



**Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore**  
**Shri Vaishnav Institute of Technology and Science**  
**Choice Based Credit System (CBCS) Scheme in light of NEP-2020**  
**Generic Elective (Even Semester)**  
**(2021-2025)**

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME									
			THEORY			PRACTICAL			L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*					
BTMEGE21	GE	PRINCIPLES OF REFRIGERATION AND AIR CONDITIONING	60	20	20	0	0	3	0	0	3	

**Legends:** L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

\***Teacher Assessment** shall be based following components: Quiz/Assignment/Project/Participation in Class, given that no component shall exceed more than 10 marks.

**Course Objectives:-**

The primary objective of the course is to describe and develop knowledge of (A) the laws of thermodynamics, need and application of refrigeration and air conditioning. (B) Learning the fundamental principles of heat pump, refrigerator, and heat engine. (C) Analyze air refrigeration systems, Vapour compression refrigeration systems, Vapour absorption refrigeration systems, and steam jet refrigeration systems (D) understanding the basics of refrigerant and air conditioning.

**Course Outcomes:-**

After completion of this course the students will be able to describe the followings:

1. Students will be able to illustrate the fundamental principles and applications of refrigeration and air conditioning system.
2. Students will be able to analyze working of heat pump and refrigerator.
3. Students will be able to analyze Air refrigeration and Vapour refrigeration system.
4. Students will be able to analyze Absorption refrigeration system.
5. Students will be able to differentiate different refrigerant and their applications in air conditioners.

**Syllabus**

**Unit-I**

**(8 Hrs)**

Definition of zeroth law, first law and second law of thermodynamics; Thermodynamic processes: isobaric process, isochoric process, isothermal process, adiabatic process, isentropic process and throttling process; Definition of Refrigeration and Air Conditioning, Brief history and need of refrigeration and air conditioning; Applications of refrigeration and air condensing systems.

**Unit-II**

**(9 Hrs)**

Definition of heat pump, refrigerator, heat engine, tonne of refrigeration and Coefficient of performance; Derivation of Coefficient of performance of heat pump and refrigerator; Numerical on COP of heat pump and refrigerator

**Chairperson**  
Board of Studies  
Shri Vaishnav Vidyapeeth  
Vishwavidyalaya, Indore

**Chairperson**  
Faculty of Studies  
Shri Vaishnav Vidyapeeth  
Vishwavidyalaya, Indore

**Controller of Examinations**  
Shri Vaishnav Vidyapeeth  
Vishwavidyalaya, Indore

**Joint Registrar**  
Shri Vaishnav Vidyapeeth  
Vishwavidyalaya, Indore





**Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore**  
**Shri Vaishnav Institute of Technology and Science**  
**Choice Based Credit System (CBCS) Scheme in light of NEP-2020**  
**Generic Elective (Even Semester)**  
**(2021-2025)**

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTMEGE21	GE	PRINCIPLES OF REFRIGERATION AND AIR CONDITIONING	60	20	20	0	0	3	0	0	3

**Legends:** L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;  
\***Teacher Assessment** shall be based following components: Quiz/Assignment/Project/Participation in Class, given that no component shall exceed more than 10 marks.

**Unit-III** **(10 Hrs)**

**Methods of Refrigeration:** working principle of air refrigeration systems and reversed Carnot cycle, working principle of Vapour compression refrigeration system and derivation of COP of VCRS, working principle of Vapour Absorption Refrigeration Systems and derivation of COP of VARS. Ice refrigeration, Dry Ice refrigeration.

**Unit-IV** **(9 Hrs)**

**Refrigerant:** Definition of refrigerant, classification of refrigerant, eco-friendly refrigerant, properties of refrigerant, nomenclature of refrigerants.

**Unit-IV** **(9 Hrs)**

Principle of air conditioning, requirement of comfort air conditioning; Working of summer air conditioning and Working of winter air conditioning; Fresh air load human comfort, heat production and regulation of human body.

**Text and Reference Books:**

1. Refrigeration and Air Conditioning by R S Khurmi and J K Gupta, S Chand and company ltd, 2005.
2. Refrigeration and Air Conditioning by C P Arora, McGraw-Hill India Publishing Ltd. 2017.
3. Refrigeration and Air-conditioning by Ramesh Arora , Prentice Hall of India, 2010.
4. Refrigeration and Air Conditioning by Manohar Prasad, New Age International Publisher, 2009.
5. Principles of Refrigeration by Roy. J Dossat, Pearson Education, 2002.
6. Refrigeration and Air Conditioning by Jordon and Prister, Prentice Hall of India Pvt. Ltd. 2005.
7. Refrigeration and Air Conditioning by W.F. Stocker and J. W. Jones, McGraw-Hill, 2008.
8. Refrigeration and Air Conditioning by Ameen Ahmadul, PHI India, 2006.

**Chairperson**  
Board of Studies  
Shri Vaishnav Vidyapeeth  
Vishwavidyalaya, Indore

**Chairperson**  
Faculty of Studies  
Shri Vaishnav Vidyapeeth  
Vishwavidyalaya, Indore

**Controller of Examinations**  
Shri Vaishnav Vidyapeeth  
Vishwavidyalaya, Indore

**Joint Registrar**  
Shri Vaishnav Vidyapeeth  
Vishwavidyalaya, Indore