

<b>GANPAT UNIVERSITY</b>									
<b>FACULTY OF ENGINEERING &amp; TECHNOLOGY</b>									
Programme		Bachelor of Technology			Branch/Spec.		CIVIL Engineering		
Semester		V			Version		2.0.0.0		
Effective from Academic Year			2019-20		Effective for the batch Admitted in			2014-15	
Subject code		2CI506		Subject Name		<b>BUILDING SERVICES</b>			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total	CE	SEE	Total	
	L	TU	P	TW					
Credit	3				3	Theory	40	60	100
Hours	3				3	Practical			
Pre-requisites:									
Learning Outcome:									
Upon successful completion of this course you will be able to:									
<ul style="list-style-type: none"> <li>• Identify building services equipment and explain its function</li> <li>• Describe how building services are integrated into a building</li> <li>• interpret building services drawings</li> <li>• Explain how building services modify the indoor environment</li> <li>• Determine how building performance and regulatory requirements affect the design and commissioning of building services</li> <li>• Explain how energy is supplied to and used in buildings and the impact of energy efficiency on the design of sustainable buildings</li> </ul>									
Theory syllabus									
Unit	Content							Hrs	
1	<b>Lighting Systems &amp; Calculations</b> Types of Lighting, Operating of Light with their technical parameters, Light fixtures, LED type Lights, Lux and Lumens calculation, Lamp efficiency, Lighting Control.							4	
2	<b>Protection Devices</b> MCB, RCCB, MCCB, Type of Fuses, Application, Advantages, Disadvantages and single line diagram for distribution, Effect of electric current on human body.							4	
3	<b>Importance of Earthing</b> Types of Earthing, Earthing measurement, Earthing resistance, method of Earthing, Chemical Earthing.							3	
4	<b>Distribution System of Water</b> General considerations, Methods of distribution, Service reservoir, System of supply of water, methods of layout of distribution pipes, Wastage of water, Water waste survey, Permissible							6	

	waste of water, Preventive measures, Water waste tests, Maintenance of distribution system.	
5	<b>Water Supply and Drainage System within Building</b> Water supply to low and high rise building, Design of water storage tank – underground and overhead tank, Design of septic Tank, Design of rain water harvesting system, Plumbing System for wastewater drainage, choice of plumbing system.	6
6	<b>Plumbing Hydraulics and Pneumatics</b> Hydrostatic Water Pressure, Types of pressure, Siphonage, Air and Gas Locks, Water Hammer, Flow in pipes under gravity and pressure.	4
7	<b>Water and Sewage Conveyance Materials</b> Pipes and conduits for water, waste water, storm water, industrial waste, industrial waste water w.r.t lengths, commercial sizes, constituents, smoothness, resistance to loads, soils, liquids and environmental suitability of pipes and pipe ends, jointing of pipes, sewers and drains & their testing.	3
8	<b>Appurtenances</b> Types of Valves – Sluice valves, pressure and flow control valve, Scour Valve, Bypass valve, Float or Ball Valves, Reflux Valves, Pressure relief Valves, Air Valves, Hydraulic Traps.	3
9	<b>Air Conditioning Systems</b> Air cooling and air conditioning systems, plant, supply systems, calculations of basic sizes of components and layout of the system. System installation requirements and demands in building layout, supply air, return air ducting, Examples of passive and active cooling systems in traditional and present day conditions. Application to a selected project, and case analysis of selected project.	3
10	<b>Fire Protection</b> Study of fire regulations, fire extinguishing systems, warning systems, fire resistance of different building materials, fire resistant doors, planning of buildings for fire escapes	3
Practical content		
Text Books		
1	Building Services - By Prof.S.M.Patil	
2	IS: 1172 - 1972, Basic requirements for water supply, drainage and sanitation.	
3	IS: 2065 – 1983, Code of practice for water supply in buildings.	
4	IS: 2064 – 1983 ,Code of practice for selection, installation & maintenance of sanitary Appliances	

Reference Books	
1	National Electrical code.
2	Electrical technology (part I,II & III) – By B.L. Theraja, A.K. Theraja,S.Chand Publication.
3	Principles of power systems – By V.K. Mehta, S Chand; 3rd Revised edition edition
4	Handbook of electrical engineering – By S.L. Bhatia, Khanna Publication
5	Plumbing, By F Hall. F.A., Palgrave Macmillan; 3rd edition edition
6	Plumbing: design and practice – By Deolalikar, S. G, McGraw Hill Education (India) Private Limited
7	Water supply and sanitary engineering – By S. C. Rangwala, Charotar Publishing House pvt. Ltd.; 28 edition
8	Water supply and sanitary engineering – By G. S. Birdie, Dhanpat Rai Publishing Company (p) Ltd
9	A.F.C. Sherratt, “Air-conditioning and Energy Conservation”, The Architectural Press, London, 1980.National Building Code.
10	William H.Severns and Julian R.Fellows, “Air-conditioning and Refrigeration”, John Wiley and Sons,
11	A.F.C. Sherratt, “Air-conditioning and Energy Conservation”, The Architectural Press, London, 1980.National Building Code.