



SECOND SEMESTER 2022 – 2023

COURSE HANDOUT (PART II)

Date: 16.01.2023

In addition to Part – I (General Handout for all courses) printed on Page 1 of the timetable book; this portion gives further specific details regarding the course.

Course Number : BIO F217

Course Title : LABORATORY FOR WATER, SANITATION AND SOLID WASTE MANAGEMENT

Instructor In-charge : P. SANKAR GANESH (<http://universe.bits-pilani.ac.in/hyderabad/psankarganesh/Profile>)

Instructor : S. Hemapriya, Puja Das

Pre-requisite for this course :

The pre-requisite for this course is BIO F216: Water, Sanitation and Solid Waste Management

Scope and Objectives of the course :

This course consists of a basic science module and laboratory experiments and a capstone project on Water, Sanitation and Solid Waste Management, i.e. an independent research project for individual or group of students.

The basic science module is a 1-week on-site training which prepares the student for the capstone project. Student will learn or get a refresher training on how research works including practical skills on how to conduct capstone project.

Apart from lab experiments which students will be conducting, they are also expected to do a capstone project. Capstone project follows a progression of modules:

a) define topic; b) compile required reading, c) select site, d) write capstone proposal (2 pages), e) design field research and survey development, f) carry out field research, g) analyze data, h) write-up, i) submit project report (max. 15 pages).

Text Book :

T1: Solid Waste Management. Sandec Training Tool 1.0 – Module 6: Yvonne Vögeli and Sylvie Peter, Eawag/Sandec, Switzerland, 2008.

(Open Access:

https://sswm.info/sites/default/files/reference_attachments/EAWAG%20SANDEC%202008%20Module%206%20Solid%20Waste%20Management%20Lecture.pdf)

T2: Faecal Sludge Management Linda Strande, Damir Brdjanovic IWA publishing, 2014.

(Open Access:

<https://www.iwapublishing.com/books/9781780404721/faecal-sludge-management>)

Reference Book :

R1: Standard Methods for the Examination of Water and Wastewater, 23rd edition. American Public Health Association, Washington, DC, 2017.

Course Plan :

The course will consist of two parts i.e. a) lab component and b) capstone project

a) List of Proposed Experiments for Lab Component:

1. Analysis of chemical oxygen demand (COD) of wastewater
2. Analysis of biological oxygen demand (BOD) of wastewater
3. Analysis of total phosphorus in wastewater
4. Analysis of total kjeldahl nitrogen in wastewater
5. Estimation of total solids and volatile solids in organic waste
6. Comet assay for toxicity assessment of organic waste
7. Estimation of volatile fatty acids (VFA) in wastewater
8. Analysis of Total Coliform in wastewater
9. Analysis of heavy metals in wastewater
10. Elemental (CHNS) analyses of organic waste/ biogas analysis using gas chromatography

b) Capstone Project:

The following activities will be carried out as part of the capstone project. The IC will explain them in detail in the lecture sessions:

1. Define the topic
2. Compile required reading
3. Develop research question (may come before, or run parallel to 2)
4. Make analysis plan and define project system boundaries
5. Design field research and survey development (Drafting phase)
6. Write capstone proposal (5 pages max.)
7. Proposal review and feedback round
8. Proposal revision and finalization of design field research and survey development (Specification/final phase)
9. Carry out field research (if required)
10. Analyze data
11. Prepare the project report
12. Submit project report
13. Submission of project diary and concise summary

Evaluation Scheme :

Evaluation Component	Duration	Weightage	Date & Time
Laboratory Evaluation 1: Evaluation will be based on first cycle of five experiments, punctuality, records and viva.	Diverse	15%	Continuous
Lab Quiz-1	30 Mins	10%	To be announced
Laboratory Evaluation 2: Evaluation will be based on second cycle of five experiments, punctuality, records and viva.	Diverse	15%	Continuous
Lab Quiz-2	30 Mins	10%	To be announced
Capstone Project	Diverse	50%	Continuous

Pedagogical approach: The course will be primarily run based on active learning pedagogical methods and the students are requested and expected to actively participate in the course.

Grading policy: Award of grades will be guided in general by the histogram of marks. Decision on border line cases will be taken based on individual's sincerity, student's regularity in attending classes, and the instructor's assessment of the student.

Make-up policy: Make-up for midterm test will be given only in genuine (medical emergency) cases of absence. If the absence is anticipated, before the examination, prior permission of the Instructor-in-charge is necessary. Make-ups for class tests/ quizzes and assignments are not given. Also refer to Clause 4.07 of *BITS Academic Regulations* for more details. Please keep checking CMS & email for the updated information on this aspect.

Notices: All notices/ announcements regarding this course shall be displayed only in the Course Management System (CMS).

Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

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