

**INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI**  
**PROFORMA FOR NEW COURSE**

1.	Title of the Course	Biological Processes in Wastewater Engineering
2.	Course Number	CE5202
3.	Status of the Course	Core
4.	Structure of Credits	3-0-0-3
5.	Offered To	PG
6.	New Course/Modification to	New
7.	To be Offered by	Department of Civil Engineering
8.	To take effect from	July 2019
9.	Prerequisite	Nil
10.	Whether approved by the Department	Yes
11.	<b>Course Objective:</b> The course describes the principles and applications of biological processes in wastewater treatment and outlines their design criteria. The course would help the students to build a solid foundation on low-cost and conventional treatment technologies employed in treatment of wastewater. The students will also be exposed to the current advancement in the biological treatment of wastewater.	
12.	<b>Course Content:</b> Overview of wastewater sources, nature, and their characteristics; Fundamentals of mass balance and reaction kinetics; Reactor Analysis; Various reactor configurations; Wastewater treatment processes: Process section; Primary; Secondary; Tertiary treatments; Suspended growth processes: Growth kinetics; Modelling of suspended growth systems; Activated sludge process; Ponds; Lagoons. Biological nitrification and denitrification; Fundamentals of aeration process in wastewater treatment; Design of aeration systems; Attached growth processes: Trickling filters; Rotating biological contactors, Bio-towers; Anaerobic processes: Process fundamentals; Standard, high rate, and hybrid reactors; Expanded/fluidized bed reactors; Expanded granular bed reactors; UASB; Two stage anaerobic reactors; Anaerobic digestion; Wastewater reclamation and reuse; Effluent disposal.	
13.	Text book(s): 1. Qasim S R, <i>Wastewater treatment plants planning, design and operation</i> , CRC Press, New York (1999). 2. Metcalf and Eddy Inc., Tchobanoglous G, Burton F, and Stensel H D, <i>Wastewater engineering – treatment and reuse</i> , Tata-McGraw Hill, New Delhi (2009).	
14.	Reference(s): 1. Van Haandel A C and Lettinga G, <i>Anaerobic sewage treatment</i> , John Wiley and Sons, Chichester (1994). 2. Peavy H S, Rowe D R, and Tchobanoglous G, <i>Environmental Engineering</i> , McGraw Hill (1985). 3. Grady, Jr. C P L and Lim H C, <i>Biological wastewater treatment: Theory and applications</i> , Marcel Dekker, Inc., New York (1999).	