

## Evidence against indicators 17.4.1 and 17.4.2

Metric and indicator reference	Metric / Indicator	Comments/Data	Yes/No	Evidence1	Public (Yes/No)
17.4	Education for the SDGs				
17.4.1	Education for SDGs commitment to meaningful education across the university, relevant and applicable to all students		Yes		
	education integrated across full curriculum		Yes	Courses run in JUIT.	
	mandatory education for all		Yes		
	optional education for all		Yes		
17.4.2	Education for SDGs specific courses on sustainability Have dedicated courses (full degrees, or electives) that address sustainability and the SDGs.		Yes		

**MINUTES OF MEETING OF ACADEMIC COUNCIL HELD ON**  
**28 JUNE 2023**

**General**

Academic Council meeting of Jaypee University of Information Technology, Waznaghat was held on 28 June, 2023 at 11.00 a.m.

The Chairman, Academic Council extended warm welcome to all the members present in the meeting and expressed thanks to outstation members Sh. Sunil Sharma, Prof. S.C. Saxena, and Prof. Lalit Kumar Awasthi for their presence in the meeting.

He also appreciated the contributions made by Prof. Karanjeet Singh, HoD Mathematics Deptt., Dr. Anupriya Kaur, HoD HSS Deptt., and Prof. Rajiv Ganguly, Deptt. of CE, the outgoing members of the Council, and welcomed the newly inducted members Prof. Rakesh Kumar Bajaj, HoD Mathematics Deptt., Dr. Amit Srivastava, HoD HSS Deptt. and Prof. Vineet Sharma, Deptt. of PMS.

**Attendance**

The following members were present:-

**Chairman**

Prof. Rajendra Kumar Sharma Vice Chancellor, JUIT, Waznaghat

**Head of the Other Institution of the Trust**

Prof. S.C. Saxena Pro-Chancellor, JIIT, Noida

**Distinguished Academicians nominated by the Pro-Chancellor**

Prof. Lalit Kumar Awasthi Professor, NIT, Hamirpur, Ex-Director, NIT-Jalandhar

**Industry Professionals nominated by the Pro-Chancellor**

Sh. Sunil Sharma Executive Vice Chairman, Jaiprakash Associates Ltd.

**The Dean of all Faculty of the University**

Prof. Ashok Kumar Gupta Dean (Academics & Research)

**Heads of the Departments / Centres of the University**

Prof. P. B. Barman HoD PMS  
Prof. Sudhir Kumar HoD BT&BI  
Prof. Ashish Kumar HoD CE  
Prof. Vivek Sehgal HoD CSE/IT  
Dr. Rajiv Kumar HoD ECE  
Prof. Rakesh Kumar Bajaj HoD Mathematics  
Dr. Amit Srivastava HoD HSS

**Professors other than Heads of Departments**

Prof. Sunil Kumar Khah CoE  
Prof. Vineet Sharma Deptt. of PMS

**Non-Member Secretary**

Maj Gen Rakesh Bassi, SM (Retd.) Registrar and Dean of Students

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## Leave of Absence, if any

The Chairman, Academic Council granted leave of absence to the following members of the Academic Council as they were not able to attend the meeting of the council due to their pre-engagements:-

Dr. Satish Kumar	Ex-Director, NIT Kurukshetra
Lt Gen Ravindra Mohan Chadha, PVSM,ABSM (Retd)	Director, Jaiprakash Power Ventures Ltd

## Agenda Items

### **ITEM NO.1/2023** CONFIRMATION OF MINUTES OF LAST MEETING OF THE ACADEMIC COUNCIL

-1

Minutes of the meeting of the last ACM held on 29 November 2021 were forwarded to the members and one comment on item No. 8.2 was received from Head – Civil Engineering Department regarding reconsidering title of the course. As per the comment received from Head Civil Engineering Department, title of the Professional Elective – VI Course “Machine Learning Engineering for Production” (L-T-P: 3-0-0) changed to “Machine Learning Engineering for Production Systems” (L-T-P: 3-0-0). The minutes of the last ACM as per **Annexure-1** with correction in title of the course listed at item No. 8.2 were confirmed.

### **ITEM NO. 2/2023-1** ACTION TAKEN REPORT ON THE MINUTES OF THE MEETING OF THE LAST ACADEMIC COUNCIL HELD ON 29 NOVEMBER 2021

The actions taken on the items approved in the last ACM dated 29 November 2021 were noted by the members.

### **ITEM NO. 3/2023-1** APPROVAL FOR DEGREE IN ADVANCE UNDER EXTRAORDINARY CIRCUMSTANCES

As per the earlier approved policy, Degree Scroll is prepared for students every year who have completed the award of Degree requirement as on 30 September of the year and degrees are being prepared / printed as per the Degree Scroll for the year. Names of the students who have completed the award of Degree requirement after 30 September of the year are being considered for inclusion in the Degree Scroll of next year and subsequent award of degree to the eligible students.

However, in some extraordinary circumstances, the requirement for the award of degree prior to Degree Scroll of next year has been observed under very special circumstances, *i.e.*, to pursue higher studies abroad, to take up PR abroad and to join services.

The proposed item was considered and deliberated by the Council. The Council approved the item and authorized the Chairman, Academic Council (Vice Chancellor) to process such cases following the defined procedure under very special circumstances.

The detailed procedure for processing such cases is as per **Annexure-2**.

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### ITEM NO. APPROVAL FOR INCLUSION OF FATHER'S NAME AND MOTHER'S NAME 4/2023-1 IN DEGREE CERTIFICATE

UGC vide D.O. No. 1-38/97 (CPP-II) dated 06/06/2014 notified the need of inclusion of Mother's Name and Father's Name in all the application forms / Degrees / Certificates issued by Universities and Colleges. Copy of the relevant letter of UGC is at **Annexure-3** for reference.

However, the existing approved degree formats issued by the University does not have provisions of Mother's Name and Father's name in the Degree Certificate. It was proposed to include Mother's Name and Father's Name in the Degree Certificate to be issued from 01/07/2023 onwards.

The item was considered and deliberated by the Council and inclusion of Mother's Name and Father's Name in the Degree Certificate to be issued from 01/07/2023 onwards was approved by the Council.

Considering the inclusion of Mother's Name and Father's Name in the Degree Certificates, formats of Degree Certificates be amended accordingly.

### ITEM NO. APPROVAL FOR PURSUING TWO ACADEMIC PROGRAMMES 5/2023-1 SIMULTANEOUSLY

UGC vide D.O. No. 1-6/2007(CPP-II)(New) dated 13/04/2022 has published the guidelines for pursuing two academic programmes simultaneously. Copy of the letter and guidelines are at **Annexure-4**.

Later through D.O. No. 1-6/2007(CPP-II)(New) pt. II dated 10/01/2023 requested to implement these guidelines for the benefit of the students and to devise a mechanism through their Statutory bodies to facilitate the students to pursue two academic programmes simultaneously, as per these guidelines.

The item was considered by the Council and after deliberation; the item was approved with a condition to follow the UGC guidelines for pursuing two academic programmes simultaneously.

### ITEM NO. APPROVAL FOR ENGAGING PROFESSOR OF PRACTICE IN THE 6/2023-1 UNIVERSITIES

UGC vide D.O. No. 9-1/2010(PS/Misc) PT-I dated 14/11/2022 conveyed the guidelines for engaging Professor of Practice in Universities to bring the industry and other professional expertise into the academic institutions through a new category of positions called "Professor of Practice". This new initiative will help to take real world practices and experiences into the class rooms and also augment the faculty resources in higher education institutions. In turn, the industry and society will benefit from trained graduates equipped with the relevant skills. The detailed guidelines for engaging Professor of Practice is at **Annexure-5**.

The Objectives, Duties and Responsibilities, General Conditions, Categories of engagement, Procedure for selecting Professor of Practice, Tenure guidelines are illustrated in the detailed guidelines.

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The proposed item was considered by the Council and in principal approval for the same was accorded by the Council.

**ITEM NO. 7/2023-1 APPROVAL FOR CREATION OF SUPERNUMERARY SEATS TO ACCOMMODATE PM CARES FOR CHILDREN SCHEME IN HIGHER EDUCATION**

Secretary, UGC vide D.O. Letter No. F.2-39/2022 (CPP-II) dated 30/03/2022 conveyed regarding creation of supernumerary seats to accommodate children who have lost both their parents during the COVID pandemic to facilitate them to pursue higher education. Copy of the letter is at **Annexure-6**. Govt. of India has launched PM CARES for children scheme for such children and Ministry of women & Child Development with support from the District Magistrates of all the States / UTs are identifying such children. Such identified children will be issued PM CARES for Children Scheme 2021 certificate by the Ministry of Woman & Child Development.

In order to accommodate such children to pursue their higher education whenever they become eligible for admission to the programs, supernumerary seats equal to number of applications received of such candidates in all UG, PG & PhD programs has to be created from the Academic Session 2023-24 onwards.

The item was considered by the Council and Council approved creation of supernumerary seats equal to number of applications received under the category in all UG, PG & PhD Programs from the Academic Session – 2023-24.

**ITEM NO. 8/2023-1 APPROVAL OF RECOMMENDATIONS OF BOARD OF STUDIES (BoS) OF DEPARTMENT OF CIVIL ENGINEERING**

**a) BOARD OF STUDIES (BoS) OF DEPARTMENT OF CIVIL ENGINEERING HELD ON 21/05/2022**

Department of Civil Engineering conducted its Board of Studies (BoS) on 21/05/2022 and recommended the following for approval by the Academic Council:

- I. To consider and approve the course structure and syllabus of the newly introduced BTech Program: BTech in Civil Engineering with Computer Application

The minutes of the BoS of department of Civil Engineering are at **Annexure-7**.

The proposed item was considered by the Council and council approved the same. The approved Course Structure and detailed syllabus of the courses is as per **Annexure-BoS-CE-1 dated 21/05/2022**.

**b) BOARD OF STUDIES (BoS) OF DEPARTMENT OF CIVIL ENGINEERING HELD ON 15/06/2023**

Department of Civil Engineering conducted its Board of Studies (BoS) on 15/06/2023 and recommended the following for approval by the Academic Council:

- I. To consider and approve the minor revision in the course structure of

BTech in Civil Engineering.

II. To consider and approve the minor revision in the course syllabus of Building Materials and Construction (18B11CE313), Fluid Mechanics (18B11CE412), Surveying (18B11CE312), **Water Resources Engineering** (18B11CE414) and Design of Steel Structures (18B11CE612).

III. To consider and approve the addition of a new Professional Elective (Geoinformatics; 3-0-0-3) for BTech Civil Engineering.

The minutes of the BoS of department of Civil Engineering are at **Annexure-8**.

The proposed items were considered by the Council and Council approved the same.

The approved revised course structure of BTech in Civil Engineering is at **Annexure-BoS-CE-1 dated 15/06/2023**.

The approved minor revisions in the syllabus of Building Materials and Construction (18B11CE313), Fluid Mechanics (18B11CE412), Surveying (18B11CE312), **Water Resources Engineering** (18B11CE414) and Design of Steel Structures (18B11CE612) are at **Annexure-BoS-CE-2 dated 15/06/2023**.

The approved syllabus of newly introduced Professional Elective (Geoinformatics; 3-0-0) is at **Annexure-BoS-CE-3 dated 15/06/2023**.

**ITEM NO. 9/2023-1 APPROVAL OF RECOMMENDATIONS OF BOARD OF STUDIES (BoS) OF DEPARTMENT OF BIOTECHNOLOGY / BIOINFORMATICS**

**a) BOARD OF STUDIES (BoS) OF DEPARTMENT OF BIOTECHNOLOGY / BIOINFORMATICS HELD ON 21/05/2022**

Department of Biotechnology / Bioinformatics conducted its Board of Studies (BoS) on 21/05/2022 and recommended the following for approval by the Academic Council:

- I. To consider and approve of detailed syllabus of courses to be offered in 2nd year of M.Sc. Microbiology Program.
- II. To consider and approve modifications in the syllabus of "Microbial Genetics and Physiology" (21MS1MB212), a course in the 2nd semester of MSc Microbiology.
- III. To consider and approve interchange of elective courses; Computational Systems Biology (Course Code 21MS2MB313; Credits 3) from 3rd to 4th semester, and Microbial Toxicology (Course Code 21MS2MB411, Credits 3) from 4th to 3rd semester in MSc Microbiology second year curriculum.
- IV. To consider and approve inclusion of two new courses on Artificial Intelligence and Data Analytics from the Department of Computer Science in the VII and VIII semester of B. Tech. Bioinformatics Program, in the existing Elective baskets.

The minutes of the BoS of department of Biotechnology / Bioinformatics are at **Annexure-9**.

The proposed items were considered by the Council and council approved the same.

The approved syllabus of courses of 2nd year of M.Sc. Microbiology Program are

at **Annexure-BoS-BT-BI-1 dated 21/05/2022.**

The approved syllabus of "Microbial Genetics and Physiology" (21MS1MB212) is at **Annexure-BoS-BT-BI-2 dated 21/05/2022.**

The approved restructuring of Elective Courses of MSc Microbiology Program is at **Annexure-BoS-BT-BI-3 dated 21/05/2022.**

The approved inclusion of new courses in 7<sup>th</sup> & 8<sup>th</sup> Semester of BTech Bioinformatics Program and approved syllabus of the courses are at **Annexure-BoS-BT-BI-4 dated 21/05/2022.**

**b) BOARD OF STUDIES (BoS) OF DEPARTMENT OF BIOTECHNOLOGY / BIOINFORMATICS HELD ON 03/03/2023**

Department of Biotechnology / Bioinformatics conducted its Board of Studies (BoS) on 03/03/2023 and recommended the following for approval by the Academic Council:

- I. To approve the modification in the course "**Environmental studies**" taught in second year of BTech program of all Branches as per UGC, NEP.
- II. To consider and approve initiating a Certificate course on "Industrial Plant Tissue Culture" and its contents.

The minutes of the BoS of department of Biotechnology / Bioinformatics are at **Annexure-10.**

The proposed items were considered by the Council and council approved the same.

The approved syllabus of "**Environmental Studies**" is at **Annexure-BoS-BT-BI-1 dated 03/03/2023.**

The approved Certificate course on "Industrial Plant Tissue Culture" and its contents are at **Annexure-BoS-BT-BI-2 dated 03/03/2023.**

**ITEM NO. APPROVAL OF RECOMMENDATIONS OF BOARD OF STUDIES (BoS) OF DEPARTMENT OF PHYSICS AND MATERIALS SCIENCE**

**10/2023-1**

Department of Physics and Materials Science conducted its Board of Studies (BoS) on 16/06/2023 and recommended the following for approval by the Academic Council:

- I. To consider the revision in the course syllabus of six (06) courses offered by Department of Physics & Materials Science.
- II. To consider and approve the three new Open Electives (Biomaterials, Biosensors and Computational Nanotechnology) during 8th Semester.

The minutes of the BoS of department of Physics & Materials Science are at **Annexure-11.**

The proposed items were considered by the Council and council approved the same.

The approved revised syllabus of six (06) courses offered by Department of Physics & Materials Science are at **Annexure-BoS-PMS-1 dated 16/06/2023.**

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The approved three new Open Electives (Biomaterials, Biosensors and Computational Nanotechnology) and syllabus of the new courses are at **Annexure-BoS-PMS-2 dated 16/06/2023.**

## **ITEM NO. 11/2023-1 APPROVAL OF RECOMMENDATIONS OF BOARD OF STUDIES (BoS) OF DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES**

### **a) BOARD OF STUDIES (BoS) OF DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES HELD ON 15/02/2023**

Department of Humanities & Social Science conducted its Board of Studies (BoS) on 15/02/2023 and recommended the following for approval by the Academic Council:

- I. BTech Minor (20 Credits) in Finance and Marketing.
- II. Introduction of Mandatory UHV II Course (3 Credit) in second semester along with BTech minor in UHV

The minutes of the BoS of department of Humanities & Social Science are at **Annexure-12.**

The proposed items were considered by the Council and council approved the same.

The approved Course Structure of Minor in Finance and Marketing to be offered by department of HSS are at **Annexure-BoS-HSS-1 dated 15/02/2023.**

The approved syllabus of mandatory course of Universal Human Values – II (03 Credits) to be offered in BTech 2<sup>nd</sup> Semester is at **Annexure-BoS-HSS-2 dated 15/02/2023.**

### **b) BOARD OF STUDIES (BoS) OF DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES HELD ON 19/06/2023**

Department of Humanities & Social Science conducted its Board of Studies (BoS) on 19/06/2023 and recommended the following for approval by the Academic Council:

- I. To review and approve the Course Structure of newly introduced BBA Program.
- II. To review and approval of detailed syllabi of BBA 1st year courses.
- III. Restructuring of 04 courses offered by HSS department for all branches of BTech 2<sup>nd</sup> & 3<sup>rd</sup> Semester, as core courses.
- IV. To consider "Centre for Management Studies" under the Department of Humanities and Social Sciences.
- V. Minor revision in course contents of 02 courses (1 Sem – Core Courses) and 2 Open Elective Courses (VIII Sem) for BTech, offered by HSS Department

The minutes of the BoS of department of Humanities & Social Science are at **Annexure-13.**

The proposed items were considered by the Council and council approved the same.

The approved Course Structure of newly introduced BBA Program is at



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## Annexure-BoS-HSS-1 dated 19/06/2023.

The approved syllabus of BBA 1<sup>st</sup> Year Courses are at **Annexure-BoS-HSS-2 dated 19/06/2023.**

The approved restructuring of 04 courses offered by HSS department for BTech 2<sup>nd</sup> & 3<sup>rd</sup> Semester is at **Annexure-BoS-HSS-3 dated 19/06/2023.**

Centre for Management Studies under the Department of Humanities and Social Sciences approved by the Council.

The approved revised syllabus of 02 Core Courses of 1<sup>st</sup> Semester and 02 Open Elective Courses of 8<sup>th</sup> Semester offered by HSS Department are at **Annexure-BoS-HSS-4 dated 19/06/2023.**

## ITEM NO. 12/2023-1 SEAT RATIFICATION FOR ACADEMIC SESSION 2023-24

Seat intake for various courses for the Academic Session – 2023-24 was proposed for approval of the Academic Council. The Council considered the proposal and approved the following for the Academic Session – 2023-24:

### Undergraduate Programs (BTech)

Program	Approved Intake for AS-2023-24
Computer Science & Engineering (CSE)	390#
Information Technology (IT)	60*
Civil Engineering (CE)	30
Civil Engineering with specialization in Computer Science (CECS)	30
Biotechnology (BT)	30
Bioinformatics (BI)	30
Electronics & Communication Engineering (ECE)	30
Electronics & Communication Engineering with specialization in Computer Science (ECS)	30
<b>Total</b>	<b>630</b>

#Including 03 new specializations: (i) CSE with specialization in Artificial Intelligence & Machine Learning(CSE-AI&ML), (ii) CSE with specialization in Artificial Intelligence and Data Science(CSE-AI&DS),and (iii) CSE with specialization in Cyber Security(CSE-CS).

\*Including 02 new specializations: (i) IT with specialization in Artificial Intelligence & Machine Learning(IT-AI&ML),and (ii) IT with specialization in Artificial Intelligence & Data Science(IT-AI&DS).

### Undergraduate Programs

Program	Proposed Intake for AS-2023-24
BSc (Hons.) in Mathematics & Computing	30
<b>BBA</b>	<b>30</b>

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## Post Graduate Programs (MSc)

Program	Approved Intake for AS-2023-24
Biotechnology	30
Microbiology	30
Physics	30
<b>Total</b>	<b>90</b>

## Post Graduate Programs (MTech)

Program	Approved Intake for AS-2023-24
Computer Science & Engineering (CSE)	18
CSE with specialisation in Information Security	
CSE with specialisation in Data Science	
Electronics & Communication Engineering (ECE)	18
ECE with specialisation in Internet of Things	
Biotechnology	18
Construction Management	18
Structural Engineering	
Environmental Engineering	
<b>Total</b>	<b>72</b>

*Note: PG Program (MTech) seat intake for each department will be 18 seats. A program will run with 5 or more students only.*

## Doctoral Programs (PhD)

Program	Approved Intake for AS-2023-24
Computer Science & Engineering	
Civil Engineering	
Biotechnology	Seats subject to availability of Supervisor in each department.
Bioinformatics	
Electronics & Communication Engg	
Mathematics	
Physics & Materials Science	
Humanities & Social Sciences	

The proposal for introduction of new academic programs and increase in the sanctioned intake of the existing programs were approved by the Chairman – Academic Council vide approval dated 23/02/2023. Copy of the approval is appended at **Annexure-14**

However, Academic Council approved the item with small modifications as listed above in deferment to earlier approval by the Chairman – Academic Council.

**ITEM NO. 13/2023-1 TO REVIEW AND EXTEND THE RESERVATION OF SEATS AND TUITION FEE CONCESSION FOR WARDS OF ARMED FORCES / PARAMILITARY FORCES PERSONNEL / PERSONS WITH DISABILITY AND WARD WIDOWS**

Reservation of 10% seats and concession in Tuition Fee was allowed for the wards of serving / retired armed forces / Paramilitary forces personnel (@30% of tuition fee) and for persons with disability and war widows (@35% of tuition fee) commencing from AY-2019-20 for the duration of 05 years, i.e., upto AY-2023-

24.

The item for allowing further extension to the Reservation Policy and Tuition Fee concession under the policy beyond AY-2023-24 was proposed for review and decision by the Council. The proposed item was deferred by the Council and review of the same shall be done next year after analysing the admissions in this category.

**ITEM NO. REPORTING ITEMS**  
**14/2023-1**

The following Reporting Items were noted by the Academic Council:-

**14.1 REVISION IN PARENT'S INCOME SLAB FOR AWARD OF WILLIAM WEBSTER MERIT-CUM-MEANS SCHOLARSHIP FROM 2022-23 ADMITTED BATCH**

Chairman Academic Council apprised the members about the decision taken towards the revision in Parent's Annual Income Slab for award of William Webster Merit-Cum-Means Scholarship from 2022-23 (Fresh cases) admitted batch from 1.5 Lacs per annum to 8.0 Lacs per annum considering the revised income slab for the Economically Weaker Section (EWS) category notified by Central Govt. However, there is no change in the annual income slab for the Parent's of the students continuing award of scholarship for the subsequent years.

Copy of the approval dated 27/02/2023 by Chairman – Academic Council is as per **Annexure – 15.**

**14.2 TUITION FEE AND HOSTEL CHARGES FOR INTERNATIONAL STUDENTS**

Chairman Academic Council apprised the members about the Tuition Fees and Hostel Charges for International students. The issue of Tuition Fees and Hostel Charges for international students was also deliberated in the Heads meeting held on 28/12/2022, chaired by the Vice Chancellor. It was unanimously agreed to adopt the Tuition Fees and Hostel charges for International students as approved for JIIT Noida. The adopted Tuition Fee and Hostel charges for international students is as under:

Programs	Tuition Fees (per annum) (in USD)	Hostel Charges (per annum) (in USD)
BTech Programs	11600 USD	3000 USD
MTech Programs	5000 USD	3000 USD
MSc Programs	3000 USD	3000 USD
PhD Programs	3000 USD	3000 USD

# 50% Discount in Tuition Fee amount for students of SAARC Nations.

**14.3 REGISTRATION OF UNIVERSITY AND STUDENTS ON ACADEMIC BANK OF CREDITS – AN INITIATIVE TOWARDS IMPLEMENTATION OF NATIONAL EDUCATION POLICY-2020**

Chairman Academic Council apprised the members about the Registration of University and Students on Academic Bank of Credits – an initiative towards implementation of National Education Policy-2020 in compliance to UGC (Establishment and Operation of Academic Bank of Credits in Higher Education) Regulations, 2021 published

in Gazette of India on 28/07/2021 – **Annexure-16**.

JUIT has registered with the Academic Bank of Credits and students admitted in Academic Year 2021-22 onwards have been asked to create ABC ID through the Portal. Out of total 927 Nos. of students, 904 Nos. of students have registered themselves on the portal as on 08/06/2023. This has been done post approval dated 26/12/2022 by the Chairman – Academic Council. Copy of the approval is at **Annexure-17**.

#### 14.4 ADMISSION STATUS – ACADEMIC SESSION 2022-23

Members were apprised of the admission status for the Academic Session 2022-23 as on 30/11/2022. The sanctioned strength vis-a-vis admission status as on 30/11/2022 is as under:-

UG Programs (BTech)	Sanctioned	Admitted
Computer Sc. & Engg.	360	357
Information Technology	60	45
Electronics & Comm. Engg.	30	04
Electronics & Computer Engg.	30	-
Civil Engineering	30	04
Civil Engineering with Computer Application	30	02
Biotechnology	30	31
Bioinformatics	30	13
<b>Total</b>	<b>600</b>	<b>456</b>

PG Programs (MTech)	Sanctioned	Admitted
Computer Science & Engineering CSE (Information Security) CSE (Data Science)	18	04
Electronics & Communication Engineering ECE (Internet of Things)	18	02
Biotechnology	18	02
Civil (Construction Management) Civil (Structural Engineering) Civil (Environmental Engineering)	18	07
<b>Total</b>	<b>72</b>	<b>15</b>

PG Programs (MSc)	Sanctioned	Admitted
Biotechnology	30	21
Microbiology	30	04
<b>Total</b>	<b>60</b>	<b>25</b>

Doctoral Programs (PhD)	Sanctioned	Admitted (till date)
Computer Science & Engineering	-	02
Civil Engineering	-	04
Biotechnology	-	01
Bioinformatics	-	-
Electronics & Communication Engg	-	02
Mathematics	-	02
Physics & Materials Science	-	01

Humanities & Social Sciences	-	-
<b>Total</b>	-	<b>12</b>

#### **14.5 LIST OF SUBJECT EXPERTS FOR FACULTY SELECTION**

Members were apprised about the approved list of subject experts for Faculty selection. Departments identified the subject experts for the selection of the faculty in their respective department and the list was proposed to the Chairman – Academic Council for approval. The proposed list was considered by the Chairman – Academic Council and same was approved vide approval dated 13/12/2022.

Copy of the approval and approved list of the subject experts is at **Annexure-18**.

#### **14.6 POLICY DOCUMENTS**

Chairman apprised the members about the approval of some policy documents in order to streamline the process of the various activities and considering requirements of various Regulatory bodies. The prepared 11 Policy Documents are as under:

1. Code of Ethics for Research
2. Consultancy Policy
3. Divyangjan Policy & Initiatives
4. e-Governance Policy
5. IT Policy
6. Library Policy (Manual)
7. Policy for Promotion of Research
8. Policy on Class Rooms
9. Policy on Guest Room
10. Policy on Laboratory Maintenance
11. Sports Policy

All the above policy documents have been approved by the Chairman – Academic Council. Copy of the approval **Annexure-19** and approved Policy Documents are appended as **Annexure-20 to 30**

#### **14.7 AWARD OF PROFICIENCY CERTIFICATE FOR 2022 PASSED OUT BATCH**

Chairman apprised the members about the award of Proficiency Certificate for 2022 passed out batch students.

The provisions of Proficiency Certification was introduced / floated from the 2018 Admission batch. First batch to which proficiency was offered completed the degree requirements in June 2022 along with the opted proficiency in the chosen field.

Students who have opted for the proficiency and met the award of proficiency conditions have been awarded with the Proficiency Certificate. Sample of the awarded Proficiency Certificate is attached at **Annexure-31**.

#### **14.8 MODIFICATION IN COURSE STRUCTURE OF MSc (BIOTECHNOLOGY)**

## **PROGRAM**

Chairman apprised the members about the modifications in Course Structure of MSc (Biotechnology) Program.

The said modifications were proposed in the MSc 3<sup>rd</sup> Semester as under:

- Clubbing of Courses “Critical Review of Classical Papers” and “Project Proposal Presentation” as a one course “Review of Classical Paper & Project Proposal Presentation (02 Credits) (22MS1BT311)
- Introduction of one new course “Food Biotechnology (02 Credits) (22MS1BT311)

The proposed modifications have been approved by the Chairman – Academic Council vide approval dated 21/04/2023. Copy of BoS Minutes, approval and detailed syllabus of newly introduced course “Food Biotechnology” (22MS1BT311) is as per **Annexure-32**.

### **14.9 APPROVAL FOR COURSE STRUCTURE (1<sup>st</sup> & 2<sup>nd</sup> SEMESTER) AND DETAILED SYLLABI COURSES OF 1<sup>st</sup> & 2<sup>nd</sup> SEMESTER OF BSc (HONS.) IN MATHEMATICS & COMPUTING**

Chairman – Academic Council apprised the members about the approval of the Course Structure (1<sup>st</sup> & 2<sup>nd</sup> Semester) and detailed syllabi of courses of 1<sup>st</sup> & 2<sup>nd</sup> Semester – BSc (Hons.) in Mathematics & Computing.

The proposed Course Structure and detailed syllabi of the courses were proposed through the Board of Studies (BoS) meeting held on 08/06/2022. (Minutes of BoS at **Annexure-33**).

The approved Course Structure is at **Annexure-34** and detailed syllabi of the courses are at **Annexure-35**.

Recommendations of the BoS of the department were considered by the Chairman – Academic Council and same were approved vide approval dated 04/10/2022. Copy of the approval by Chairman – Academic Council is at **Annexure-36**.

### **14.10 FLOATING OF NEW COURSE “APPLIED SOFT COMPUTING TECHNIQUES” (22PIWMA231) TOWARDS PhD COURSE WORK – DEPTT. OF MATHEMATICS**

Chairman – Academic Council apprised the members about the introduction of new course towards the course work for the PhD Program.

Department of Mathematics through its Board of Studies held on 30/12/2022 (Minutes of BoS at **Annexure-37**) proposed for introduction of new course towards the course work for the PhD Program. The newly proposed course is as under:

Applied Soft Computing Techniques (22PIWMA231) (L-T-P) (3-0-0) (03 Credits)

The proposal of introduction of new course was approved by the Chairman – Academic Council vide approval dated 02/03/2023. Copy of approval and detailed syllabus of newly introduced course “Applied Soft Computing Techniques” (22P1WMA231) are at **Annexure-38**.

**14.11 FLOATING OF NEW OPEN ELECTIVE COURSES BY DEPARTMENT OF CIVIL ENGINEERING**

Chairman – Academic Council apprised the members about the introduction of two (02) new Open Elective Courses offered by Department of Civil Engineering Department.

Department of Civil Engineering through its Board of Studies held on 21/05/2022 (Minutes of BoS at **Annexure-39**) proposed for introduction of new Open Elective Course for BTech Program. The newly proposed courses are as under:

- Perennial Power Structures (22B1WCE731) (L-T-P) (3-0-0) (03 Credits)
- Disaster Risk Analysis and Management (22B1WCE831) (L-T-P) (3-0-0) (03 Credits)

The proposed introduction of Open Elective Courses was approved by the Chairman – Academic Council vide approval dated 22/10/2022. Copy of approval and detailed syllabus of newly introduced courses are as per **Annexure-40**.

**14.12 REPRINTING OF DEGREE CERTIFICATES DUE TO SPELLING ERROR IN NAME**

Chairman – Academic Council apprised the members about the reprinting of two (02) Degree Certificates due to spelling error in name printed on the Degree certificate in respect of below mentioned students:-

Ms. Suchi Johari, Enrolment No. 132208 – MTech (CSE)

Ms. Shivani Sood, Enrolment No. 106558 – PhD (Biotechnology)

Noting for change in the name and reprinting of the degree was moved to the Chairman – Academic Council and upon approval by the Chairman – Academic Council, reprinting of the degrees was done with correct name. The earlier printed Degree certificate having spelling error in name were called back and cancelled. Copy of the approval Chairman – Academic Council and reprinted Degree certificates are appended at **Annexure-41**.

**ITEM NO. 15/2023-1 ANY OTHER ITEM WITH THE PERMISSION OF THE CHAIR**

**15.1 APPROVAL FOR POST DOCTORATE FELLOWSHIP RULES**

In order to improvise and enhance the academic standards of the Institution, it was proposed to devise the mechanism for induction of Post Doctorate Fellows and implementation of Post Doctorate Fellowship Programmes for induction of such Post Doctorate Fellows. Such induction will translate to better research environment, perception of the institution and may bring higher accolades to the

## JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY

(Established under HP Legislative Assembly Act No. 14 of 2002 and UGC Section 2(f) Approved)

Institution under NIRF rankings.

In order to attain the above objective, it was proposed to frame proper rules and regulations for offering post doctorate fellowship to the prospective candidates.

The item was considered by the Council and after deliberation item was approved.  
The approved Post Doctorate Fellowship Rules are as per **Annexure-42**.

There being no other point, meeting ended with a vote of thanks to the Chair.

(Maj Gen Rakesh Bassi, SM (Retd))  
Registrar & Non-Member Secretary

Confirmed

(Prof Rajendra Kumar Sharma)  
Chairman, Academic Council &  
Vice-Chancellor, JUIT, W





## Civil Engineering Materials and Energy Efficient Building

COURSE CODE: 23B11CE313

COURSE CREDITS: 3

CORE/ELECTIVE: CORE

L-T-P: 3-0-0

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### Course Objectives:

1. To introduce the students to a wide range of materials that can be used in construction and maintenance of civil engineering project.
2. To gain understanding of properties and usage of bricks, stones, timber and miscellaneous materials used in construction.
3. Introducing green Rating Systems and Energy Efficient Buildings.

### Course Outcomes:

S.No.	Course Outcomes	Level of Attainment
CO-1	Learn about properties and usage of bricks, stones, timber and miscellaneous materials used in construction.	Familiarity
CO-2	Learn about various tests conducted on civil engineering materials.	Familiarity
CO-3	Learn how various civil engineering materials usage during a construction work.	Usage
CO-4	Learn concepts of energy efficiency in building.	Usage
CO-5	Introducing green Rating Systems and Energy Efficient Buildings.	Usage

**Course Contents:**

<b>Unit</b>	<b>Contents</b>	<b>Lectures required</b>
<b>1</b>	<b>Introduction to Civil Engineering Material:</b> Scope, selection criteria of construction material, classification and properties of civil engineering material.	<b>3</b>
<b>2</b>	<b>Building Stones:</b> Introduction, characteristics of good building stones, selection, and use of stone, dressing of stones.	<b>4</b>
<b>3</b>	<b>Bricks :</b> Introduction, constituents of brick earth, manufacture of bricks, good qualities of bricks, classification of bricks, standard test for bricks	<b>4</b>
<b>4</b>	<b>Cement:</b> Introduction, type, properties and uses of cement, ingredients of cement, manufacture of cement, composition and function of cement clinker, standard test of cement, admixtures. <b>Concrete:</b> Introduction, classification of concrete, water-cement ratio, strength and workability of concrete, defects, non-destructive testing of concrete.	<b>9</b>
<b>5</b>	<b>Mortar:</b> Introduction, classification of mortar, function of mortar, selection of mortar for civil engineering works. <b>Timber:</b> Introduction, growth and structure of tree, classification of tree, characteristics of good timber, defect of timber, seasoning of timber, preservation of timber	<b>6</b>
<b>6</b>	<b>Asphalt, Bitumen, Tar and Miscellaneous Materials:</b> Type, properties and uses of asphalt, bitumen and tar, type, properties and uses of glass, plastic materials, insulating materials, gypsum products, composite materials.	<b>6</b>
<b>7</b>	<b>Energy Efficient Building:</b> Introduction, conventional versus energy efficient buildings, Energy efficiency and conservation requirements for existing buildings, IAQ requirement analysis. Green buildings rating Systems, climatological factors, materials specifications and heat transfer principles, thermal performance evaluation, heat loss from buildings, design of artificial ventilations system, carbon footprint estimation. Energy efficient lighting system design, LEED and TERI GRIHA ratings, performance ratings of green buildings. Zero energy building.	<b>10</b>
<b>Total lectures</b>		<b>42</b>

**Suggested Text Book(s):**

1. S.K Duggal: Building Materials, 4th Edition, New Age International Publishers,2012
2. M.L Gambhir, Neha Jamwal, Building Materials, Mc Graw Hill, 2014
3. Mili Majumdar (ed.), Energy-efficient Buildings in India.

**Suggested Reference Book(s):**

1. Peter A. Thornton and Vito J. Colangela Prentice “Fundamental of Engineering Materials”, Hall Publishing Company, 1985.
2. Parbin Singh “Civil Engineering Material”, Katson Books,2008.
3. R.K.Rajput “Engineering Material”, S. Chand & Company Ltd,2004.

**Evaluation Scheme:**

<b>S. No</b>	<b>Exam</b>	<b>Marks</b>	<b>Duration</b>	<b>Coverage / Scope of Examination</b>
1	T-1	15	1 Hour.	Syllabus covered upto T-1
2	T-2	25	1.5 Hours	Syllabus covered upto T-2
3.	T-3	35	2 Hours	Entire Syllabus
4.	Teaching Assessment	25	Entire Semester	Assignments (10) - 10 Presentation(1) -10 Attendance/Quiz -5

## **Water Quality Engineering**

COURSE CODE - 23B11CE312

COURSE CREDITS: 3

CORE/ELECTIVE: CORE

L-T-P: 3-0-0

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### **Course Objectives:**

1. To apprehend water quality criteria and standards.
2. To understand the knowledge about sources, causes and impact of various pollutants in water.
3. To be abreast with physical, chemical and biological methods of water treatment.
4. To understand the process and designing of water supply and treatment systems.
5. Understand the software Application in water supply modelling.

### **Course Outcomes:**

<b>S. No.</b>	<b>Course Outcomes</b>	<b>Level of Attainment</b>
CO-1	Understand the different sources of raw water and the associated water demands from such sources.	Familiarity
CO-2	Understand the different treatment processes associated for supplying treated water for different uses and meeting the quality criterion of Indian standards.	Assessment
CO-3	Understand the importance of the disinfection process (purification) of treated water supply for domestic purposes.	Assessment
CO-4	Understand the different components of water distribution system including network analysis.	Usage
CO-5	Understand the impact of water pollutants on environment, self-purification and disposal standards using various modelling methods.	Usage

**Course Contents:**

Unit	Contents	Lectures required
1	<p><b>Introduction:</b> Importance of planned water supplies; financing, planning and execution of modern water supply schemes.</p> <p><b>Water demands:</b> Various types of demands; the per capita demand: variations in demand; design periods; population forecasting by various methods.</p> <p><b>Sources of water:</b> Kinds of water sources and their characteristics; factors governing the selection of a source of water supply; storage capacity of impounded reservoir.</p> <p><b>Quality of water:</b> physical, chemical and biological characteristics of water, common water borne diseases, standards of purified water for various purposes</p>	10
2	<p><b>Treatment of water:</b> screening and types; aeration units; sedimentation; sedimentation tanks and their types; sedimentation aided with coagulation; classifications of filters and their constructional and operational details.</p> <p><b>Water softening:</b> Importance of water softening; lime- soda process; zeolite process.</p> <p><b>Miscellaneous treatment methods:</b> Removal of color, odor and taste, iron and manganese; fluoridation and de-fluoridation.</p>	10
3	<p><b>Disinfection:</b> Methods of disinfection; chlorination and its types.</p>	4
4	<p><b>Collection and Distribution of water:</b> Intakes and their design for lakes, streams and rivers; methods of distribution; concept of service and balancing reservoirs; capacity of distribution reservoirs; Design of water distribution systems; analysis of pipe networks by Hardy Cross method, equivalent pipe method, method of sections and Newton-Raphson method; Layout of distribution system; the house water connection; construction and maintenance of distribution systems.</p> <p><b>Pipes-Joints-Fittings:</b> various types of conduits; testing and inspection; joints in pipes; valves in pipe line.</p> <p><b>Pumps and pumping stations:</b> Types of pumps and their choice; pumping stations; economical diameter of rising main; hand pumps; pump testing; Water hammer and its control measures.</p>	10

<b>5</b>	<b>Modelling techniques:</b> To connect various issues and themes related to availability of water, developing water stress index. Numerical problems using computer applications and software for data set generations.	<b>8</b>
<b>Total lectures</b>		<b>42</b>

**Suggested Text Book(s):**

1. J. S Birdie, G S Birdie: Water Supply and Sanitation Engineering, 9th Edition, Dhanpat Rai Publications, India, 2014.
2. Garg S.K: Environmental Engineering – Water Supply Engineering (Volume -1), Khanna Publishers, India, 2015.
3. B.C. Punmia, A.K. Jain, A.K. Jain: Water Supply Engineering, 2nd Edition, Laxmi Publications. India, 2016.
4. Integrated Computer Application in Water Supply: Application and Implementations for Systems Operation and Management by Bryan Coulbeck (Volume 2), Annotation copyright Book News, Inc. Portland, Or.

**Suggested Reference Book(s):**

1. H. Peavy, D. Rowe, G. Tchobanoglous "Environmental Engineering", 1<sup>st</sup> Edition, McGraw Higher Education Publications, India, 2017.

**Other useful resource(s):**

1. Link to NPTEL course  
Contents: <https://nptel.ac.in/courses/105104102/Domestic%20water%20treat.htm>

**Evaluation Scheme:**

S. No	Exam	Marks	Duration	Coverage / Scope of Examination
1	T-1	15	1 Hour.	Syllabus covered upto T-1
2	T-2	25	1.5 Hours	Syllabus covered upto T-2
3.	T-3	35	2 Hours	Entire Syllabus

4.	Teaching Assessment	25	Entire Semester	Assignments (10) - 10  Presentation (1) -10  Attendance/Quiz -5
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**Course Outcomes (COs) contribution to the Programme Outcomes (POs)**

Course Outcomes	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	Average
CO-1	2	2	2	2	1	1	1	1	2	2	2	2	<b>1.66</b>
CO-2	2	3	2	3	1	1	2	2	2	2	1	2	<b>1.91</b>
CO-3	3	2	2	2	2	1	2	1	2	2	1	2	<b>1.83</b>
CO-4	2	2	3	3	2	2	2	2	2	3	2	1	<b>2.16</b>
CO-5	3	2	3	3	1	2	2	1	3	2	2	1	<b>2.08</b>
Average	<b>2.4</b>	<b>2.2</b>	<b>2.4</b>	<b>2.6</b>	<b>1.4</b>	<b>1.4</b>	<b>1.8</b>	<b>1.4</b>	<b>2.2</b>	<b>2.2</b>	<b>1.6</b>	<b>1.6</b>	



## Water Quality Lab

COURSE CODE: 23B17CE372

COURSE CREDITS: 1

CORE/ELECTIVE: CORE

L-T-P: 0-0-2

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### Course Objectives:

1. Physical Characteristics of water samples.
2. Inorganic Constituents of water samples.
3. Biological Characteristics of water samples.

### Course Outcomes:

S.No.	Course Outcomes	Level of Attainment
CO-1	Identify environmental problems arising due to engineering and technological activities and the science behind those problems.	Familiarity
CO-2	Determination of various inorganic impurities in water samples	Assessment
CO-3	Determine physical, chemical and biological characteristics of water and waste water samples.	Assessment

CO-4	Analyze material balance for different environmental systems.	Usage
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**List of Experiments:**

S. No	Description	Hours
1	Determination of pH and Temperature of water and wastewater sample.	2
2	Determination of total solids, suspended solids and dissolved solids of water and wastewater sample.	2
3	Determination of specific conductivity of water and wastewater sample.	2
4	Determination of turbidity.	2
5	Determination of chlorides of water and wastewater sample.	2
6	Determination of type and extent of alkalinity of water and wastewater sample.	2
7	Determination of type and extent of acidity of water and wastewater sample.	2
8	Determination of temporary and permanent hardness.	2
9	Determination of optimum dose of coagulant.	2
10	Determination of Sulphates of water and wastewater sample.	2
11	Determination of Kjeldahl Nitrogen (Inorganic) of the sample.	2



CO-1	3	3	3	3	2	2	1	1	1	1	1	1	1	<b>1.83</b>
CO-2	3	3	3	3	3	1	1	1	1	1	1	1	3	<b>2.00</b>
CO-3	3	3	2	3	2	3	2	1	1	1	2	1	1	<b>2.00</b>
CO-4	3	3	3	2	3	2	1	1	1	1	1	1	1	<b>1.83</b>
Average	<b>3</b>	<b>3</b>	<b>2.75</b>	<b>2.75</b>	<b>2.5</b>	<b>2</b>	<b>1.25</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1.25</b>	<b>1.5</b>		

## **Environmental Studies**

COURSE CODE -

COURSE CREDITS: 0

CORE/ELECTIVE: Audit

L-T-P: 2-0-0

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### **Course Objectives:**

1. Identify environmental problems arising due to engineering and technological activities and the science behind those problems.
2. Estimate the population- economic growth, energy requirement and demand.
3. Analyze material balance for different environmental systems
4. Realize the importance of ecosystem and biodiversity for maintaining ecological balance.
5. Identify the major pollutants and abatement devices for environmental management and sustainable development.
6. Recognizing the major concepts of environmental studies, developing problem solving ability, forecasting the global climate change.

### **Course Outcomes:**

<b>S. No.</b>	<b>Course Outcomes</b>	<b>Level of Attainment</b>
CO-1	Introducing basic concept of environmental studies, interdisciplinary nature and scope of the subject.	Familiarity
CO-2	Understanding ecosystem services and its functioning as well as equitable use of natural resources.	Assessment
CO-3	Understanding Pollution, A threat to the environment and finding its solutions, Pollutant sampling and monitoring of samples.	Assessment
CO-4	Correlating the concept of Biodiversity and its importance to human mankind.	Usage
CO-5	Understanding social issues and their impact on environment	Usage
CO-6	Role of Information Technology in environment and human health.	Usage

**Course Contents:**

Unit	Contents	Lectures required
1	<b>Multidisciplinary nature of environmental studies:</b> The Multidisciplinary nature of environmental studies: Definition, scope and importance, Need for public awareness, Types of Ecosystems, World Biomes, Ecosystem functioning, Biogeochemical cycles.	3
2	<b>Natural resources, their consumption &amp; Protection:</b> Natural resources, their consumption & Protection: Water, Land Energy (Renewable, non-renewable, wind, solar, hydro, Biomass), Mineral, Forest, & Food resources, Role of an individual in conservation of natural resources, Equitable use of resources.	4
3	<b>Pollution- a threat to environment:</b> Pollution- a threat to environment: Air, Water & Land pollution, sources & causes, Space pollution, causes & effects, toxicity limits of pollutants. Critical issues concerning global Environment (Urbanization, population growth, global warming, climate change, acid rain, ozone depletion etc.) and the Roots in: Cultural, Social, Political, Commercial, industrial, territorial domains	4
4	<b>Environmental standards &amp; Quality:</b> Environmental standards & Quality: Air, Water & Soil Quality, Pollutant sampling, pollution control systems. Green Chemistry and its Application.	3
5	<b>Biodiversity and its conservation:</b> Biodiversity loss: Diversity of flora and fauna, species and wild life diversity, Biodiversity hotspots, threats to biodiversity.	4
6	<b>Social Issues and the Environment:</b> Waste land reclamation, consumerism and waste products, eco-consumerism, dematerialization, green technologies, eco-tourism. Water conservation, rain water harvesting, watershed management. Environment protection act, Air (prevention and control of pollution) act; Water (prevention and control of pollution) act, Wildlife protection act, Forest conservation act, Issues involved in enforcement of environmental legislation National Environmental Policy; Function of pollution control boards (SPCB and CPCB), their roles and responsibilities.	4
7	<b>Human Population and the environment:</b> Population growth, variation among nations. Population explosion—Family welfare program. Environment and human health. Human rights. Value education. HIV/AIDS. Women and child welfare. Role of Information technology in environment and human health. Case Studies.	4

<b>8</b>	<b>Field work:</b> Field Work: Explore the surrounding flora & fauna (Study of common plants, insects, birds document environmental assets), documentation of industries in local region and their possible effects, measure of water, air and land quality, Visit to a local polluted site-urban/rural /industrial / agricultural, Study of simple ecosystems-pond, river, hill slopes etc.	<b>4</b>
<b>Total lectures</b>		<b>30</b>

**Suggested Text Book(s):**

1. Environmental Studies By: M. P. Poonia and S.C. Sharma, Khanna Publishers
2. Textbook of Environmental Studies for UG Courses –ErachBharucha, University Press
3. Joseph, B., 2005, Environmental Studies, Tata McGraw Hill, India.

**Suggested Reference Book(s):**

1. Nebel, B.J. & Wright, R.T., 1993, Environmental Science, 8th Edition, Prentice Hall, USA.
2. Chiras D D. (Ed.). 2001. Environmental Science – Creating a sustainable future. 6th ed. Jones & Barlett Publishers.
3. David Laurance. 2003. Environment Impact assessment, Wiley publications.
4. Chhokar KB, Pandya M & Raghunathan M. 2004. Understanding Environment. Sage publications, NewDelhi.

**Other useful resource(s):**

1. Issues of the journal: Down to Earth, published by Centre for Science and Environment.
2. Audio visuals from: Discovery, National Geographic etc.
3. Rachel Carson 1960. Silent springs

**Evaluation Scheme:**

S. No	Exam	Marks	Duration	Coverage / Scope of Examination
1	Quiz-1	15	1 Hour.	Syllabus covered up to T-1
2	Quiz-2	25	1.5 Hours	Syllabus covered up to T-2
3.	Quiz-3	35	2 Hours	Entire Syllabus

4.	Teaching Assessment	25	Entire Semester	Assignments- 10 Presentation -10 Attendance-5
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**Course Outcomes (COs) contribution to the Programme Outcomes (POs)**

Course Outcomes	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	Average
CO-1	2	2	2	2	2	1	1	2	2	2	2	1.28	1.8
CO-2	2	3	3	3	3	1	1	1	2	2	1	2	2.0
CO-3	2	2	2	2	3	1	1	1	2	2	1	2	1.8
CO-4	2	3	3	3	2	1	1	1	2	3	2	2	2.1
CO-5	2	3	3	2	2	1	1	1	1	1	3	2	1.8
CO-6	2	2	2	2	1	1	1	2	2	2	2	2	1.8
Average	2.0	2.5	2.5	2.33	2.16	1.0	1.0	1.16	1.8	2.0	1.8	2.0	



## Environmental Science and Technology

COURSE CODE:22BS1GE211

COURSE CREDITS: 2

CORE/ELECTIVE: CORE

L-T-P: 2-0-0

**Pre-requisite:** None

### Course Objectives:

1. Identify environmental problems arising due to engineering and technological activities and the science behind those problems.
2. Estimate the population- economic growth, energy requirement and demand.
3. Analyze material balance for different environmental systems
4. Realize the importance of ecosystem and biodiversity for maintaining ecological balance.
5. Identify the major pollutants and abatement devices for environmental management and sustainable development.
6. Recognizing the major concepts of environmental studies, developing problem solving ability, forecasting the global climate change

### Course Outcomes:

S.No.	Course Outcomes	Level of Attainment
CO-1	Introducing basic concept of environmental studies, interdisciplinary nature and scope of the subject	Familiarity
CO-2	Understanding ecosystem services and its functioning as well as equitable use of natural resources.	Assessment
CO-3	Understanding Pollution, A threat to the environment and finding its solutions, Pollutant sampling and monitoring of samples.	Assessment
CO-4	Correlating the concept of Biodiversity and its importance to human mankind	Usage
CO-5	Understanding social issues and their impact on environment.	Usage
CO-6	Role of Information Technology in environment and human health	Usage

### Course Contents:

Unit	Contents	Lectures required
1	<b>Unit 1: Multidisciplinary nature of environmental studies:</b> The Multidisciplinary nature of environmental studies: Definition, scope and importance, Need for public awareness, Types of ecosystems, World Biomes, Ecosystem functioning, Biogeochemical cycles.	3

<b>2</b>	<b>Unit 2: Natural resources, their consumption &amp; Protection:</b> Natural resources, their consumption & Protection: Water, Land Energy (Renewable, non-renewable, wind, solar, hydro, Biomass), Mineral, Forest, & Food resources, Role of an individual in conservation of natural resources, Equitable use of resources.	<b>4</b>
<b>3</b>	<b>Unit 3: Pollution- a threat to environment:</b> Pollution- a threat to environment: Air, Water & Land pollution, sources & causes, Space pollution, causes & effects, toxicity limits of pollutants. Critical issues concerning global Environment (Urbanization, population growth, global warming, climate change, acid rain, ozone depletion etc.) and the Roots in: Cultural, Social, Political, Commercial, industrial, territorial domains	<b>4</b>
<b>4</b>	<b>Unit 4: Environmental standards &amp; Quality:</b> Environmental standards & Quality: Air, Water & Soil Quality, Pollutant sampling, pollution control systems. Green Chemistry and its applications	<b>3</b>
<b>5</b>	<b>Unit 5: Biodiversity and its conservation:</b> Biodiversity loss: Diversity of flora and fauna, species and wild life diversity, Biodiversity hotspots, threats to biodiversity	<b>4</b>
<b>6</b>	<b>Unit 6: Social Issues and the Environment:</b> Waste land reclamation, consumerism and waste products, eco-consumerism, dematerialization, green technologies, eco-tourism. Water conservation, rain water harvesting, watershed management. Environment protection act, Air (prevention and control of pollution) act; Water (prevention and control of pollution) act, Wildlife protection act, Forest conservation act, Issues involved in enforcement of environmental legislation National Environmental Policy; Function of pollution control boards (SPCB and CPCB), their roles and responsibilities.	<b>4</b>
<b>7</b>	<b>Unit 7: Human Population and the environment:</b> Population growth, variation among nations. Population explosion—Family Welfare Programme. Environment and human health. Human rights. Value education.HIV/AIDS. Women and Child Welfare. Role of Information Technology in environment and human health. Case Studies.	<b>4</b>
<b>8</b>	<b>Unit 8: Field work:</b> Field Work: Explore the surrounding flora & fauna (Study of common plants, insects, birds document environmental assets), documentation of industries in local region and their possible effects, measure of water, air and land quality, Visit to a local polluted site-Urban/Rural /Industrial / Agricultural, Study of simple ecosystems-pond, river, hill slopes etc	<b>4</b>
<b>Total lectures</b>		<b>30</b>

### Suggested Text Book(s):

1. Environmental Studies By: M. P. Poonia and S.C. Sharma, Khanna Publishers
2. Textbook of Environmental Studies for UG Courses –Erach Bharucha, University Press
3. Joseph, B., 2005, Environmental Studies, Tata McGraw Hill, India.

**Suggested Reference Book(s):**

1. Nebel, B.J. & Wright, R.T., 1993, Environmental Science, 8th Edition, Prentice Hall, USA.
2. Chiras D D.(Ed.). 2001. Environmental Science – Creating a sustainable future. 6th ed. Jones & Barlett Publishers.
3. David Laurance. 2003. Environment Impact assessment, Wiley publications.
4. Chhokar KB, Pandya M & Raghunathan M. 2004. Understanding Environment. Sage publications, New Delhi.

**Other useful resource(s):**

1. Issues of the journal: Down to Earth, published by Centre for Science and Environment.
2. Audio visuals from: Discovery, National Geographic etc.
3. Rachel Carson 1960. Silent springs

**Evaluation Scheme:**

<b>S. No</b>	<b>Exam</b>	<b>Marks</b>	<b>Duration</b>	<b>Coverage / Scope of Examination</b>
1	T-1	15	1 Hour.	Syllabus covered up to T-1
2	T-2	25	1.5 Hours	Syllabus covered up to T-2
3.	T-3	35	2 Hours	Entire Syllabus
4.	Teaching Assessment	25	Entire Semester	Assignment (2) - 10 Quizzes(2)-10 Attendance - 5

## Sustainable Technologies for Waste Management

COURSE CODE: 19B1WBT731

COURSE CREDITS: 3

CORE/ELECTIVE: ELECTIVE

L-T-P: 3-0-0

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**Pre-requisite:** Environmental pollution: Cause and remediation strategies

### Course Objectives:

1. Sustainable strategies and technologies for waste and resource management at national and international level for overall development in this sector

### Course Outcomes:

**CO I.** Students will know about the types of waste, their prevalence and available treatment options.

**CO II:** Students will be able to grasp the concepts of waste to energy technologies and apply their knowledge to look for appropriate one.

**CO III.** Students will develop the skill of linking waste and management strategies to society and its needs.

**CO IV:** Students will develop an understanding risk assessment and life cycle of the waste.

**CO V:** Students will be able to recognize real-world examples of waste disposal and handling

### Course Content:

S.No.	Topics	No. of lectures
1	<b>Introduction</b> Concept of Sustainable Technologies for waste management.	2
	<b>Technology Matrix for Solid Waste Management</b> Type of Wastes and appropriate technologies, Municipal Solid Waste, Industrial waste, medical and other wastes. Status of various waste streams in India and available treatment options	5

2	<p><b>Waste to Energy Technologies</b> Technologies for recovering energy from waste, based in part on their potential for climate change mitigation and relevance to India, Case studies of adapted waste-to-energy technologies and evaluating their impact. The focus will be on methane, hydrogen and ethanol and next generation fuel technologies utilizing agricultural and municipality waste.</p>	6
3	<p><b>Developing Sustainable Strategies</b> Corporate / Organizational responsibility, Sustainability strategy development., Management tools, Sustainable/ethical investment accounts , Silos and open access, Product development and design</p>	5
4	<p><b>Electronic waste and Battery Waste Management</b> MOEFCC policy advice and carrying out activities relating to electronic/battery waste management, current status in India and global projections, hazardous substances in e- /battery waste and health perspectives, recycling technologies for e-/battery wastes, new strategies for waste collection and disposal, extended producer responsibility</p>	5
5	<p><b>Green composites and Bioelectrochemical systems for sustainable world</b> Green composites: towards a sustainable future; Cellulose fiber/nanofiber from natural sources including waste-based sources; Clean production strategies; Green composites for the built environment  Microbial electrosynthesis; BES for sustainable agriculture; BES for sustainable energy production and product recovery; Life cycle assessment of a BES</p>	8
6	<p><b>Industrial Ecology &amp; Economic, Social and legal instruments</b> The onset of industrial ecology and conceptual framework and linkages with waste management. Social issues and costs associated with waste management, traditional approaches to financing, the new advisory projects in India, economic incentive systems to avoid or recycle waste, Laws and obligations related to waste management, carbon foot print.</p>	6
7	<p><b>Risk Assessment and Life cycle assessment of Waste, Case studies</b> Hazardous wastes and their risk assessment, available models and management, life cycle inventory and impact assessment</p>	5
	Total	42

**Evaluation scheme:**

T1	1 hour	15 (course covered upto T1)
T2	1.5 hour	25 (course covered upto T2, including that covered upto T1)
T3	2 hours	35 (total syllabus)

Tutorials, quiz, and home assignments 25

Total 100

**Text books:**

1. Concept of genetics by William S Klug and M.R. Cummings
2. Principles of Genetics. D P Snustad, M J Simmons

**Reference books:**

1. Sustainable Solid Waste Management. A system engineering approach. Chana Ni-Ben and Pires Ana. IEEE Press.
2. E-waste: Implications, regulations, and management in India and current global best practices. Rakesh Johri. Teri Press.
3. Green Composites: Natural and waste-based composites for a sustainable future by Caroline Baillie and Randika Jayasinghe
4. Scientific and research articles from Elsevier, Springer, Wiley and RSC Journals
5. Solid Waste Management - A Manual by All India Institute of Local Self-Government Publications
6. Toxic and Hazardous Waste by Sinha P.C.
7. Manual on Solid Waste Management by Palnitkar, Sneha
8. Basic Hazardous Waste Management by William C. Blackman
9. Management Of Municipal Solid Waste by Ramchandra T. V.
10. Solid Waste Management by H V. Bijalani
11. TED talks

# Sewage Treatment and Disposal

COURSE CODE:18B11CE512

COURSE CREDITS: 3

CORE/ELECTIVE: CORE

L-T-P: 3-0-0

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**Pre-requisite:** None

## Course Objectives:

1. Learn to understand the basic fundamentals for treatment of municipal wastewater systems and the associated flow-sheets of the different treatment systems.
2. Learn about the operations of the wastewater treatment plant and the fundamental scientific principles involved in the treatment process.
3. Learn to design the unit operations and unit processes for treatment of municipal wastewaters.
4. Learn to design the physico-chemical and biological treatment systems for treatment of municipal wastewaters.
5. Learn to design the fundamentals of sludge treatment and tertiary treatment processes

## Course Outcomes:

S.No.	Course Outcomes	Level of Attainment
CO-1	Critically analyze the problems arising out of the operation of wastewater treatment plant.	Familiarity
CO-2	Ability to utilize proper design considerations depending upon the selected treatment method for wastewater and their potential limitations.	Assessment
CO-3	Estimate design details for different treatment processes including conventional, low-cost treatment systems and advanced systems.	Assessment
CO-4	Ability to learn apply effective disposal methods for treated waste water (sludge handling).	Usage

## Course Contents:

Unit	Contents	Lectures required
1	<b>Collection of Sewage:</b> Systems of sewerage – separate, combined and partially separate. Quantity of sanitary sewage and variations. Shapes of sewer – circular and egg shaped. Design of sewers, self-cleansing velocity and slopes, Construction and testing of sewer lines. Sewer materials. Joints and appurtenances.	15

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2	<b>Sewage Characterization:</b> Quality parameters- BOD, COD, Solids, D.O., Oil & Grease. Indian Standards for disposal of effluents into inland surface sources and on land	4
3	<b>Sewage Treatment:</b> Objectives, sequence and efficiencies of conventional treatment units. Preliminary treatment, screening and grit removal units. Theory and design aspects of primary treatment, secondary treatment- activated sludge process & its modifications, Trickling filter, sludge digestion and drying beds. Stabilization pond, aerated lagoon, UASB process, septic tank and Imhoff tank.	18
4	<b>Disposal of Sewage:</b> Disposal of sewage by dilution – self-purification of streams. Sewage disposal by irrigation (sewage treatment	5
<b>Total lectures</b>		<b>42</b>

### Suggested Text Book(s):

1. J. S Birdie, G S Birdie: Water Supply and Sanitation Engineering, 9<sup>th</sup> Edition, Dhanpat Rai Publications, India, 2014.
2. Garg S.K: Environmental Engineering – Sewage Disposal and Air Pollution Engineering (Volume -2), Khanna Publishers, India, 2015.
3. B.C. Punmia, A.K. Jain, A.K. Jain: Wastewater Engineering (including Air Pollution), 2<sup>nd</sup> Edition, Laxmi Publications. India, 2016

### Suggested Reference Book(s):

1. H. Peavy, D. Rowe, G.Tchobanoglous "Environmental Engineering", 1<sup>st</sup> Edition, McGraw Higher Education Publications, India, 2017.
2. Metcalf and Eddy Inc: Wastewater Engineering: Treatment and Resource Recovery, 4<sup>th</sup> Edition, McGraw Hill Publications. India, 2014

### Other useful resource(s):

1. Link to NPTEL course contents: <https://nptel.ac.in/courses/105105048/>
2. Link to topics related to course:
  - i. <https://nptel.ac.in/courses/105104102/17>
  - ii. <https://nptel.ac.in/courses/105104102/20#>
  - iii. <https://nptel.ac.in/courses/105104102/23>
  - iv. <https://nptel.ac.in/courses/105104102/26>



**Evaluation Scheme:**

S. No	Exam	Marks	Duration	Coverage / Scope of Examination
1	T-1	15	1 Hour.	Syllabus covered upto T-1
2	T-2	25	1.5 Hours	Syllabus covered upto T-2
3.	T-3	35	2 Hours	Entire Syllabus
4.	Teaching Assessment	25	Entire Semester	Assignment (2) - 10  Quizzes(2)-10  Attendance - 5

**Course Outcomes (COs) contribution to the Programme Outcomes (POs)**

Course Outcomes (Sewage Treatment and Disposal)	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	Average
CO-1	2	3	2	2	2	1	2	2	2	2	1	2	1.92
CO-2	3	2	2	2	3	2	2	2	2	1	1	1	1.92
CO-3	3	2	3	2	2	2	2	1	2	1	1	2	1.92
CO-4	2	2	2	3	2	2	2	1	2	3	2	2	2.08
Average	2.5	2.25	2.25	2.25	2.25	1.75	2.00	1.50	2.00	1.75	1.25	1.75	

# Solid Waste Management

COURSE CODE:18B1WCE532

COURSE CREDITS: 3

CORE/ELECTIVE: Elective

L-T-P: 3-0-0

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**Pre-requisite:** None

**Course Objectives:**

1. Identify the physical and chemical composition of waste.
2. Analyze the functional elements for solid waste management.
3. Understand the techniques and methods used in transformation, conservation, and recovery of materials from solid wastes.
4. Identify and design waste containment systems.

**Course Outcomes:**

S.No.	Course Outcomes	Level of Attainment
CO-1	Detailed composition of Solid waste both Physical and Chemical	Familiarity
CO-2	Functional elements for solid waste management.	Assessment
CO-3	Familiarity with the techniques and method involved in solid waste management.	Assessment
CO-4	Designing of waste containment landfill system for proper treatment of MSW generated	Usage

**Course Contents:**

Unit	Contents	Lectures required
1	<b>Sources and Types:</b> Solid waste: Definitions, Types and Sources of waste, Waste Generation and waste generation rates. Factors affecting the generation rate, Composition characteristics and properties, Methods of sampling, Effects of improper disposal of solid wastes- Public Health and Environmental effects. Elements of solid waste management and financial aspects. Solid waste management rules, 2016, Role of NGO's.	8

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2	<b>On-Site Storage and Processing:</b> On-Site Methods-Effect of storage, Materials used for containers- segregation of solid wastes, Public health and economic aspects of open storage, Waste Segregation and storage, Case studies under Indian scenario as well as worldwide, Source reduction of waste, reuse and recycling.	8
3	<b>Collection and Transfer:</b> Methods of Residential and Commercial Waste Collection, Collection Vehicles, Manpower Collection Routes, Analysis of Collection Systems, Transfer Stations – Selection of Location, Operation and Maintenance, Options Under Indian Conditions, Field Problems Solving.	8
4	<b>Off- Site Processing:</b> Objectives of Waste Processing – Physical Processing Techniques and Equipments; Resource Recovery from Solid Waste Composting and Bio- methanation; Thermal Processing Options – Case Studies Under Indian Conditions.	10
5	<b>Land Disposal of Solid Waste; Sanitary Landfills</b> – Site Selection, Design and Operation of Sanitary Landfills – Landfill Liners – Management of Leachate and Landfill Gas- Landfill Bioreactor– Dumpsite Rehabilitation	8
<b>Total lectures</b>		<b>42</b>

#### Suggested Text Book(s):

1. Tchobanoglous G, Theisen H and Vigil SA \_Integrated Solid Waste Management, Engineering Principles and Management Issues‘ McGraw-Hill, 1993. Kenneth A. Berman, Jerome L. Paul: Algorithms, Cengage Learning, 2002.
2. Mantell, C.L., Solid Waste Management, John Wiley, New York, 1975.
3. Peavy, H.S, Rowe, D.R., and G. Tchobanoglous, \_Environmental Engineering‘, McGraw Hill Inc., New York, 1985.
4. Chandrappa, Ramesh, Das, D.B., Solid Waste Management: Principles and Practise, Springer, 2012.

#### Suggested Reference Book(s):

1. Government of India, —Manual on Municipal Solid Waste Management, CPHEEO, Ministry of Urban Development, New Delhi, 2016.
2. Qian X, Koerner RM and Gray DH, \_Geotechnical Aspects of Landfill Design and Construction‘ Prentice Hall, 2002.
3. George Tchobanoglous and Frank Kreith | Handbook of Solid waste Management, McGraw Hill, New York, 2002.
4. Bhide A.D. And Sundaresan, B.B. —Solid Waste Management Collection, Processing and Disposal, 2001.

#### Other useful resource(s):

1. [http://www.utdallas.edu/~brikowi/Teaching/Environ\\_Geology/LectureNotes/WasteManagement/wasteManagement.pdf](http://www.utdallas.edu/~brikowi/Teaching/Environ_Geology/LectureNotes/WasteManagement/wasteManagement.pdf)
2. <http://www.csupomona.edu/~fjanger/ce457/ce457.htm>
3. [http://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture\\_notes/env\\_occupational\\_health\\_students/ln\\_solid\\_waste\\_final.pdf](http://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/env_occupational_health_students/ln_solid_waste_final.pdf)

4. <http://www.ilo.org/oshenc/part-vii/environmental-pollution-control/item/514-solid-waste-management-and-recycling>
5. <https://www.youtube.com/watch?v=SSIRzuE78TA>
6. [https://www.youtube.com/watch?v=MFmr6Yapn\\_A](https://www.youtube.com/watch?v=MFmr6Yapn_A)
7. <https://www.youtube.com/watch?v=zchfhZZF7UY>
8. <https://www.youtube.com/watch?v=4552riac7VM>

**Evaluation Scheme:**

S. No	Exam	Marks	Duration	Coverage / Scope of Examination
1	T-1	15	1 Hour.	Syllabus covered up to T-1
2	T-2	25	1.5 Hours	Syllabus covered up to T-2
3.	T-3	35	2 Hours	Entire Syllabus
4.	Teaching Assessment	25	Entire Semester	Assignment (2) - 10 Quizzes(2)-10 Attendance - 5

**Course Outcomes (COs) contribution to the Programme Outcomes (POs)**

Course Outcomes (Solid Waste Management)	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	Average
CO-1	2	1	1	2	1	2	1	1	-	-	-	1	1.33
CO-2	2	3	2	2	2	2	2	1	-	-	-	2	2
CO-3	3	3	2	2	1	2	2	1	-	-	-	1	1.88
CO-4	3	3	3	2	2	2	2	1	-	-	-	2	2.22
<b>Average</b>	<b>2.5</b>	<b>2.5</b>	<b>2</b>	<b>2</b>	<b>1.5</b>	<b>2</b>	<b>1.75</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1.5</b>	

## Air and Noise Pollution and Control

COURSE CODE:18B1WCE533

COURSE CREDITS: 3

CORE/ELECTIVE: ELECTIVE

L-T-P: 3-0-0

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**Pre-requisite:** None

### Course Objectives:

1. Learn history of air pollution, definition of air pollution, and source and classification of air pollution.
2. Learn the effects of air pollutants on human health, vegetation and materials and major control devices to control air pollution problems.
3. Learn dispersion phenomenon of air pollutants covering diffusion and advection, meteorological components, stability of atmosphere and corresponding plume shapes.
4. Learn an overview of noise pollution including methods for prevention, control, measures and management of the pollution.

### Course Outcomes:

S.No.	Course Outcomes	Level of Attainment
CO-1	Learn the air pollution issues and characterize the elements of air pollution.	Familiarity
CO-2	Solve and design complex problems related to dispersion and air quality modeling.	Assessment
CO-3	Apply relevant techniques and methods for control and prevention of air pollution.	Assessment
CO-4	Develop an overview understanding of the strategies, regulations and policies to manage air and noise pollution.	Familiarity

### Course Contents:

Unit	Contents	Lectures required
1	<b>Introduction:</b> The earth's atmosphere: structure and composition.	3
2	<b>Definition and Elements:</b> Air pollution: definitions: types of pollutants, sources; effect of air pollution on health, environment and materials; air pollution episodes.	5
3	<b>Meteorology:</b> Air pollution meteorology: atmospheric circulation patterns, atmospheric stability and vertical mixing, lapse rate and	6

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	temperature inversions.	
4	<b>Dispersion Modelling:</b> Atmospheric dispersions modelling: atmospheric stability classes, Gaussian model, estimation of downwind concentrations, plume rise, tall stacks, and critical wind speed.	8
5	<b>Control of Particulate Matters:</b> Control of particulate Matter: characteristics of particles drag force, impaction, interception and diffusion. Cyclones, Electrostatic precipitators, Fabric filter, Particulate scrubbers, spray-chambers, cyclone spray chambers, orifice and wet-impingement scrubbers, venturi and venture-jet scrubbers.	6
6	<b>Control of Gaseous Emissions:</b> Control of gaseous emissions: gas-liquid and gas solid equilibrium, solubility, absorption and kinetics. Gas absorption: physical and chemical absorption, isotherms, and absorption potentials.	6
7	<b>Legislation and Regulations:</b> Air Pollution Control Act, National Environmental Policy Act, Ambient Air Quality Standards.	4
8	<b>Noise Pollution:</b> Noise pollution definition, prevention and control measures, management of pollution.	4
<b>Total lectures</b>		<b>42</b>

#### Suggested Text Book(s):

1. H.S. Peavy, D.R. Row and G. Tchobanoglous, Environmental Engineering, Mc Graw Hill International Edition.
2. Air Pollution, M. N. Rao and H.V.N. Rao, Tata Mc Graw Hill.
3. Wark, K., & Warner, C. F. (1981). Air pollution: its origin and control.

#### Suggested Reference Book(s):

1. Atmospheric Pollution: History, Science, and Regulation, by Mark Z. Jacobson, Cambridge University Press, Cambridge, 2002.
2. Air Quality, by Thad Godish, 4th Edition, Lewis Publishers, 2003.
3. Atmospheric Chemistry and Physics, by John Seinfeld and Spyros Pandis, John Wiley & Sons, 1997.

#### Other useful resource(s):

1. Link to NPTEL course contents:<https://nptel.ac.in/courses/105102089/>
2. Link to topics related to course:<https://nptel.ac.in/courses/105104099/>

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**Evaluation Scheme:**

S. No	Exam	Marks	Duration	Coverage / Scope of Examination
1	T-1	15	1 Hour	Syllabus covered upto T-1
2	T-2	25	1.5 Hours	Syllabus covered upto T-2
3.	T-3	35	2 Hours	Entire Syllabus
4.	Teaching Assessment	25	Entire Semester	Assignment (2) - 10 Quizzes(2)-10 Attendance - 5

**Course Outcomes (COs) contribution to the Programme Outcomes (POs)**

Course Outcomes (Air and Noise Pollution and Control)	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	Average
CO-1	2	1	1	1	1	1	1	2	x	x	x	2	1.33
CO-2	2	3	3	3	3	2	x	1	2	1	x	1	2.1
CO-3	2	3	3	3	3	2	2	1	2	1	x	1	2.1
CO-4	2	1	1	2	1	1	2	2	2	1	1	2	1.5
<b>Average</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2.25</b>	<b>2</b>	<b>1.5</b>	<b>1.67</b>	<b>1.5</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1.5</b>	

## Industrial Wastewater Treatment

COURSE CODE:18B1WC633

COURSE CREDITS: 3

CORE/ELECTIVE: ELECTIVE

L-T-P: 3-0-0

**Pre-requisite:** None

### Course Objectives:

1. Learn to understand the basic fundamentals for treatment of industrial wastewater systems and the associated management strategies for its implementation.
2. Learn about the operations of the industrial wastewater treatment plant and the fundamental scientific principles involved in the treatment process.
3. Learn to design the unit operations and unit processes for treatment of industrial wastewaters.
4. Learn to design the physico-chemical and biological treatment systems for treatment of industrial wastewaters.

### Course Outcomes:

S.No.	Course Outcomes	Level of Attainment
CO-1	To study the fundamentals of utilization of water by different industries and the different pollutants generated in the industrial wastes.	Familiarity
CO-2	To understand the fundamentals of prevention and the control of the pollutants generated in the industrial wastes.	Assessment
CO-3	To study the fundamentals of the treatment of industrial wastes generated including physico-chemical process and biological processes	Assessment
CO-4	To understand the advanced techniques for treatment of industrial wastewater	Assessment
CO-5	To involve case studies for the different manufacturing units and their respective treatment processes for different industries	Usage

### Course Contents:

Unit	Contents	Lectures required
1	Classification of different industrial wastes (like soluble organics, suspended solids, acid/alkali, thermal discharge, inorganics, coloring substances, nutrients, heavy metal etc.) Industrial Waste Survey (possibility of minimization, variation of flow and characteristics, possibility of water conservation and reuse, strength to undergo)	10



	difference wastes like process, cooling, sanitary and in plant wastes.	
2	Techniques for ascertaining character (grab sample, composite sample etc), Neutralization (equalization basin, limestone bed, limestone tower) Equalizations Basin (objective, function, design principles), Flootation technique (gravity and DAF methods).	12
3	Heavy metals (discussion and removal techniques), Cementation/Recovery techniques, chemical oxidation (chlorine, ozone, hydrogen peroxide)	7
4	Biological Treatment of Organic Matter (ASP, TF, SBR, Lagoon, Anaerobic System), fundamentals of anaerobic process	13
<b>Total lectures</b>		<b>42</b>

### Suggested Text Book(s):

1. Eckenfelder, W.W. Jr., Industrial Water Pollution Control, 3rd Edition, McGraw Hill International Edition, Singapore, 2000.
2. Arceivala, S.J., Wastewater Treatment for Pollution Control, 2nd Edition, Tata McGraw Publishing Co. Ltd., New Delhi, 1998.

### Suggested Reference Book(s):

1. H. Peavy, D. Rowe, G. Tchobanoglous "Environmental Engineering", 1<sup>st</sup> Edition, McGraw Higher Education Publications, India, 2017.
2. Metcalf and Eddy Inc: Wastewater Engineering: Treatment and Resource Recovery, 4<sup>th</sup> Edition, McGraw Hill Publications. India, 2014.

### Other useful resource(s):

1. Link to NPTEL course contents: <https://nptel.ac.in/courses/105106119/36>

### Evaluation Scheme:

S. No	Exam	Marks	Duration	Coverage / Scope of Examination
1	T-1	15	1 Hour.	Syllabus covered upto T-1
2	T-2	25	1.5 Hours	Syllabus covered upto T-2
3.	T-3	35	2 Hours	Entire Syllabus

4.	Minor Project	25	Entire Semester	Students will present a case study on manufacturing and treatment of wastes generated from surrounding different industries
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#### Course Outcomes (COs) contribution to the Programme Outcomes (POs)

Course Outcomes (Industrial Wastewater Treatment)	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	Average
CO-1	2	2	2	2	3	1	2	2	3	1	1	2	1.92
CO-2	3	2	3	3	1	2	2	2	2	1	2	2	2.08
CO-3	3	2	3	3	1	1	3	2	2	3	1	2	2.17
CO-4	2	3	3	2	2	2	1	1	1	3	2	2	2.00
CO-5	3	2	2	1	2	2	1	2	3	3	2	2	2.08
<b>Average</b>	<b>2.6</b>	<b>2.2</b>	<b>2.6</b>	<b>2.2</b>	<b>1.8</b>	<b>1.6</b>	<b>1.8</b>	<b>1.8</b>	<b>2.2</b>	<b>2.2</b>	<b>1.6</b>	<b>2</b>	

## Environmental Management and Impact Assessment

COURSE CODE:18B1WCE732

COURSE CREDITS: 3

CORE/ELECTIVE: ELECTIVE

L-T-P: 3-0-0

**Pre-requisite:** None

### Course Objectives:

1. Learn the basic objectives necessary to conduct EIA.
2. Learn the various national and international regulations and acts pertaining to EIA.
3. Learn the steps and methodologies involved in conducting EIA for different projects and environments.
4. Understand and predict the impacts of different activities on several environmental factors.
5. Understand the concept of risk management.

### Course Outcomes:

S.No.	Course Outcomes	Level of Attainment
CO-1	Recognize the need for EIA of potential projects.	Familiarity
CO-2	Demonstrate familiarity with regulations pertaining to EIA.	Assessment
CO-3	Demonstrate the use of methodologies in assessment of impacts of potential projects.	Assessment
CO-4	Comprehend risk management	Usage

### Course Contents:

Unit	Contents	Lectures required
1	<b>Environmental Impact Assessment:</b> Definition of Environmental Impact Assessment(EIA), Environmental Assessment(EA) and Environmental Impact Statement(EIS); National Environmental Policy Act (NEPA); National Goals of Environmental Policy; Council on Environmental Quality (CEQ); Draft, Supplemental and Final EIS; Environmental Inventory; Objectives of EIA	8
2	<b>EIA in India:</b> Administrative arrangements of EIA in India; Impact Assessment Agency(IAA) in MOEF-CC, GOI, India; Expert committee for administering EIA; Screening and Scoping; Requirements of prior environmental clearance; SEIAA; Category A	8

	and Category B projects.	
3	<b>EIA Methodologies:</b> Interaction matrices, Checklists, Networks, Adhoc Procedures, Overlay techniques; Simple interaction matrix and Stepped matrix; Application of various methodologies	6
4	<b>Environmental Indicators and Indices:</b> Definition of Environmental Indicator and Environmental Index; Biological Indicators; Procedures involved in calculation of Air Quality Index (AQI), Water Quality Index(WQI)and Noise Index; Similarity and Diversity Index	6
5	<b>EIA Study – Air Environment:</b> Definition of Air Pollution; Projects which contribute to air pollution; Basic steps for prediction and assessment of air pollution <b>Water Environment:</b> Basic Steps; Spatial and Temporal Phases; Operational Impacts of alternatives <b>Biological Environment:</b> Basic Steps <b>Cultural Environment:</b> Basic Steps	6
6	<b>Planning and Management of Impact Studies:</b> Conceptual Approach; Proposal Development; Interdisciplinary Team Formation; Team Leader Selection; General Study Management; Fiscal Control	6
7	<b>Risk Assessment:</b> Definition of Risk according to EPA; Risk Management; Human Health Risk Assessments; Ecological Risk Assessments	2
<b>Total lectures</b>		<b>42</b>

### Suggested Text Book(s):

1. Larry W Canter: Environmental Impact Assessment, Mc Graw Hill Publishers.
2. Anjaneyulu, Y and Valli Manickam: Environmental Impact Assessment Methodologies, 2<sup>nd</sup> Edition, BS Publications, 2007.

### Suggested Reference Book(s):

1. Peter Wathern, "Environmental Impact Assessment: Theory and Practice ", Routledge, 1998

### Other useful resource(s):

1. Link to NPTEL course contents:[www.epa.gov/risk](http://www.epa.gov/risk)

### Evaluation Scheme:

S. No	Exam	Marks	Duration	Coverage / Scope of Examination
1	T-1	15	1 Hour.	Syllabus covered upto T-1
2	T-2	25	1.5 Hours	Syllabus covered upto T-2

3.	T-3	35	2 Hours	Entire Syllabus
4.	Teaching Assessment	25	Entire Semester	Assignment (2) - 10 Quizzes(1) -10 Attendance - 5

### Course Outcomes (COs) contribution to the Programme Outcomes (POs)

Course Outcomes (Environmental Management and Impact Assessment)	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	Average
CO-1	2	2	2	2	2	1	1	1	2	2	2	2	1.75
CO-2	2	3	3	3	3	1	1	1	2	2	1	2	2.00
CO-3	2	2	2	2	3	1	1	1	2	2	1	2	1.75
CO-4	2	3	3	3	2	1	1	1	2	3	2	2	2.08
Average	2	2.5	2.5	2.5	2.5	1	1	1	2	2.25	1.5	2	