form and orientation. Fenestration design of buildings to enhance air movement and ventilation.

Natural ventilation –prediction, measurement & Techniques of evaluation. Effects of shading devices on indoor air velocity. Effect of area of openings on average indoor wind velocity. Effect of size of inlet on the performance efficiency. Use & application of ventilation analysis software.



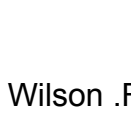

**REFERENCES:**

- 1.Awbi Hazim,B., “Ventilation of Buildings”, E&FN Spon, London, 1995
- 2.Croome, Dereck (ed.), “Naturally Ventilated Buildings”, E&FN Spon, London, 1997
- 3.Moss,Keith,J., “Heat and Mass Transfer in Building Services Design”, E&FN Spon, London, 1998. (Chapter 8 on Natural Ventilation in Buildings)

**COURSE OBJECTIVES**

- To make an awareness about the benefits of natural ventilation in buildings.
- To understand about different ways of natural ventilation of buildings.
- To be knowledgeable about the fenestration design of buildings to achieve desired ventilation in buildings.
- To understand the mechanical and hybrid ventilation methods.

v. To get introduced to the software used for ventilation analysis of buildings.			
<b>COURSE OUTCOMES (CO)</b>			
<b>Course Outcomes</b>			<b>Aligned Programme Outcomes (PO)</b>
i. Assessment of number of air changes for a given building (Analysis). ii. Assessment of wind speed in the interiors for a given building (Analysis). iii. Design of Fenestration for natural ventilation of interior spaces. iv. Integration of natural ventilation and mechanical ventilation in buildings. v. Make acquainted about the software used for ventilation analysis of buildings.			
<b>COURSE PLAN – PART II</b>			
<b>COURSE OVERVIEW</b>			
This course focus on need and types of ventilation in buildings. The course deals with the ways of natural ventilation. The prediction, measurement and techniques of evaluation of natural ventilation are dealt in this course.			
<b>COURSE TEACHING AND LEARNING ACTIVITIES</b>			
<b>S.No.</b>	<b>Week</b>	<b>Topic</b>	<b>Mode of Delivery</b>
1	1 <sup>st</sup>	Ventilation Fundamentals – Definition, Terminologies, Need for ventilation of interiors	PPT/ Lecture
2	2 <sup>nd</sup>	Ventilation Requirements – Health ventilation & Indoor air pollution and Comfort ventilation	PPT/ Lecture/ Discussion
3	3 <sup>rd</sup> & 4 <sup>th</sup>	Health Ventilation and Comfort ventilation – Requirements for different climatic conditions, Standards, Concepts.	PPT/ Lecture
4	5 <sup>th</sup> & 6 <sup>th</sup>	Factors influencing choice of ventilation, Natural Ventilation aspects	PPT/ Lecture/ Tutorials
5	7 <sup>th</sup>	Ventilation due to Thermal Buoyancy & Wind Force	PPT/ Lecture/ Tutorials
6	8 <sup>th</sup>	Ventilation due to wind force and combination of Wind force and Thermal Buoyancy. Design of Fenestration for ventilation	PPT/ Lecture/ Tutorials
7	9 <sup>th</sup>	Test & Assignment 1	-
8	10 <sup>th</sup>	Mechanical Ventilation and Hybrid ventilation	PPT/ Lecture/ Tutorials
9	11 <sup>th</sup>	Energy efficiency in the ventilation design of buildings	PPT/ Lecture
10	12 <sup>th</sup> & 13 <sup>th</sup>	Fenestration design of buildings to enhance air movement and ventilation. Assignment 2	Lecture/ Tutorials
11	14 <sup>th</sup> & 15 <sup>th</sup>	Ventilation/ Air movement analysis - software	Lecture / Tutorials

12	16 <sup>th</sup>	Conclusion and Feedback	PPT	
<b>COURSE ASSESSMENT METHODS</b>				
<b>S.No.</b>	<b>Mode of Assessment</b>	<b>Week/Date</b>	<b>Duration</b>	<b>% Weightage</b>
1	Assignment 1/ Tutorials	9 <sup>th</sup> week	10 days	25%
2	Test	9 <sup>th</sup> week	1 hr.	20%
3	Assignment 2/ Tutorials	13 <sup>th</sup> week	10 days	25%
4	End-semester examination	2 <sup>nd</sup> week – May 2022	2 hours	30%
<b>COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)</b>				
<ul style="list-style-type: none"> <li>i. Feedback survey about course content and suggestions for any improvement/ modification - online</li> <li>ii. Assessment of the knowledge the students have gained through this subject - online</li> <li>iii. Feedback regarding the teaching-learning process - online</li> </ul>				
<b>COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)</b>				
<ul style="list-style-type: none"> <li>i. For a student to secure a minimum of E grade he/ she has to secure a minimum of 30% in the final assessment and also secure maximum of 35% or Class Average/2 in all assessments put together.</li> <li>ii. The minimum attendance requirement to be eligible for appearing in the final semester examination is 75%. A maximum of 10% shall be allowed under On Duty (OD) category.</li> <li>iii. If any student is absent on the day of tutorial session, he/ she shall forfeit the marks for that particular tutorial exercise.</li> <li>iv. If any candidate is absent in the test due to genuine reasons, he/ she can appear for retest.</li> <li>v. Assignments are required to be prepared independently by each of the candidate. If any student submits assignments directly copied from other students / books/ journals (cut and paste) he/ she shall forfeit the marks for that particular assignment.</li> </ul>				
<b>ADDITIONAL COURSE INFORMATION</b>				
The faculty member is available for consultation during working hours on all working days. The students can also e-mail their queries to subbaiah@nitt.edu.				
<b>FOR APPROVAL</b>				
<div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;">   <b>Course Faculty</b> _____ </div> <div style="text-align: center;">   <b>CC-Chairperson</b> _____ </div> <div style="text-align: center;">   <b>Wilson .F</b> </div> <div style="text-align: center;">   <b>HOD</b> Dr. K. Thirumaran </div> </div>				