



10, Institutional Area, Vasant Kunj,
New Delhi 110070

55th MEETING OF THE ACADEMIC COUNCIL

**MINUTES OF THE FIFTY FIFTH MEETING OF THE ACADEMIC COUNCIL HELD
ON 25 MAY 2023 AT 10.00 A.M.**

PRESENT

The following members of the Academic Council attended the meeting:

Members

Professor Prateek Sharma, Chairperson
Professor Ramakrishnan Sitaraman
Professor Shaleen Singhal
Professor Anandita Singh
Professor P.S.N. Rao
Professor Shashi Bhushan Tripathi
Professor Vivek Suneja
Mr Manoj Chugh
Dr Sabhyata Bhatia
Dr Gopal Sarangi
Dr Bidyut Kumar Bhadra
Dr Niraj Sharma
Professor Vinay Shankar Prasad Sinha
Professor Naqui Anwer
Dr Sukanya Das
Dr Chaithanya Madhurantakam
Dr Shruti Sharma Rana
Mr Kamal Sharma, Secretary

Special Invitee

Dr Sanyyam Khurana
Dr Priyanka Arora

Professor T.C. Kandpal, Professor Sagnik Dey, Prof Shreekant Gupta, Mr Shubhashis Dey, Dr Madhusudan Sau, Mr Sudhir Vadehra, Dr Sudipta Chatterjee, Professor Arun Kansal, Professor Suresh Jain, Mr Rahul Mittal, Dr Smriti Das and Dr Chander Kumar Singh could not attend the meeting.

Prof Prateek Sharma welcomed all the Academic Council members. He briefed the members about the initiative to launch five-year integrated postgraduate programmes (FYIPP) and four-year undergraduate programmes (FYUP) before requesting the Registrar to take up the agenda item. He provided the salient features of the programmes and how these programmes provided opportunities to implement the various provisions of the National Education Policy (NEP) 2020, including the multiple entry and multiple exit options.

Item No. 1: To confirm the minutes of the Fifty Fourth Meeting of the Academic Council held on 30 January 2023. The Registrar informed that the minutes of the Fifty Fourth Meeting of the Academic Council, held on 30 January 2023, were circulated to the members and minor comment has been received from one member which has been incorporated. The Academic Council may, therefore, consider confirming the minutes, as circulated.

TS/AC/55.1.1 The Council resolved that the minutes of the 54th Academic Council Meeting held on 30 January 2023 be confirmed.

Item No. 2. To consider and approve new 5-year Integrated Post-Graduate Programme Structure in Data Science and Environmental Studies

Prof Vinay S.P. Sinha presented to the Academic Council the programme structure of two new FYIPPs – (i) Data Science and (ii) Environmental Studies as per the National Education Policy (NEP) 2020 and provisions of the new guidelines issued by the UGC as placed at **Enclosure 1**.

The Members suggested to separately offer these programmes as FYUP and FYIPP for better outreach and understanding of the potential target audience. It was, therefore, suggested by the members to offer these programmes with following format and nomenclature:

- (a) FYUP in Data Science [BSc (Honours/BSc Honours with Research)]
- (b) FYUP in Environmental Studies [(BSc (Honours/BSc Honours with Research)]
- (c) FYIPP (Dual Degree) in Data Science [BSc (Honours/BSc Honours with Research) & MSc]
- (d) FYIPP (Dual Degree) in Environmental Studies [BSc (Honours/BSc Honours with Research) & MSc]

The Academic Council after some minor modifications approved the programme structure of the above-mentioned Programmes in (i) Data Science and (ii) Environmental Studies.

TS/AC/55.2.1 The Academic Council resolved to approve the programme structure of the above Programmes in (i) Data Science and (ii) Environmental Studies placed as **Enclosure 1**.

Item No. 3: To consider and approve existing programme structure of MSc (Environmental Studies and Resource Management) and MSc (Climate Science and Policy)

Prof Vinay S.P. Sinha presented to the Academic Council existing programme structure of MSc (Environmental Studies and Resource Management) and MSc (Climate Science and Policy) placed at **Enclosure 2**. The Academic Council after some deliberation approved the existing programme structure of MSc (Environmental Studies and Resource Management) and MSc (Climate Science and Policy) programmes.

TS/AC/55.3.1 The Academic Council resolved to approve the existing programme structure of MSc (Environmental Studies and Resource Management) and MSc (Climate Science and Policy) programmes placed at **Enclosure 2**.

Item No. 4: To consider and approve introduction of multiple entry/exit option in existing M.Tech programmes of Department of Sustainable Engineering from the academic session 2023-24

Prof. Naqui Anwer presented to the Academic Council's about the introduction of multiple entry/exit option in existing M.Tech programmes of Department of Sustainable Engineering from the academic session 2023-24 placed as **Enclosure 3**. Prof. Naqui Anwer informed the AC members that the department plans to offer separate admission in Post Graduate Diploma in Renewable Energy Engineering and Management (PGDREEM) and Post Graduate Diploma in Urban Development Management (PGDUDM) programmes. The syllabus of these PG programmes shall remain the same as that of the first two semester of M.Tech (REEM) and M.Tech (UDM) programmes. The PG diploma programmes can be offered in online mode once the first batch (in regular mode) is passed out as per UGC regulations for offering online programmes. The proposal was deliberated by the members. The AC members suggested to start the PG Diploma programme as a separate programme instead of as an exit option in M.Tech programmes in order to make it a distinct academic programme. Since the PG Diploma programmes have been suggested to be offered as new programmes, this would provide the flexibility to drop some of the courses [from programme structure of M.Tech (REEM) and M.Tech. (UDM)] to make the PG Diploma programmes accessible to non-engineering students and therefore will provide the flexibility to expand the eligibility criteria with inclusion of graduates from different disciplines.

Prof. Anwer also informed that the Department would like to commence M.Tech (REEM) and M.Tech (UDM) in weekend mode without any change in the overall sanction intake capacity. The overall credits requirement and syllabus will remain the same for these weekend programmes as well. This was done in order to attract working professionals for whom it is not possible to join the programme during the weekdays.

The Academic Council therefore suggested following titles of the proposed programmes from the academic session 2023-24:

1. Post Graduate Diploma in Renewable Energy Management (PGDREM)

The programme structure of PGDREM has been carved out from the programme structure of 1st and 2nd semesters of M.Tech (REEM). The draft structure is attached as 'Annexure – 1 (PGDREM)' for your perusal.

Eligibility: Bachelor's degree in Science/Technology/
Engineering/Management or equivalent or
B.Voc in similar streams.

2. Post Graduate Diploma in Urban Development Management (PGDUDM)

The programme structure of PGDUDM has carved out from the programme structure of 1st and 2nd semesters of M.Tech (UDM). The draft structure is attached as 'Annexure – 2 (PGDUDM)' for your perusal.

Eligibility: B.Sc/B.Tech/B.Arch/B.Plan/BBA or B.A in Geography, Sociology, Economics, Political Science, Public Administration, Social Anthropology or Environmental Studies or B.Voc in similar streams

TS/AC/55.4.1 The Academic Council resolved to approved the introduction of one year Post Graduate Diploma in Renewable Energy Management (PGDREM) and Post Graduate Diploma in Urban Development Management (PGDUDM) programmes in the format described above and commencement of M.Tech (REEM) and M.Tech (UDM) in weekend mode in the Department of Sustainable Engineering from the academic session 2023-24 placed as **Enclosure 3**.

Item No. 5: To consider and approve programme outline and structure for Four Year Under-Graduate Programme in Business Administration (BBA Honours/BBA Honours with research)

Dr Shruti Sharma Rana presented to the Academic Council programme outline and structure for FYUP in Business Administration (BBA Honours/BBA Honours with research) placed at **Enclosure 4**. The Academic Council after deliberation approved the programme outline and structure for the above programme.

TS/AC/55.5.1 The Academic Council resolved to approve programme outline and structure for FYUP in Business Administration (BBA Honours/BBA Honours with research) placed at **Enclosure 4**.

Item No. 6: Presentation on FYUP in Economics (BSc Honors /BSc Honors with research)

The Department of Policy and Management Studies made a presentation on the FYUP in Economics [(BSc (Honors /BSc Honors with research))].

Dr Sukanya Das presented to the Academic Council for approval of the programme structure of the new FYUP in Economics [(BSc Honors/BSc Honors with research)] as per NEP 2020 as placed at **Enclosure 5**. The Academic Council after deliberation approved the programme structure of the programme

TS/AC/55.6.1 The Academic Council resolved to approve the programme structure of the new FYUP in Economics [(BSc Honors /BSc Honors with research)] as placed at **Enclosure 5**.

Item No. 7: Any other item with the permission of the Chair

(a) **Appointment of Professor of Practice:** Prof Prateek Sharma informed the Academic Council about the appointment of Professor of Practice (PoP) in different fields at TERI School of Advanced Studies. He further stated that it is an honorary post. They will help in fundraising, placement of students, design of curriculum, etc. In case they undertake any teaching activity, we have to pay them honorarium. UGC guidelines and regulations have been followed in the appointments. The Selection Committee consisted of two Senior Professors and One eminent external expert. The following appointments have been made. The engagements of these PoPs along with their brief resume are placed as **Enclosure 6:**

- (a) Mr Shraman Jha
- (b) Dr Neeraj Sharma
- (c) Dr B K Bhadra
- (d) Dr Deb Jyoti Pal
- (e) Dr A.K. Mitra
- (f) Col Sanjay Kumar Srivastava (Retd)
- (g) Dr Sumit Sharma
- (h) Gp Capt (Dr) S N Mishra (Retd)

TS/AC/55.7(a) The Academic Council noted the matter and resolved to approve the appointment of Professor of Practice.

(b) **Number of seats:** The number of seats for 4-year undergraduate and integrated programmes has been put up for the approval of the Academic Council as placed at **Enclosure 7.**

TS/AC/55.7(b) The Academic Council resolved to approve the number of seats for 4-year undergraduate and integrated programmes as placed at **Enclosure 7.**

Due to time constraint, the Academic Council decided to drop Item Nos.3, 5, 8 and 10 of the agenda and take it up in the next Academic Council meeting.

There being no other items for discussion, the meeting was adjourned with a vote of thanks to the Chair at 1710 hours.

Sd/
Kamal Sharma
Registrar (Acting)

Enclosures:-

1. Programme structure of the new 5-years Integrated Postgraduate Programmes in Data Science and Environmental Studies
2. Existing programme structure of MSc (Environmental Studies and Resource Management) and MSc (Climate Science and Policy) programmes

3. Introduction of one year PGDREM and PGDUDM programmes and introduction of multiple entry/exit option in existing M.Tech programmes of Department of Sustainable Engineering
4. Four Year Under-Graduate Programme in Business Administration (BBA Honours/ BBA Honours with research)
5. Four Year Under-Graduate Programme in Economics (BSc Honors /BSc Honors with research)
6. Roles of engagement and brief resume of Professor of Practice
7. Number of seat of the newly launched programmes

Distribution:-

Electronic Copy:

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Approval of Proposed course structure in - Four Year Under Graduate Programme in Data Science (BSc Honours/BSc Honours with Research); Four Year Under Graduate Programme in Environmental Studies (BSc Honours/BSc Honours with Research); Five Year Integrated Post-Graduate Programme in Data Science (MSc in Data Science) and Five Year Integrated Post-Graduate Programme in Environmental Studies (MSc in Environmental Studies)

NEP 2020 Definitions

A. Type of courses

1. Major:

Major discipline is the discipline or subject of main focus and the degree will be awarded in that discipline. Students should secure the prescribed number of credits (about 50% of total credits) through core courses in the major discipline

Disciplinary/Interdisciplinary major provides the opportunity to the student to pursue in-depth study of a particular subject or discipline (Section 5.1.1, Page 20, NEP 2020).

All major courses may be of 4 credits (Section 3.2.5a, Page 14, NEP 2020).

A student has to secure a minimum of 50% of credits from the major discipline (for a disciplinary/interdisciplinary degree) in order to obtain a 3-year/4-year **UG degree with single major**.

A student has to secure a minimum of 40% credits from the second major discipline in order to obtain a 3-year/4-year UG degree with double major¹.

Types	3-year Single Major		3-year Double Major	
	Credit	% Credit	Credit	% Credit
Major	60	50.0	72	40.0
Minor	24	20.0	72	40.0
Multidisciplinary	9	7.5	9	5.0
Ability Enhancement Courses (AEC)	8	6.7	8	4.4
Skill Enhancement Courses (SEC)	9	7.5	9	5.0
Value Added Courses (VAC)	6	5.0	6	3.3
Summer Internship (SI)	4	3.3	4	2.2
Total	120	100.0	180	100.0

2. Minor

Minor discipline helps a student to gain a broader understanding beyond the major discipline.

¹ Thus, in order to obtain double UG degree, the student will have to take at least 50% from the first major and 40% from the second major discipline (minor discipline may be converted into the second major discipline: 60 major + 24 minor + 9 multidisciplinary + 8 AEC + 9 SEC + 6-8 VAC + 2-4 Summer internship (= 120 Credits) will be the credits distribution for UG degree with one major for 3-year UG, while 72 major 1 + 72 major 2 + 9 multidisciplinary + 8 AEC + 9 SEC + 6-8 VAC + 2-4 Summer internship (180 Credits) will be the credits distribution for UG degree with double major for 3-year UG.

The minor stream courses include vocational courses which will help the students to equip with job-oriented skills. (Section 5.1, Page 20, NEP 2020).

Students will have the option to choose courses from disciplinary/interdisciplinary minors and skill-based courses relating to a chosen vocational education programme (Section 5.1.2, Page 20, NEP 2020).

All minor courses may be of 4 credits (Section 3.2.5a, Page 14, NEP 2020).

3. Multidisciplinary

All courses under the multi-disciplinary may be of 3-credits (Section 5.1.4, Page 22, NEP 2020).

- I. Natural and Physical Sciences: Students can choose basic courses from disciplines such as Natural Science, for example, Biology, Botany, Zoology, Biotechnology, Biochemistry, Chemistry, Physics, Biophysics, Astronomy and Astrophysics, Earth and Environmental Sciences, etc.
- II. Mathematics, Statistics, and Computer Applications: Courses under this category will facilitate the students to use and apply tools and techniques in their major and minor disciplines. The course may include training in programming software like Python among others and applications software like STATA, SPSS, Tally, etc. Basic courses under this category will be helpful for science and social science in data analysis and the application of quantitative tools.
- III. Library, Information, and Media Sciences: Courses from this category will help the students to understand the recent developments in information and media science (journalism, mass media, and communication).
- IV. Commerce and Management: Courses include business management, accountancy, finance, financial institutions, fintech, etc.,
- V. Humanities and Social Sciences: The courses relating to Social Sciences, for example, Anthropology, Communication and Media, Economics, History, Linguistics, Political Science, Psychology, Social Work, Sociology, etc. will enable students to understand the individuals and their social behaviour, society, and nation. Students be introduced to survey methodology and available large-scale databases for India. The courses under humanities include, for example, Archaeology, History, Comparative Literature, Arts & Creative expressions, Creative Writing and Literature, language(s), Philosophy, etc., and interdisciplinary courses relating to humanities. The list of Courses that can include interdisciplinary subjects such as Cognitive Science, Environmental Science, Gender Studies, Global Environment & Health, International Relations, Political Economy and Development, Sustainable Development, Women's and Gender Studies, etc.

4. Ability Enhancement Courses (AEC)

- I. Students are required to achieve competency in a Modern Indian Language (MIL) and in the English language with special emphasis on language and communication skills (Section 5.1.4, Page 22, NEP 2020).
- II. The courses aim at enabling the students to acquire and demonstrate the core linguistic skills, including critical reading and expository and academic writing skills, that help students articulate their arguments and present their thinking clearly and coherently and recognize the importance of language as a mediator of knowledge and identity.
- III. They would also enable students to acquaint themselves with the cultural and intellectual heritage of the chosen MIL and English language, as well as to provide a

reflective understanding of the structure and complexity of the language/literature related to both the MIL and English language.

- IV. The courses will also emphasize the development and enhancement of skills such as communication, and the ability to participate/conduct discussion and debate.

All courses under Ability Enhancement (language) categories may be of 3-credits.

5. Skill Enhancement Courses (SEC)

These courses are aimed at imparting practical skills, hands-on training, soft skills, etc., to enhance the employability of students. (Section 5.1.5, Page 22, NEP 2020).

All courses under the Skill Enhancement categories may be of 3-credits.

6. Value-Added Courses (VAC)

Courses under Value Added, Summer Internship/ Apprenticeship/ Community outreach activities, etc., for all majors, may be of 2-credits. (Section 5.1.6, Page 22, NEP 2020).

- I. **Understanding India:** The course aims at enabling the students to acquire and demonstrate the knowledge and understanding of contemporary India with its historical perspective, the basic framework of the goals and policies of national development, and the constitutional obligations with special emphasis on constitutional values and fundamental rights and duties.
- II. **Environmental science/education:** The course seeks to equip students with the ability to apply the acquired knowledge, skills, attitudes, and values required to take appropriate actions for mitigating the effects of environmental degradation, climate change, and pollution, effective waste management, conservation of biological diversity, management of biological resources, forest and wildlife conservation, and sustainable development and living.
- III. **Digital and technological solutions:** Courses in cutting-edge areas that are fast gaining prominences, such as Artificial Intelligence (AI), 3-D machining, big data analysis, machine learning, drone technologies, and Deep learning with important applications to health, environment, and sustainable living that will be woven into undergraduate education for enhancing the employability of the youth.
- IV. **Health & Wellness, Yoga education, sports, and fitness:** Course components relating to health and wellness seek to promote an optimal state of physical, emotional, intellectual, social, spiritual, and environmental well-being of a person. Sports and fitness activities will be organized outside the regular institutional working hours.

B. Type of programmes

B1: UG Degree Programmes with Single Major: A student has to secure a minimum of 50% credits from the major discipline for the 3-year/4-year UG degree to be awarded a single major.

B2: UG Degree Programmes with Double Major: A student has to secure a minimum of 40% credits from the second major discipline for the 3-year/4-year UG degree to be awarded a double major.

B3: Interdisciplinary UG Programmes: The credits for core courses shall be distributed among the constituent disciplines/subjects so as to get core competence in the interdisciplinary programme.

B4: Multidisciplinary UG Programmes:

The credits to core courses will be distributed among the broad disciplines such as Life sciences, Physical Sciences, Mathematical and Computer Sciences, Data Analysis, Social Sciences, Humanities, etc.

The statutory bodies of the Universities and Colleges such as the Board of Studies and Academic Council will decide on the list of courses under major category and credit distribution for double major, interdisciplinary and multidisciplinary programmes

Year 1: Semester 1 (Data Science)

S.No.	Course	Type	Level	Credit	Credits
1.	Fundamentals of Data Science	Major 1	101	2	10
2.	Mathematics for Data Science	Major 2	103	4	
3.	Statistics for Data Science	Major 3	105	4	
4.	Minor 1*	Minor 1 (Elective)	107	4	4
5.	Environment and Society	Multidisciplinary 1	109	2	2
6.	Communication Skills and Technical Writing	AEC 1	111	2	2
7.	Fundamentals of Computers and Programming	SEC 1	113	2	2
8.	Principles and Concepts of Sustainability	VAC 1	115	2	2
Credits earned				22	22

S.No.	List of Minor 1 Elective*	Type	Level	Credit	Credits
1	Ecology and Ecosystems	Minor	107	4	4
2	Earth and Earth Surface Processes	Minor	107	4	4
3	Basics of Climate Science and Policy	Minor	107	4	4
Credits earned				4	4

Year 1: Semester 2 (Data Science)

S.No.	Course	Type	Level	Credit	Credits
1.	Problem-Solving and Python Programming	Major 4	102	3	9
2.	Fundamentals of Information Technology	Major 5	104	3	
3.	Database Management System	Major 6 (Elective) ²	106	3	
4.	Web Technology	Major 6 (Elective) ²	108	3	
5.	Minor 2*	Minor 2 (Elective)	110	3	3
6.	Environmental Chemistry	Multidisciplinary 2	112	3	3
7.	Modern Indian Language 1 or Business Communication and Information Ethics	AEC 2	114	3	3
8.	Introduction to Remote Sensing	SEC 2	116	2	2
9.	Ancient Indian Sustainable Practices	VAC 2	118	2	4
10.	Constitutional Values and Fundamental Duties	VAC 2	120	2	
Credits earned in 2nd semester				24	24
Total credits earned at the end of first year = 22 + 24 = 46 (Minimum requirement 40)					

² Choose one elective as Major 6

11.	Vocational course/ Summer internship project (8-weeks) to Exit with UG-Certificate	Vocational/ Internship ³	122	4	4
Total credits earned for UG Certificate = 22 + 24 + 4 = 50					

S.No.	List of Minor 2 Elective*	Type	Level	Credit	Credits
1	Biological Science	Minor	110	3	3
2	Environmental Physics	Minor	110	3	3
Credits earned				3	3

EXIT 5: UG Certificate in Data Science earned credit 50, Minimum requirement 44 by UGC

³Students exiting the programme after securing minimum 40 credits will be awarded UG Certificate in Data Science provided they secure additional 4 credits in work-based vocational courses offered during summer-term or internship/apprenticeship in addition to 6 credits from skill-based courses earned during 1st and 2nd semester.

Year 2: Semester 3 (Data Science)

S.No.	Course	Type	Level	Credit	Credits
1.	Data Wrangling and Visualization	Major 7	201	3	9
2.	Data Structures and Algorithm	Major 8	203	3	
3.	Data Mining and Data Analysis	Major 9	205	3	
4.	Minor 3*	Minor 3 (Elective)	211	3	3
5.	Multidisciplinary 3 [±]	Multidisciplinary 3(Elective)	213	3	3
6.	Modern Indian Language 2	AEC 3	215	3	3
7.	Introduction to Geographic Information System	SEC 3	217	3	3
8.	Cybersecurity for Data Science	SEC 4	219	2	2
Credits earned				23	23

S.No.	List of Minor 3 Elective*	Type	Level	Credit	Credits
1.	Atmosphere and Global Climate Change	Minor	211	3	3
2.	Land and Soil Conservation and Management	Minor	211	3	3
3.	Biodiversity and Conservation	Minor	211	3	3
Credits earned				3	3

S.No.	List of Multidisciplinary 3 Elective [±]	Type	Level	Credit	Credits
1.	Advanced Statistics	Multidisciplinary	213	4	4
2.	Linear Algebra and Discrete Mathematics	Multidisciplinary	213	4	4
3.	Bioinformatics	Multidisciplinary	213	4	4
Credits earned				4	4

Year 2: Semester 4 (Data Science)

S.No.	Course	Type	Level	Credit	Credits
1.	Artificial Intelligence	Major 10	202	4	16
2.	Time Series Analysis	Major 11	204	4	
3.	Object Oriented Programming	Major 12	206	4	
4.	Computer Networks	Major 13 (Elective) ⁴	208	4	
5.	Business Analytics	Major 13 (Elective) ⁵	210		
6.	Minor 4*	Minor 4 (Elective)	212	4	4
Credits earned				20	20
Credits earned in 2nd year = 23 + 20 = 43				46	46
Credits earned at end of the 2nd year = 46 + 43 = 89 (Minimum requirement 80)					
7.	Vocational course/ Summer internship project (8-weeks) to Exit with UG-Diploma	Vocational course⁶	214	4	4
Total credits earned for UG Diploma = 46 + 43 + 4 = 93					

S.No.	List of Minor 4 Elective*	Type	Level	Credit	Credits
1	Water Resources Management	Minor	212	4	4

⁴ Choose one elective as Major 13

⁵ Choose one elective as Major 13

⁶Students exiting the programme after securing minimum 80 credits will be awarded UG Diploma in Data Science provided they secure additional 4 credits in work-based vocational courses offered during first or (check) second year summer-term or internship/apprenticeship in addition to 6 credits from skill-based courses earned during 1st and 2nd semester.

2	Natural Hazards and Disaster Risk Reduction	Minor	212	4	4
3	Project Management	Minor	212	4	4
Credits earned				4	4

EXIT 6: UG Diploma in Data Science earned credit 93, Minimum requirement 84 by UGC

Year 3: Semester 5 (Data Science)

S.No.	Course	Type	Level	Credit	Credits
1.	Machine Learning	Major 14	301	4	12
2.	Analysis and Design of Algorithms	Major 15	303	4	
3.	Blockchain	Major 16	305	4	
4.	1 st Minor Course 5*	Minor 5 (Elective)	307	4	8
5.	2 nd Minor Course 5*	Minor 5 (Elective)	307	4	
Credits earned				20	20

S.No.	List of Minor 5 Elective*	Type	Level	Credit	Credits
1.	Geoinformatics for Resource Management	Minor	307	4	4
2.	Green Technologies	Minor	307	4	4
3.	Solid and Hazardous Waste Management	Minor	307	4	4
4.	Environmental Movement	Minor	307	4	4
5.	Business and Professional Communication	Minor	307	4	4
6.	OR any one Minor Course from Semester-7 which student cannot opt in 4-Year.	Minor	307	4	4
Credits earned				8	8

Year 3: Semester 6 (Data Science)

S.No.	Course	Type	Level	Credit	Credits
1.	Big Data Technology	Major 17	302	4	12
2.	Natural Language Processing	Major 18	304	4	
3.	Predictive Modelling and Analytics	Major 19	306	4	
4.	1 st Minor Course 6*	Minor 6 (Elective)	308	4	8
	2 nd Minor Course 6*	Minor 6 (Elective)	308	4	
Credits earned				20	20
Credits earned in 3rd year = 20 + 20 = 47				47	47
Credits earned at end of the 3rd year = 46 + 43 + 40 = 129 (Minimum requirement 120)					
5.	Vocational course/ Summer internship project (8-weeks) to Exit 3-Years BSc Degree	Vocational course ⁷	310	4	4
Total credits earned for 3-year UG Degree = 46 + 43 + 40 + 4 = 133					

S.No.	List of Minor 6 Elective*	Type	Level	Credit	Credits
1.	Internet of Things	Minor	308	4	4
2.	Digital Marketing Analytics	Minor	308	4	4
3.	Cloud Computing	Minor	308	4	4
4.	Urban Ecosystem	Minor	308	4	4
5.	Marine Ecology	Minor	308	4	4

⁷Students exiting the programme after securing minimum 120 credits will be awarded 3-Years BSc Degree in Data Science provided they secure additional 4 credits in work-based vocational courses offered during first or (check) second year summer-term or internship/apprenticeship in addition to 6 credits from skill-based courses earned during 1st and 2nd semester.

6.	Forest Ecology	Minor	308	4	4
7.	Environmental Ethics	Minor	308	4	4
8.	OR any one Minor Course from Semester-8 which student cannot opt in 4-Year.	Minor	308	4	4
Credits earned				8	8

EXIT 7: 3-year UG Degree in Data Science earned credit 133, Minimum requirement 124 by UGC

Year 4: Semester 7 (Data Science-Honours/ Honours with Research)

S.No.	Course	Type	Level	Credit	Credits
1.	Soft- Computing	Major 20	401	4	14
2.	Data Warehousing and Data Pipeline	Major 21	403	4	
3.	Research Methodology and Thesis Writing	Major 22	405	2	
4.	Internet of Things	Major 23(Elective) ⁸	407	4	
5.	Cloud Computing	Major 23(Elective) ⁹	409	4	
6.	1 st Minor Course 7*	Minor 7 (Elective)	411	3	6
7.	2 nd Minor Course 7*	Minor 7 (Elective)	411	3	
8.	Principles and Concepts of Sustainability [@]	VAC	413	2	2
Credits earned				20+2	22[@]

[@] VAC Introduce in case students from other institutions have not opted for such courses in B.Sc.

S.No.	List of Minor 7 Elective*	Type	Level	Credit	Credits
1.	Earth and Environment	Minor	411	4	4
2.	Ecosystem Processes	Minor	411	3	3
3.	Environmental Policy, Law and Governance	Minor	411	4	4
4.	Atmospheric Science	Minor	411	4	4
5.	Climate Change Impact on Natural Systems	Minor	411	4	4
6.	Climate Change Mitigation Approaches	Minor	411	3	3
7.	Principles of GIS & GNSS	Minor	411	4	4
8.	Principles of Remote Sensing	Minor	411	4	4
Credits earned				3	3

Year 4: Semester 8 (Data Science-Honours/ Honours with Research)

S.No.	Course	Type	Level	Credit	Credits
1.	Introduction to Deep Learning	Major 24	402	4	8
2.	Parallel Programming	Major 25	404	4	
3.	Minor 8*	Minor 8	406	4	4
4.	Spatial Data Analysis and Modelling	Major 26 ¹⁰	408	4	12
5.	Environmetrics	Major 27 ¹¹	410	4	
6.	Environmental Finance and Economics	Major 28 ¹²	412	4	
7.	Research Project/Dissertation¹³		414	12	12
Credits earned				24	24

⁸ Choose one elective as Major 23

⁹ Choose one elective as Major 23

¹⁰Students exiting the programme after securing minimum 160 credits will be awarded 4-year UG Degree (Honours) in Data Science after doing at least 3 courses for 12 credits in lieu of a research project/dissertation.

¹¹Students exiting the programme after securing minimum 160 credits will be awarded 4-year UG Degree (Honours) in Data Science after doing at least 3 courses for 12 credits in lieu of a research project/dissertation.

¹²Students exiting the programme after securing minimum 160 credits will be awarded 4-year UG Degree (Honours) in Data Science after doing at least 3 courses for 12 credits in lieu of a research project/dissertation.

¹³ Students who secure 75% marks and above in the first six semesters and wish to undertake research at the UG level can choose a research stream in the fourth year by doing a research project or dissertation under the guidance of a faculty member of the University; the students who secure at least 160 credits, including 12 credits from a research project/dissertation can exit the programme with 4-year UG Degree (Honours with Research) in Data Science.

Credits earned in 4th year = 20 + 24 = 44	44	44
Credits earned at end of the 4th year = 46 + 43 + 40 + 44= 173 (Minimum requirement 160)		
Total credits earned for 4-year UG Degree = 46 + 43 + 40 + 44= 173		

EXIT 8: 4-year UG Degree in Data Science (Honours/ Honours with Research) earned credit 173, Minimum requirement 160 by UGC

S.No.	List of Minor 8 Elective*	Type	Level	Credit	Credits
1.	Earth and Environment	Minor	406	4	4
2.	Ecosystem Processes	Minor	406	3	3
3.	Ecological Footprint and EIA	Minor	406	4	4
4.	Climate Risk and Vulnerability Assessment	Minor	406	4	4
5.	Climate Change Impacts on Managed System	Minor	406	3	3
6.	Digital Image Processing	Minor	406	4	4
7.	Multivariate Data Analysis	Minor	406	4	4
8.	Environmental Policy, Law and Governance	Minor	406	4	4
Credits earned				3	3

Five Year Integrated Masters Programme in Data Science (MSc in Data Science)

Year 5: Semester 9 (MSc. in Data Science)

S.No.	Course	Type	Level	Credit	Credits
1.	Advanced Machine Learning	Major 29	501	4	12
2.	Recent Trends in Data Science	Major 29	503	4	
3.	Big Data Ethics and Data Communication	Major 30 (Elective) ¹⁴	505	4	
4.	Location Analytics	Major 30 (Elective) ¹⁵	505	4	
5.	1 st Minor Course 9*	Minor 9	507	4	8
6.	2 nd Minor Course 9*	Minor 9	507	4	
Credits earned				20	20

S.No.	List of Minor 9 Elective*	Type	Level	Credit	Credits
1.	Application of Geoinformatics for Land Resources	Minor	507	4	4
2.	Application of Geoinformatics for Water Resources	Minor	507	4	4
3.	Applications of Geoinformatics for Atmosphere	Minor	507	4	4
4.	ESG and Sustainability	Minor	507	4	4
5.	Air Quality Management	Minor	507	4	4
6.	Aerosol Science and Satellite Meteorology	Minor	507	4	4
7.	Climate Modelling	Minor	507	4	4
8.	Environmental Modelling	Minor	507	4	4
9.	Optimization Techniques	Minor	507	4	4
Credits earned				8	8

Year 5: Semester 10 (Master of Science Degree in Data Science)

S.No.	Course	Type	Level	Credit	Credits
1.	4 core courses in Data Science*	Core	502	16	16
2.	1 elective course*	Elective	504	4	4
Credits earned				20	20
Credits earned in 2nd year = 20 + 20 = 40				40	40
Credits earned at end of the 2nd year in MSc. = 20 + 20 = 40					
Total credits earned for Dual Degree (UG + PG) = 173 + 40 = 213 (Minimum requirement 200)					

* Under the approval of Academic Council

EXIT 9: 5-year PG Degree in Data Science earned credit 213, Minimum requirement 200 by UGC

¹⁴ Choose one elective as Major 30

¹⁵ Choose one elective as Major 30

Five Years Course Distribution of Integrated Master Programme in Data Science

Semester	Discipline Specific Courses - Core / Major	Minor	Inter-disciplinary courses	Ability Enhancement courses (language)	Skill Enhancement courses /Internship /Dissertation	Common Value-Added	Vocational course/ Summer internship	Research Project/ Dissertation	Total
									Credits
I	10	4	2	2	2	2	0	-	22
II	9	3	3	3	2	4	4*	-	24
Students exiting the programme after securing 40 credits will be awarded UG Certificate in the relevant Discipline /Subject provided they secure 4 credits in work based vocational courses offered during summer term or internship / Apprenticeship in addition to 6 credits from skill-based courses earned during first and second semester.									40+4
III	9	3	3	3	5	-	-	-	23
IV	16	4	0	0	0	0	4**	-	20
Students exiting the programme after securing 80 credits will be awarded UG Diploma in the relevant Discipline /Subject provided they secure additional 4 credit in skill based vocational courses offered during first year or second year summer term.									80 +4
V	12	8	-	-	-	-	-	-	20
VI	12	8	-	-	-	-	4**	-	20
3-Year BSc in Data Science: Students who want to undertake 3-year UG programme will be awarded UG Degree in the relevant Discipline /Subject upon securing 120 credits									120 +4
VII	14	6	-	-	-	2	-	-	20
VIII	20	4	-	-	-	-	4**	12#	24
4-Year BSc (Honours/ Honours with Research) in Data Science: Students will be awarded UG Degree (Honours/ Honours with Research) in the relevant Discipline /Subject									160
VII	14	6	-	-	-	2	-	-	20
VIII	20	4	-	-	-	-	4**	12#	24
4-Year BSc (Honours/ Honours with Research) in Geoinformatics: Students will be awarded UG Degree (Honours/ Honours with Research) in the relevant Discipline /Subject									160
IX	12	8	-	-	-	-	-	-	20
X	-	-	-	-	-	-	4	16	20
5-Year MSc in Data Science: Students will be awarded PG Degree in the relevant Discipline /Subject									200
IX	12	8	-	-	-	-	-	-	20
X	-	-	-	-	-	-	4	16	20
5-Year MSc in Geoinformatics: Students will be awarded PG Degree in the relevant Discipline /Subject									

*Applicable only when student want to exit the programme

** Student can exit the programme without earning 4 credits in the second year, provided candidate taken this credits in the first-year under Vocational course/ Summer internship.

4-Year BSc (Honours with Research) students will opt in-house 12 credits of Research Project/ Dissertation requirement and it will be considered as core (major).

Year 1: Semester 1 (Environmental Studies)

S.No.	Course	Type	Level	Credit	Credits
1.	Ecology and Ecosystems	Major 1	101	4	10
2.	Earth and Earth Surface Processes	Major 2	103	4	
3.	Environment and Society	Major 3	105	2	
4.	Minor 1*	Minor (Elective)1	107	4	4
5.	Fundamentals of Data Science	Multidisciplinary	109	2	2
6.	Communication Skills and Technical Writing	AEC 1	111	2	2
7.	Fundamentals of Computers and Programming	SEC 1	113	2	2
8.	Principles and Concepts of Sustainability (SD)	VAC 1	115	2	2
Credits earned				22	22

S.No.	List of Minor 1 Elective*	Type	Level	Credit	Credits
1.	Mathematics for Data Science	Minor	107	4	4
2.	Statistics for Data Science	Minor	107	4	4
3.	Basics of Climate Science and Policy	Minor	107	4	4
Credits earned				4	4

Year 1: Semester 2 (Environmental Studies)

S.No.	Course	Type	Level	Credit	Credits
1.	Environmental Chemistry	Major 4	102	3	9
2.	Environmental Laboratory	Major 4	104	3	
3.	Environmental Physics	Major 5 (Elective) ¹⁶	106	3	
4.	Biological Science	Major 5 (Elective) ¹⁷	108	3	
5.	Minor 2*	Minor 2 (Elective)	110	3	3
5.	Problem-Solving and Python Programming	Multidisciplinary 2	112	3	3
6.	Modern Indian Language 1 or Business Communication and Information Ethics	AEC 2	114	3	3
7.	Introduction to Remote Sensing	SEC 2	116	2	2
8.	Ancient Indian Sustainable Practices	VAC 2	118	2	4
9.	Constitutional Values and Fundamental Duties	VAC 3	118	2	
Credits earned in 2nd semester				24	24
Total credits earned at the end of first year = 22 + 24 = 46 (Minimum requirement 40)					
10.	Vocational course/ Summer internship (8-weeks) to Exit with UG-Certificate	Vocational/ Internship¹⁸	120	4	4
Total credits earned for UG Certificate = 22 + 24 + 4 = 50					

¹⁶ Choose one elective as Major 5¹⁷ Choose one elective as Major 5¹⁸ Students exiting the programme after securing minimum 40 credits will be awarded UG-Certificate in Environmental Studies provided they secure additional 4 credits in work-based vocational courses offered during summer-term or internship/apprenticeship in addition to 6 credits from skill-based courses earned during 1st and 2nd semester.

EXIT 5: UG Certificate in Environmental Studies earned credit 50, Minimum requirement 44 by UGC

S.No.	List of Minor 2 Elective*	Type	Level	Credit	Credits
1.	Fundamentals of Information Technology	Minor	110	3	3
2.	Database Management System	Minor	110	3	3
3.	Web Technology	Minor	110	3	3
Credits earned				3	3

Year 2: Semester 3 (Environmental Studies)

S.No.	Course	Type	Level	Credit	Credits
1.	Atmosphere and Global Climate Change	Major 6	201	3	9
2.	Biodiversity and Conservation	Major 7	203	3	
3.	Gender and Environment	Major 8	205	3	
4.	Minor 3*	Minor 3	207	3	3
5.	Multidisciplinary 3 [±]	Multidisciplinary 3 (Elective)	209	3	3
6.	Modern Indian Language 2	AEC 3	211	3	3
7.	Introduction to Geographic Information System	SEC 3	213	3	5
8.	Cybersecurity for Data Science	SEC 4	215	2	
Credits earned				23	23

S.No.	List of Minor 3 Elective*	Type	Level	Credit	Credits
1.	Greenhouse Gas Budget and Climate Change	Minor	207	3	3
2.	Land and Soil Conservation and Management	Minor	207	3	3
3.	Climate Change and Extreme Events	Minor	207	3	3
4.	Data Handling and Visualization	Minor	207	3	3
5.	Data Mining and Data Analysis	Minor	207	3	3
Credits earned				3	3

S.No.	List of Multidisciplinary 3 Elective [±]	Type	Level	Credit	Credits
1.	Advanced Statistics	Multidisciplinary	209	4	4
2.	Linear Algebra and Discrete Mathematics	Multidisciplinary	209	4	4
3.	Bioinformatics	Multidisciplinary	209	4	4
Credits earned				4	4

Year 2: Semester 4 (Environmental Studies)

S.No.	Course	Type	Level	Credit	Credits
1.	Principles of Hydrology	Major 9	202	4	16
2.	Natural Hazards and Disaster Risk Reduction	Major 10	204	4	
3.	Environment and Pollution Science	Major 11	206	4	
4.	Natural Resource Management and Sustainability	Major 12	208	4	
5.	Minor 4*	Minor (Elective) 4	210	4	4
Credits earned				20	20
Credits earned in 2nd year = 23 + 20 = 43				43	43
Credits earned at end of the 2nd year = 46 + 43 = 89 (Minimum requirement 80)					

6.	Vocational course/ Summer internship project (8-weeks) to Exit with UG-Diploma	Vocational/ Internship ¹⁹	212	4	4
Total credits earned for UG Diploma = 46 + 43 + 4 = 93					

S.No.	List of Minor 4 Elective*	Type	Level	Credit	Credits
1.	Artificial Intelligence	Minor	210	4	4
2.	Time Series Analysis	Minor	210	4	4
3.	Object Oriented Programming	Minor	210	4	4
4.	Computer Networks	Minor	210	4	4
5.	Business Analytics	Minor	210	4	4
Credits earned				4	4

EXIT 6: UG-Diploma in Environmental Studies earned credit 93, Minimum requirement 84 by UGC

Year 3: Semester 5 (Environmental Studies)

S.No.	Course	Type	Level	Credit	Credits
1.	Green Technologies	Major 13	301	4	12
2.	Solid and Hazardous Waste Management	Major 14	303	4	
3.	Environmental Movement	Major 15	305	4	
4.	1 st Minor Course 5*	Minor 5 (Elective)	307	4	8
5.	2 nd Minor Course 5*	Minor 5 (Elective)	307	4	
Credits earned				20	20

S.No.	List of Minor 5 Elective*	Type	Level	Credit	Credits
1.	Geoinformatics for Resource Management	Minor	307	4	4
2.	Watershed Management	Minor	307	4	4
3.	Machine Learning	Minor	307	4	4
4.	Analysis and Design of Algorithms	Minor	307	4	4
5.	Blockchains	Minor	307	4	4
6.	Business and Professional Communication	Minor	307	4	4
7.	OR any one Minor Course from Semester 7	Minor	307	4	4
Credits earned				8	8

Year 3: Semester 6 (Environmental Studies)

S.No.	Course	Type	Level	Credit	Credits
1.	Urban Ecosystem	Major 16	302	4	12
2.	Marine Ecology	Major 17	304	4	
3.	Forest Ecology	Major 18	306	4	
4.	1 st Minor Course 6*	Minor 6 (Elective)	308	4	8
5.	2 nd Minor Course 6*	Minor 6 (Elective)	308	4	
Credits earned				20	20

¹⁹Students exiting the programme after securing minimum 80 credits will be awarded UG-Diploma in Environmental Studies provided they secure additional 4 credits in work-based vocational courses offered during summer-term or internship/apprenticeship in addition to 6 credits from skill-based courses earned during 1st and 2nd semester.

Credits earned in 3rd year = 20 + 20 = 40				40	40
Credits earned at end of the 3rd year = 46 + 43 + 40 = 129 (Minimum requirement 120)					
Total credits earned for 3-year UG Degree = 46 + 43 + 40 + 4 = 133					
6.	Vocational course/ Summer internship project (8-weeks) to Exit 3-Years BSc Degree	Vocational/ Internship²⁰	310	4	4
Total credits earned for 3-year UG Degree = 46 + 43 + 40 + 4 = 133					

S.No.	List of Minor 6 Elective*	Type	Level	Credit	Credits
1.	Digital Marketing Analytics	Minor	308	4	4
2.	Environmental Ethics	Minor	308	4	4
3.	Big Data Technology	Minor	308	4	4
4.	Predictive Modelling and Analytics	Minor	308	4	4
5.	OR any one Minor Courses from Semester 8	Minor	308	4	4
Credits earned				8	8

EXIT 7: 3-year UG Degree in Environmental Studies earned credit 133, Minimum requirement 124 by UGC

Year 4: Semester 7 (Honours/ Honours with Research) in Environmental Studies

S.No.	Course	Type	Level	Credit	Credits
1.	Ecosystem Processes	Major 19	401	3	15
2.	Environmental Chemistry II	Major 20	403	3	
3.	Environmental Monitoring Lab II	Major 21	405	4	
4.	Research Methodology and Thesis Writing	Major 22	407	2	
5.	Earth and Environment	Major 23(Elective) ²¹	409	4	
6.	Energy and Environment	Major 23(Elective) ²²	411	3	6
7.	1 st Minor Course 7*	Minor 7 (Elective)	413	3	
8.	2 nd Minor Course 7*	Minor 7 (Elective)	413	3	
9.	Principles and Concepts of Sustainability (SD) [@]	VAC	415	2	2
Credits earned				21+2	23[@]

[@]VAC Introduce in case students from other institutions have not opted for such courses in B.Sc.

S.No.	List of Minor 7 Elective*	Type	Level	Credit	Credits
1.	Principles of GIS & GNSS	Minor	413	4	4
2.	Principles of Remote Sensing	Minor	413	4	4
3.	Atmospheric Science	Minor	413	4	4
4.	Climate Change Impact on Natural Systems	Minor	413	4	4
5.	Climate Change Mitigation Approaches	Minor	413	3	3

²⁰Students exiting the programme after securing minimum 80 credits will be awarded UG-Diploma in Environmental Studies provided they secure additional 4 credits in work-based vocational courses offered during summer-term or internship/apprenticeship in addition to 6 credits from skill-based courses earned during 1st and 2nd semester.

²¹ Choose one elective as Major 23

²² Choose one elective as Major 23

6.	Machine Learning	Minor	413	4	4
7.	Analysis and Design of Algorithms	Minor	413	4	4
8.	Blockchain	Minor	413	4	4
9.	Soft-Computing	Minor	413	4	4
10.	Data Warehousing and Data Pipeline	Minor	413	4	4
11.	Cloud Computing	Minor	413	4	4
12.	Internet of Things	Minor	413	4	4
Credits earned				4	4

Year 4: Semester 8 (Honours/ Honours with Research) in Environmental Studies

S.No.	Course	Type	Level	Credit	Credits
1.	Ecological Footprint and EIA	Major 24	402	4	8
2.	Environmental Finance and Economics	Major 25	404	4	
3.	Minor 8*	Minor 8 (Elective)	406	4	4
4.	Wildlife Assessment, Conservation and Management	Major 26 ²³	408	4	12
5.	Integrated Watershed Management	Major 27 ²⁴	410	4	
6.	Environment Health and Risk Assessment	Major 28 ²⁵	412	4	
7.	Research Project/Dissertation²⁶		414	12	12
Credits earned				24	24
Credits earned in 4th year = 21 + 24 = 45				45	45
Credits earned at end of the 4th year = 46 + 43 + 40 + 45 = 174 (Minimum requirement 160)					
Total credits earned for 4-year UG Degree = 41 + 46 + 47 + 46 = 178					

S.No.	List of Minor 8 Elective*	Type	Level	Credit	Credits
1.	Environmental Policy, Law and Governance	Minor	406	4	4
2.	Multivariate Data Analysis	Minor	406	4	4
3.	Environmental Statistics	Minor	406	4	4
4.	Climate Change Impacts on Managed System	Minor	406	4	4
5.	Climate Risk and Vulnerability Assessment	Minor	406	4	4
6.	Introduction to Deep Learning	Minor	406	4	4
7.	Predictive Modelling and Analytics	Minor	406	4	4
8.	Big Data Technology	Minor	406	4	4
Credits earned				4	4

EXIT 8: 4-year UG Degree in Environmental Studies (Honours/ Honours with Research) earned credit 173, Minimum requirement 160 by UGC

²³Students exiting the programme after securing minimum 160 credits will be awarded 4-year UG Degree (Honours) in Environmental Studies after doing at least 3 courses for 12 credits in lieu of a research project/dissertation.

²⁴Students exiting the programme after securing minimum 160 credits will be awarded 4-year UG Degree (Honours) in Environmental Studies after doing at least 3 courses for 12 credits in lieu of a research project/dissertation.

²⁵Students exiting the programme after securing minimum 160 credits will be awarded 4-year UG Degree (Honours) in Environmental Studies after doing at least 3 courses for 12 credits in lieu of a research project/dissertation.

²⁶ Students who secure 75% marks and above in the first six semesters and wish to undertake research at the UG level can choose a research stream in the fourth year by doing a research project or dissertation under the guidance of a faculty member of the University; the students who secure at least 160 credits, including 12 credits from a research project/dissertation can exit the programme with 4-year UG Degree (Honours with Research) in Environmental Studies.

Five Year Integrated Masters Programme in Environmental Studies (MSc in Environmental Studies)

Year 5: Semester 9 (MSc. in Environmental Studies)

S.No.	Course	Type	Level	Credit	Credits
1.	ESG and Sustainability	Major 29	501	4	12
2.	Air Quality Management	Major 30	502	4	
3.	Water and Wastewater Treatment Methods	Major 31	503	4	
4.	1 st Minor Course 9*	Minor 9 (Elective)	504	4	8
5.	2 nd Minor Course 9*	Minor 9 (Elective)	504	4	
Credits earned				20	20

S.No.	List of Minor 9 Elective*	Type	Level	Credit	Credits
1.	Aerosol Science and Satellite Meteorology	Minor	504	4	4
2.	Climate Modelling	Minor	504	4	4
4.	Environmental Modelling	Minor	504	4	4
5.	Life Cycle and Vulnerability Assessment Techniques	Minor	504	4	4
6.	Industrial Ecology and EMS	Minor	504	4	4
7.	Entrepreneurship in Solid Waste Management	Minor	504	4	4
8.	Advanced Machine Learning	Minor	504	4	4
9.	Recent Trends in Data Science	Minor	504	4	4
10.	Independent Study	Minor	504	4	4
Credits earned				8	8

Year 5: Semester 10 (Master of Science Degree in Environmental Studies)

S.No.	Course	Type	Level	Credit	Credits
1.	4 core courses of 16 credits*	Core	502	16	16
2.	1 elective course of 4 credits*	Elective	504	4	4
Credits earned				20	20
Credits earned in 2nd year = 20 + 20 = 40				40	40
Credits earned at end of the 2nd year in MSc. = 20 + 20 = 40					
Total credits earned for Dual Degree (UG + PG) = 174 + 40 = 214 (Minimum requirement 200)					

* Under the approval of Academic Council

EXIT 9: 5-year PG Degree in Environmental Studies earned credit 214, Minimum requirement 200 by UGC

Five Years Course Distribution of Integrated Master Programme in Environmental Studies

Semester	Discipline Specific Courses - Core / Major	Minor	Inter-disciplinary courses	Ability Enhancement courses (language)	Skill Enhancement courses /Internship /Dissertation	Common Value-Added	Vocational course/ Summer internship	Research Project/ Dissertation	Total
									Credits
I	10	4	2	2	2	2	-	-	22
II	9	3	3	3	2	4	4*	-	24
Students exiting the programme after securing 40 credits will be awarded UG Certificate in the relevant Discipline /Subject provided they secure 4 credits in work based vocational courses offered during summer term or internship / Apprenticeship in addition to 6 credits from skill-based courses earned during first and second semester.									40+4
III	9	3	3	3	5				23
IV	16	4					4**		20
Students exiting the programme after securing 80 credits will be awarded UG Diploma in the relevant Discipline /Subject provided they secure additional 4 credit in skill based vocational courses offered during first year or second year summer term.									80 +4
V	12	8	-	-	-	-	-	-	20
VI	12	8	-	-	-	-	4**	-	20
3-Year BSc in Environmental Studies: Students who want to undertake 3-year UG programme will be awarded UG Degree in the relevant Discipline /Subject upon securing 120 credits									120 +4
VII	15	6	-	-	-	2	-	-	21
VIII	20	4	-	-	-	-	4**	12#	24
4-Year BSc (Honours/ Honours with Research) in Environmental Studies: Students will be awarded UG Degree (Honours/ Honours with Research) in the relevant Discipline /Subject									160
VII	15	6	-	-	-	2	-	-	21
VIII	20	4	-	-	-	-	4**	12#	24
4-Year BSc (Honours/ Honours with Research) in Climate Science and Policy: Students will be awarded UG Degree (Honours/ Honours with Research) in the relevant Discipline /Subject									160
IX	12	8	-	-	-	-	-	-	20
X	-	-	-	-	-	-	4	16	20
5-Year MSc in Environmental Studies: Students will be awarded PG Degree in the relevant Discipline /Subject									200
IX	12	8	-	-	-	-	-	-	20
X	-	-	-	-	-	-	4	16	20
5-Year MSc in Climate Science and Policy: Students will be awarded PG Degree in the relevant Discipline /Subject									200

*Applicable only when student want to exit the programme

** Student can exit the programme without earning 4 credits in the second year, provided candidate taken this credits in the first-year under Vocational course/ Summer internship.

4-Year BSc (Honours with Research) students will opt in-house 12 credits of Research Project/ Dissertation requirement and it will be considered as core (major).

Approval of Existing Master Programmes Structure for Environmental Studies and Resource Management (ESRM) & Climate Science and Policy (CSP)

Year 1: Semester – I (MSc. in Environmental Studies and Resource Management)

S.No.	Course	Type	Level	Credit	Credits
1.	Ecosystem Processes	Core	401	3	15
2.	Environmental Chemistry II	Core	403	3	
3.	Environmental Monitoring Lab II	Core	405	4	
4.	Research Methodology and Thesis Writing	Core	407	2	
5.	Earth and Environment	Core ²⁷	409	4	
6.	Energy and Environment	Core ²⁸	411	3	
7.	1 st Elective Course*	Elective	413	3	6
8.	2 nd Elective Course*	Elective	413	3	
9.	Principles and Concepts of Sustainability (SD) @	VAC	415	2	2
Credits earned				21+2	23@

@VAC Introduce in case students from other institution have not opted such courses in B.Sc.

^{1,2}Choose one subject from these two subjects.

S.No.	List of Elective Courses*	Type	Level	Credit	Credits
1.	Principles of GIS & GNSS	Elective	413	4	4
2.	Principles of Remote Sensing	Elective	413	4	4
3.	Atmospheric Science	Elective	413	4	4
4.	Climate Change Impact on Natural Systems	Elective	413	4	4
5.	Climate Change Mitigation Approaches	Elective	413	3	3
6.	Machine Learning±	Elective	413	4	4
7.	Analysis and Design of Algorithms±	Elective	413	4	4
8.	Blockchain±	Elective	413	4	4
9.	Soft-Computing±	Elective	413	4	4
10.	Data Warehousing and Data Pipeline±	Elective	413	4	4
11.	Cloud Computing±	Elective	413	4	4
12.	Internet of Things±	Elective	413	4	4
Credits earned				4	4

±Offer after Academic Council approval of BSc in Data Science in July 2023 which will be launch in the July 2024 Session onwards

Year 1: Semester – II (MSc. in Environmental Studies and Resource Management)

S.No.	Course	Type	Level	Credit	Credits
1.	Ecological Footprint and EIA	Core	402	4	8
2.	Environmental Finance and Economics	Core	404	4	
3.	Elective Course*	Elective	406	4	4

4.	Wildlife Assessment, Conservation and Management	Core	408	4	12
5.	Integrated Watershed Management	Core	410	4	
6.	Environment Health and Risk Assessment	Core	412	4	
Credits earned				24	24
Credits earned in 1st year of MSc. = 21 + 24 = 45 (Minimum requirement 40)				45	45

S.No.	List of Elective Courses*	Type	Level	Credit	Credits
1.	Environmental Policy, Law and Governance	Elective	406	4	4
2.	Multivariate Data Analysis	Elective	406	4	4
3.	Environmental Statistics	Elective	406	4	4
4.	Climate Change Impacts on Managed Systems	Elective	406	4	4
5.	Climate Risk and Vulnerability Assessment	Elective	406	4	4
6.	Introduction to Deep Learning±	Elective	406	4	4
7.	Predictive Modelling and Analytics±	Elective	406	4	4
8.	Big Data Technology±	Elective	406	4	4
Credits earned				4	4

±Offer after Academic Council approval of BSc in Data Science in July 2023 which will be launch in the July 2024 Session onwards

Year 2: Semester – III (MSc. in Environmental Studies and Resource Management)

S.No.	Course	Type	Level	Credit	Credits
1.	ESG and Sustainability	Core	501	4	12
2.	Air Quality Management	Core	503	4	
3.	Water and Wastewater Treatment Methods	Core	505	4	
4.	1 st Elective Course*	Elective	507	4	8
5.	2 nd Elective Course*	Elective	507	4	
Credits earned				20	20

S.No.	List of Elective Courses*	Type	Level	Credit	Credits
1.	Aerosol Science and Satellite meteorology	Elective	507	4	4
2.	Climate Modelling	Elective	507	4	4
3.	Environmental Modelling	Elective	507	4	4
4.	Life Cycle and Vulnerability Assessment Techniques	Elective	507	4	4
5.	Industrial Ecology and EMS	Elective	507	4	4
6.	Entrepreneurship in Solid Waste Management	Elective	507	4	4
7.	Advanced Machine Learning±	Elective	507	4	4
8.	Recent Trend in Data Science±	Elective	507	4	4
9.	Independent Study	Elective	507	4	4
Credits earned				8	8

±Offer after Academic Council approval of BSc in Data Science in July 2023 which will be launch in the July 2024 Session onwards

Year 2: Semester – IV (MSc. in Environmental Studies and Resource Management)

S.No.	Course	Type	Level	Credit	Credits
1.	Core Project for 6-Months	Core	502	16	16
2.	Work on Social Responsibility / Community Engagement and Services / NSS	Elective	504	4	4
Credits earned				20	20
Credits earned in 2nd year = 20 + 20 = 40				40	40
Credits earned at end of the 2nd year in MSc. = 45 + 40 = 85 (Minimum requirement 80)					

Year 1: Semester – I (MSc. in Climate Science and Policy)

S.No.	Course	Type	Level	Credit	Credits
1.	Atmospheric Science	Core	401	4	15
2.	Climate Change Impact on Natural Systems	Core	403	4	
3.	Climate Change Mitigation Approaches	Core	405	3	
4.	Research Methodology and Thesis Writing	Core	407	2	
5.	Energy and Environment	Core ²⁹	409	3	
6.	Environmental Monitoring Lab II	Core ³⁰	411	4	
7.	1 st Elective Course*	Elective	413	3	6
8.	2 nd Elective Course*	Elective	413	3	
9.	Principles and Concepts of Sustainability (SD) [@]	VAC	415	2	2
Credits earned				21+2	23[@]

[@]VAC Introduce in case students from other institution have not opted such courses in B.Sc.

^{3,4}Choose one from these two subjects

S.No.	List of Elective Courses*	Type	Level	Credit	Credits
1.	Earth and Environment	Elective	413	4	4
2.	Ecosystem Processes	Elective	413	3	3
3.	Environmental Chemistry II	Elective	413	3	3
4.	Principles of GIS & GNSS	Elective	413	4	4
5.	Principles of Remote Sensing	Elective	413	4	4
6.	Machine Learning ±	Elective	413	4	4
7.	Analysis and Design of Algorithms±	Elective	413	4	4
8.	Blockchain±	Elective	413	4	4
9.	Soft-Computing±	Elective	413	4	4
10.	Data Warehousing and Data Pipeline±	Elective	413	4	4
11.	Cloud Computing±	Elective	413	4	4
12.	Internet of Things±	Elective	413	4	4
Credits earned				6	6

±Offer after Academic Council approval of BSc in Data Science in July 2023 which will be launch in the July 2024 Session onwards

Year 1: Semester – II (MSc. in Climate Science and Policy)

S.No.	Course	Type	Level	Credit	Credits
1.	Climate Change Impacts on Managed Systems	Core	402	4	8
2.	Climate Adaptation, Risk and Vulnerability Assessment	Core	404	4	
4.	Elective Course*	Elective	406	4	4
5.	Climate Change: Agriculture Forest and Other Land Use (AFOLU)	Core	408	4	12

6.	Climate Change: Urban Infrastructure and Transport	Core	410	4	
7.	Economics and Climate Finance	Core	412	4	
Credits earned				24	24
Credits earned in 1st year of MSc. = 21 + 24 = 45 (Minimum requirement 40)				45	45

S.No.	List of Elective Courses*	Type	Level	Credit	Credits
1.	Environmental Policy, Law and Governance	Elective	406	4	4
2.	Multivariate Data Analysis	Elective	406	4	4
3.	Environmental Statistics	Elective	406	4	4
4.	Ecological Footprint and EIA	Elective	406	4	4
5.	Environmental Finance and Economics	Elective	406	4	4
6.	Introduction to Deep Learning±	Elective	406	4	4
7.	Predictive Modelling and Analytics±	Elective	406	4	4
8.	Big Data Technology±	Elective	406	4	4
Credits earned				4	4

±Offer after Academic Council approval of BSc in Data Science in July 2023 which will be launch in the July 2024 Session onwards

Year 2: Semester – III (MSc. in Climate Science and Policy)

S.No.	Course	Type	Level	Credit	Credits
1.	Climate Change: Energy and Industry	Core	501	4	12
2.	ESG and Sustainability	Core	503	4	
3.	Climate Change: Water Resources	Core	505	4	
4.	1 st Elective Course*	Elective	507	4	8
5.	2 nd Elective Course*	Elective	507	4	
Credits earned				20	20

S.No.	List of Elective Courses*	Type	Level	Credit	Credits
1.	Aerosol Science and Satellite meteorology	Elective	507	4	4
2.	Climate Modelling	Elective	507	4	4
3.	Environmental Modelling	Elective	507	4	4
4.	Transformation Pathways and Climate Change Governance	Elective	507	4	4
5.	Life Cycle and Vulnerability Assessment techniques	Elective	507	4	4
6.	Advanced Machine Learning±	Elective	507	4	4
7.	Recent Trend in Data Science±	Elective	507	4	4
8.	Independent Study	Elective	507	4	4
Credits earned				8	8

±Offer after Academic Council approval of BSc in Data Science in July 2023 which will be launch in the July 2024 Session onwards

Year 2: Semester – IV (MSc. in Climate Science and Policy)

S.No.	Course	Type	Level	Credit	Credits
1.	Core Project for 6-Months	Core	502	16	16
2.	Work on Social Responsibility / Community Engagement and Services / NSS	Elective	504	4	4
Credits earned				20	20
Credits earned in 2nd year = 20 + 20 = 40				40	40
Credits earned at end of the 2nd year in MSc. = 45 + 40 = 85 (Minimum requirement 80)					

Five Years Course Distribution of Integrated Master Programme in Environmental Studies

Semester	Discipline Specific Courses - Core / Core	Elective	Inter-disciplinary courses	Ability Enhancement courses (language)	Skill Enhancement courses /Internship /Dissertation	Common Value-Added Courses	Vocational course/ Summer internship	Research Project/ Dissertation	Total
									Credits
I	10	4	2	2	2	2	-	-	22
II	9	3	3	3	2	4	4*	-	24
Students exiting the programme after securing 40 credits will be awarded UG Certificate in the relevant Discipline /Subject provided they secure 4 credits in work based vocational courses offered during summer term or internship / Apprenticeship in addition to 6 credits from skill-based courses earned during first and second semester.									40+4
III	9	3	3	3	5				23
IV	16	4					4**		20
Students exiting the programme after securing 80 credits will be awarded UG Diploma in the relevant Discipline /Subject provided they secure additional 4 credit in skill based vocational courses offered during first year or second year summer term.									80 +4
V	12	8	-	-	-	-	-	-	20
VI	12	8	-	-	-	-	4**	-	20
3-Year BSc in Environmental Studies: Students who want to undertake 3-year UG programme will be awarded UG Degree in the relevant Discipline /Subject upon securing 120 credits									120 +4
VII	15	6	-	-	-	2	-	-	21
VIII	20	4	-	-	-	-	4**	12#	24
4-Year BSc (Honours/ Honours with Research) in Environmental Studies: Students will be awarded UG Degree (Honours/ Honours with Research) in the relevant Discipline /Subject									160
VII	15	6	-	-	-	2	-	-	21
VIII	20	4	-	-	-	-	4**	12#	24
4-Year BSc (Honours/ Honours with Research) in Climate Science and Policy: Students will be awarded UG Degree (Honours/ Honours with Research) in the relevant Discipline /Subject									160
IX	12	8	-	-	-	-	-	-	20
X	-	-	-	-	-	-	4	16	20
5-Year MSc in Environmental Studies: Students will be awarded PG Degree in the relevant Discipline /Subject									200
IX	12	8	-	-	-	-	-	-	20
X	-	-	-	-	-	-	4	16	20
5-Year MSc in Climate Science and Policy: Students will be awarded PG Degree in the relevant Discipline /Subject									200

*Applicable only when student want to exit the programme

** Student can exit the programme without earning 4 credits in the second year, provided candidate taken these credits in the first-year under Vocational course/ Summer internship.

4-Year BSc (Honours with Research) students will opt in-house 12 credits of Research Project/ Dissertation requirement and it will be considered as core (Core).

Enclosure 3

To consider approval for introducing multiple entry/exit option in existing M.Tech programmes of Department of Sustainable Engineering from the academic session 2023-24

To introduce multiple entry/exit option in existing M.Tech programmes, viz. M.Tech in Renewable Energy Engineering and Management (M.Tech (REEM)) and M.Tech in Urban Development Management (M.Tech (UDM)), from the academic session 2023-24.

Proposal 1: After the completion of the first two semesters of the existing M.Tech (REEM) programme, PG Diploma in Renewable Energy Engineering and Management (PGDREEM) may be awarded as exit option.

Proposal 2: After the completion of the first two semesters of the existing M.Tech (UDM) programme, PG Diploma in Urban Development Management (PGDUDM) may be awarded as exit option.

Proposal 3: Separate admission may also be offered to PGDREEM and PGDUDM as one year PG Diploma programmes. The syllabus of these PG programmes shall remain the same as that of the first two semesters of M.Tech (REEM) and M.Tech (UDM) programmes. *The PG Diploma programmes can be offered in online mode once the first batch (in regular mode) is passed out as per UGC regulations for offering online programmes.*

Note: The above proposals are in line with the “Guidelines for Multiple Entry and Exit in Academic Programmes offered in Higher Education Institutions” issued by UGC and in compliance with UGC notification D.O.No.F. 1 -3/202 I (QIP). The above proposals of offering PG Diploma programmes corresponds to Level 8 and existing Masters programmes correspond to Level 9 of the guidelines document (refer page 13).

Proposal 4: Offering the existing M.Tech Programmes, viz. M.Tech (REEM) and M.Tech (UDM) in weekend mode without any change in the overall sanctioned intake capacity. The overall credit requirement and entire syllabus shall also remain unchanged. This will provide an additional option for working professionals to take admission into existing M.Tech programmes in weekend mode. Seeking approval for “M.Tech (REEM) – Weekend Programme” to start from the academic session 2023-24 and also provided in principle approval for “M.Tech (UDM) – Weekend Programme” to start in coming sessions.

The members of BoS have given following additional recommendations:

- (i) *The teaching faculty (Internal/External) should be engaged through a contract to take classes on weekends only and they should be entitled to get remuneration for the same.*
- (ii) *The academic rigour in terms of delivery of lectures, tutorials & practicals and maintenance of attendance record should be maintained same as that of programmes offered in regular mode.*
- (iii) *At the start of the session, planning should be done as the classes for weekend programmes may require additional academic calendar for want of more number of weekend days for the completion of courses.*

In response to Proposal 1, Proposal 2 and Proposal 3:

1. Exit/entry option to our existing M.Tech programmes shall not be introduced. The planned PG Diploma programmes shall be introduced as new programmes and the course structure of which would be similar to that of the first two semesters of M.Tech programmes. For optimized management of the logistics, the students taking admission in PG Diploma programmes shall attend the classes with the M.Tech students.
2. Since now PG Diploma programmes are offered as new programmes, we have the flexibility to drop some of the courses (from programme structure of M.Tech (REEM)) to make the PG Diploma programmes light (36-40 credit spread over two semesters) and also have a flexibility to change the eligibility criteria for PG Diploma programmes to the extent of allowing the candidates having simple graduation. The titles of the proposed programmes are:
 1. Post Graduate Diploma in Renewable Energy Management (PGDREM)
 2. Post Graduate Diploma in Urban Development Management (PGDUDM)
3. A new programme titled **Post Graduate Diploma in Renewable Energy Management (PGDREM)** is proposed to be introduced with eligibility criteria for admission as Bachelor's degree in Science/Technology/Engineering/Management or equivalent or B.Voc in similar streams". The programme structure of PGDREM has carved out from the programme structure of 1st and 2nd semesters of M.Tech (REEM). The draft structure is attached 'Annexure – 1 (PGDREM)' for your perusal and approval.
4. A new programme titled **Post Graduate Diploma in Urban Development Management (PGDUDM)** is proposed to be introduced with eligibility criteria for admission as "B.Sc/B.Tech/B.Arch/B.Plan/BBA or B.A in Geography, Sociology, Economics, Political Science, Public Administration, Social Anthropology or Environmental Studies or B.Voc in similar streams". The programme structure of PGDUDM has carved out from the programme structure of 1st and 2nd semesters of M.Tech (UDM). The draft structure is attached 'Annexure – 2 (PGDUDM)' for your perusal and approval.

In response to Proposal 4:

1. Offering the existing M.Tech programme in Renewable Energy Engineering and Management (REEM) in weekends without any change in the overall sanctioned intake capacity. The overall credit requirement and entire syllabus shall also remain unchanged. In continuation, the existing M.Tech programme in Urban Development Management (UDM) shall also be offered in weekends without any change in the overall sanctioned intake capacity, the overall credit requirement and entire syllabus.

Enclosure 4**Program highlights**

TERI-SAS's Bachelor of Business Administration (BBA) Hons is a 4-year undergraduate degree programme designed to impart a comprehensive knowledge and understanding of business administration and management. The course is designed to cater to the interdisciplinary and industry specific needs of the future world. This four-year BBA FYUP (Four-year undergraduate programme) offers not only a wide range of core managerial and administration-related subjects but also an option to do minor specialization in areas such as data science and environmental science. A combination of various such domains would equip the graduates to explore diverse career opportunities.

Further, beyond general management, this UG program offers four core specializations in select disciplines of human resources management, finance, operations management, marketing management, and sustainability management. TERI-SAS being a pioneer in sustainability education with a key focus on areas related to climate change, climate financing, ESG strategies, energy and water management, economics and policies for a sustainable future and lifestyle for the environment, provides unique opportunities to its students to interact and engage with faculty and industry leaders in developing further skills in these futuristic domains. Further, the programme comes with a unique opportunity to pursue BBA Hons with research to help interested students in pursuing a research career.

Program outcomes

- Provide students with a sound theoretical foundation on the business challenges of the future
- Prepare students with capabilities and skills in areas of general management, marketing, finance, global business, human resource management and sustainability to take up roles in managerial position across diverse industries.
- To encourage creativity, critical and innovative thinking leading to entrepreneurial skills.
- Enhance the ability of students to work in interdisciplinary domains by providing opportunities to a wide variety of electives and courses

Programme Structure (with entry and exit points)

BBA FYUP HONS PROGRAMME					
Year	Semester	Credits	Vocational Course	Total credit	Exit Option
BBA (1st Year)	Semester 1	22	4	22+24+4=50	Exit with UG Certificate
	Semester 2	24			
BBA (2nd Year)	Semester 3	22	4	46+42+4=92	

	Semester 4	20			Exit with UG Diploma
BBA (3rd Year)	Semester 5	20	4	88+40+4=132	Exit with 3yr BBA Degree
	Semester 6	20			
BBA (4th Year)	Semester 7	21		46+42+40+45=173	BBA Honours degree

Year 1: Semester 1 (BBA FYUP)**BBA 1st Semester**

S.No.	Course	Type	Credit	Total Credits
1	Financial Accounting	Major	4	8
2	Principles of Management	Major	4	
3	Minor	Minor	4	4
4	Environment and Society	Multidisciplinary	2	2
5	Communication Skills and Technical Writing	AEC	2	2
6	Fundamentals of Computers and Programming	SEC	4	4
7	Principles and Concepts of Sustainability	VAC	2	2
Credits earned			22	22

Year 1: Semester 2 (BBA FYUP)

BBA 2nd Semester				
S.No.	Course	Type	Credit	Total Credits
1	Marketing management I	Major	4	8

2	Organisational Behaviour	Major	4	
3	Minor	Minor	3	3
4	Introduction to Mathematics and Statistics	Multidisciplinary	4	4
5	Modern Indian Language	AEC	3	3
6	Behavioural Science	SEC	2	2
7	Ancient Indian Sustainable Practices	VAC	2	4
8	Constitutional Values and Fundamental Duties	VAC	2	
Credits earned			24	24
Credits earned in 2nd year = 22 + 24= 46			46	46
Total credits earned at the end of first year = 22 + 24 = 46 (Minimum requirement 40)				
9	Vocational course/ Summer internship project (8-weeks) to Exit with UG-Certificate		4	4

Year 2: Semester 3 (BBA FYUP)

BBA 3rd Semester

S.No.	Course	Type	Credit	Credits
1	Marketing management II	Major	4	8
2	Introduction to Operations Management	Major	4	
3	Minor	Minor	3	3
4	Data analysis and spreadsheet modelling	Multidisciplinary	3	3
5	Modern Indian Language 2	AEC	3	3
6	Data Visualization	SEC	3	3
7	Team Building	SEC	2	2

Credits earned	22	22
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Year 2: Semester 4(BBA FYUP)**BBA 4th Semester**

S.No.	Course	Type	Credit	
1	Human Resource Management	Major	4	16
2	Management Accounting	Major	4	
3	Economic environment and business implication	Major	4	
5	Business law	Major	4	
6	Minor	Minor	4	4
Credits earned			20	20
Credits earned in 2nd year = 22 + 20= 42			42	42
Total Credits earned at end of the 2nd year = 46 + 42 = 88 (Minimum requirement 80)				
7	Vocational course/ Summer internship project (8-weeks) to Exit with UG-Diploma		4	4

Year 3: Semester 5 (BBA FYUP)**BBA 5th Semester**

S.No.	Course	Type	Credit	Credits
1	Entrepreneurship and startup ecosystems in India	Major	4	12
2	Design thinking and critical analysis	Major	4	
3	Operations Research	Major	4	
4	1 st Minor Course	Minor	4	8
5	2 nd Minor Course	Minor	4	
Credits earned			20	20

Year 3: Semester 6 (BBA FYUP)**BBA 6th Semester**

S.No.	Course	Type	Credit	
1	Financial Management	Major	4	12
2	Business Research Methods	Major	4	
3	Supply Chain Management	Major	4	
4	1 st Minor Course	Minor	4	8
5	2 nd Minor Course	Minor	4	
Credits earned			20	20
Credits earned in 3rd year = 20 + 20 = 40			40	40
Credits earned at end of the 3rd year = 46+ 42 + 40 = 128 (Minimum requirement 120)				
6	Vocational course/ Summer internship project (8-weeks) to Exit 3-Years BBA Degree		4	4
Total credits earned for 3-year UG Degree = 46+ 42 + 40 + 4 = 132				

Year 4: Semester 7 (BBA – Honours/ Honours with Research)

BBA 7th Semester				
S.No.	Course	Type	Credit	Credits
1	Strategic management	Major	4	8
2	Entrepreneurship development and SME	Major	4	
3	Major Elective	HR/FIN/OP/MKT	4	8
4	Major Elective	HR/FIN/OP/MKT	4	
5	1 st Minor Course	Minor	3	3

7	AI for everyone	VAC	2	2
Credits earned			21	21

Year 4: Semester 8 (BBA – Honours/ Honours with Research)**BBA 8th Semester**

S.No.	Course	Type	Credit	Credits
1	Entrepreneurship for sustainable business	Major	4	8
2	Global business operations/International Business	Major	4	
3	Minor	Minor	4	4
4	Major Elective	HR/FIN/OP/MKT	4	12
5	Major Elective	HR/FIN/OP/MKT	4	
6	Major Elective	HR/FIN/OP/MKT	4	
7	Research Project/Dissertation		12	12
Credits earned			24	24
Credits earned in 4th year = 21 + 24 = 45			44	44
Credits earned at end of the 4th year = 46+ 42 + 40+ 45= 173 (Minimum requirement 160)				
Total credits earned for 4-year UG Degree = = 46+ 42 + 40+ 45= 173				

Enclosure 5**Four-Year Undergraduate Programme in Economics**

The Department of Policy and Management Studies, TERI School of Advanced Studies will be launching a Four-Year Undergraduate Programme (FYUP) in Economics from the forthcoming academic session, starting from August 2023. The FYUP is designed in accordance with the National Education Policy (NEP) 2020 and the recent guidelines issued by the University Grants Commission with in-built options of multiple entry and exit.

Eligibility

Senior Secondary School Leaving Certificate or Higher Secondary (12th Grade) Certificate obtained after successful completion of Grade 12 or equivalent from any discipline with Mathematics or Applied Mathematics in Grade 12 can apply. There is no upper age bar.

Admission criteria

Candidates shall be admitted based on the merit list prepared of the National Level Test (CUET-UG) or 12th Grade marks. In all cases the students are required register online at the admission link that will be provide once the admissions are announced. For any further query write to admissions@terisas.ac.in.

Structure of the FYUP (with entry and exit points)

Year	Semester	Credits	Total credit	Exit Option
B.Sc. in Economics (1st Year)	Semester 1	22	22+24+4=50	Exit with UG Certificate
	Semester 2	24		
B.Sc. in Economics (2nd Year)	Semester 3	25	46+46+4=96	Exit with UG Diploma
	Semester 4	21		
B.Sc. in Economics (3rd Year)	Semester 5	25	46+46+45=137	Exit with a 3year B.Sc. in Economics Degree
	Semester 6	20		
B.Sc. in Economics (4th Year)	Semester 7	20	46+46+45+48=185	Exit with a 4 year B.Sc. Honours (or Honours with research) in Economics Degree
	Semester 8	28		

Proposed Programme Outline - FYUP

Year 1: Semester 1

S.No.	Course	Type	Level	Credit	Credits
1.	Principles of Economics	Major 1	101	4	8
2.	Introductory Mathematical Methods for Economics	Major 2	103	4	
3	Minor from Data Science/Environmental Studies/Management	Minor 1		4	4
4.	Environment and Society	Multidisciplinary 1		2	2
5.	Fundamentals of Computers and Programming	SEC 1		4	4
6.	Communication Skills and Technical Writing	AEC 1		2	2
7.	Principles and Concepts of Sustainability	VAC 1		2	2
Credits earned				22	22

Year 1: Semester 2

S.No.	Course	Type	Level	Credit	Credits
1	Introductory Statistical and Econometric Methods	Major 3	102	4	8
2	Introduction to Development Economics	Major 4	104	4	
3.	Minor from Data Science/Environmental Studies/Management	Minor 2		3	3
4.	Introduction to Mathematics and Statistics	Multidisciplinary 2		3	3
5.	Modern Indian Language	AEC 2		3	3

6.	Behavioural Science	SEC 2		2	2
7.	Ancient Indian Sustainable Practices	VAC 2		2	3
8.	Constitutional Values and Fundamental Duties	VAC 3		2	2
Credits earned in 2 nd semester				24	24
Total credits earned at the end of first year = 22 + 24 = 46					
9.	Vocational course TBD	Vocational course		4	4
10.	Summer internship project (8-weeks)	Internship		4	
Total credits earned for UG Certificate = 22 + 24 + 4 = 50					
Exit option: UG Certificate in Economics if 50 credits earned (Min. requirement by UGC is 44 credits)					

Year 2: Semester 3

S.No.	Course	Type	Level	Credit	Credits
1.	Intermediate Microeconomics-I	Major 5	201	4	12
2.	Basic Mathematics for Economics	Major 6	203	4	
3.	Intermediate Macroeconomics-I	Major 7	204	4	
4.	Minor from Data Science/Environmental Studies/Management	Minor 3		3	3
5.	Data analysis and spreadsheet modelling	Multidisciplinary 3		3	3
6.	Modern Indian Language	AEC 3		3	3
7.	Data Visualization	SEC 3		2	2
8.	Team Building	SEC 4		2	2
Credits earned				25	25

Year 2: Semester 4

S.No.	Course	Type	Level	Credit	
1.	Intermediate Microeconomics-II	Major 8	202	4	12
2.	Intermediate Statistical Methods for Economics	Major 9	205	4	
3.	Intermediate Macroeconomics-II	Major 10	206	4	
6.	Minor from Data Science/Environmental Studies/Management	Minor 4		4	4
7.	Cybersecurity for Data Science (Cybersecurity)	SEC 5		3	3
8.	Aerial Photography	VAC 4		2	2
Credits earned				21	21
Credits earned in 2 nd year = 25 + 21 = 46				46	46
Credits earned at end of the 2 nd year = 46 + 46 = 92 (Min. credits required are 80)					
9.	Vocational course	Vocational course		4	4
10.	Summer internship project (8-weeks)	Internship		4	
Total credits earned for UG Diploma = 46 + 46 + 4 = 96					
Exit option: UG Diploma in Economics if 96 credits earned (Min. requirement by UGC is 84 credits)					

Year 3: Semester 5

S.No.	Course	Type	Level	Credit	Credits
1.	Game Theory	Major 11	301	4	16
2.	Econometrics-I	Major 12	303	4	
3.	Growth Economics	Major 13	305	4	
4	Issues in the Indian Economy	Major 14	307	4	

5	Minor from Data Science/Environmental Studies/Management	Minor 5		4	4
6	Environmental Law, Policy and Governance (Environmental Politics)	Multidisciplinary 4		3	3
7	TBD	AEC 4		2	2
Credits earned				25	25

Year 3: Semester 6

S.No.	Course	Type	Level	Credit	
1.	Development Economics	Major 15	302	4	16
2.	International Trade Theory and Policy	Major 16	304	4	
3.	International Finance and Capital Flows	Major 17	306	4	
4.	Econometrics -II	Major 18	308	4	
5.	Minor from Data Science/Environmental Studies/Management	Minor 6	312	4	4
Credits earned				20	20
Credits earned in 3 rd year = 25 + 20 = 45				41	41
Credits earned at end of the 3 rd year = 46 + 46 + 45 = 137					
Total credits earned for 3-year UG Degree = 46 + 46 + 45 = 137 (Min. requirement is 120 credits)					

Year 4: Semester 7

S.No.	Course	Type	Level	Credit	Credits
1.	Environmental Economics	Major 19	401	4	16
2.	Research Methodology	Major 20	403	4	

3.	Econometrics using R	Major 21	405	4	
4.	Behavioural Economics/ Public Economics/ Global Political Economy/ History of Economic Thought/ Economic History (Major elective)	Major 22	407	4	
5.	Minor from Data Science/Environmental Studies/Management	Minor 7	409	4	4
Credits earned				20	20

Year 4: Semester 8

S.No.	Course	Type	Level	Credit	
1.	Energy and Resource Economics	Major 23	404	4	12
2.	Financial Economics	Major 24	406	4	
3.	Health Economics	Major 25	408	4	
4.	Minor from Data Science/Environmental Studies/Management	Minor 8	410	4	4
5.	Climate Change Economics	Major 26	412	4	12
6.	Public Economics/Industrial Organization/Money & Banking/Law & Economics	Major 27	414	4	
7.	Impact Evaluation	Major 28	416	4	
8.	Research Project/Dissertation		418	12	12
Credits earned				28	28
Credits earned in 4 th year = 20 + 28 = 48				48	48
Credits earned at end of the 4 th year = 46 + 46 + 45 + 48 = 185					
Total credits earned for 4-year UG Degree are 185 (Min. requirement is 160 credits)					

Enclosure 6**(a) Mr Shraman Jha****Brief profile**

A cross-over, dedicated not-for-profit professional with three decades of corporate leadership record across diverse Emerging Markets (India, Bangladesh, Africa & Middle East). Track record of rigorous strategy formulation, driving turnarounds, new business development and leveraging of public policy. Credited with delivering exceptional execution through partnerships and alignment. Mild-mannered and affable with a humour-laced work style. Adaptable and effective in matrix organisations of global enterprises and Indian organisations.

Professional Experience:**Hindustan Unilever Foundation (HUF): CEO (Sep 2022–To Date)**

HUF is dedicated to helping Water Security in India

Lead the organisation in all its dimensions- building partnerships, managing stakeholders, and external advocacy

WWF India: Director Fund Raising, Marketing and Communications (Sep 2020–Sep 2022)

WWF is the world's foremost NGO in the broader environment space

Elevated and personally led focused environment awareness outreach across media formats and with partnerships Rapidly built India's presence in the global WWF network.

Education:

University of Pune	MA in Economics	2000
IIM Calcutta	MBA	1993
St. Stephen's College, Delhi	BA (Hons) Economics	1991

Roles and responsibilities (Engagement)

- (a) Involve in the development and designing of courses and curriculum.
- (b) Networking with industry experts who can contribute in delivering of lectures in various courses at the University
- (c) Introduce new courses and deliver lectures as per institutional policies.
- (e) To encourage students in innovation and entrepreneurship projects & provide necessary mentorship for these activities.
- (f) To focus on enhanced industry-academia collaborations.
- (g) Conduct jointly in collaboration with regular faculty member of the institution, workshops, seminars, deliver special lectures and training programmes.
- (h) Carryout joint research project or consultancy services in collaboration with the regular faculty members

(b) Dr Neeraj Sharma

Brief profile

Dr Neeraj Sharma is currently Director- Institute Partnerships at Teachmint. He pursued his PhD degree in Management Science from Department of Management Studies, Indian Institute of Technology, Delhi. He obtained his M Tech (Human Resource Development and Management) from the Department of Humanities and Social Science at Indian Institute of Technology, Kharagpur.

He has approximately 25 years of experience in the corporate world. He has handled multiple profiles during these 25 years. He handled Training and Quality functions at Usha Martin Industries, Jamshedpur. He was head of Quality at Tata Infotech. The training and Quality function was also headed by him at Hughes Escorts Communications Ltd, at Gurgaon office. One of his significant contributions was being the founding member of the team which conceptualized and implemented, technology-based learning in management education through the division DirecWay Global Education. This work was further enhanced when he joined NIIT and launched NIIT Imperia and training.com, which became a major achievement in the area of technology-based management education through the best schools of management in the country. Dr Sharma in his role as Head of University Partnerships at upGrad started technology-based law education and health care management education. Dr Sharma has successfully persuaded and convinced some of the best management schools in the country to opt for technology-based learnings. He has closely worked with IIMs at Ahmedabad, Calcutta, Bangalore, Lucknow, Indore, Kozhikode, Trichy, Raipur, Jammu etc in addition to IIFT, New Delhi, NMIMS, MDI, University of Phoenix to name a few. He has been part of this technology-based education since its inception. Dr Sharma takes great interest in educating youth about our spiritual knowledge and runs a popular program in West Delhi titled - Life Management Program for Youth (LMPY). He authored a book titled Man Manthan – a collection of Hindi poetry.

Roles and responsibilities (Engagement)

- (a) Involve in the development and designing of courses and curriculum.
- (b) Launch and outreach of new academic programmes.
- (c) Networking with industry experts who can contribute in delivery of lectures in various courses at the University.
- (d) Introduce new courses and deliver lectures as per institutional policies.
- (e) To encourage students in innovation and entrepreneurship projects & provide necessary mentorship for these activities.
- (f) To focus on enhanced industry-academia collaborations.
- (g) Conduct jointly in collaboration with regular faculty member of the institution, workshops, seminars, deliver special lectures and training programmes.
- (h) Carryout joint research project or consultancy services in collaboration with the regular faculty members
- (i) Helping in the Creation of Centre of Executive Education at TERI SAS

(c) Dr B.K. Bhadra

Brief profile

Dr Bhadra has more than 28 years of Teaching and Industrial Experience in the field of Satellite Remote Sensing and Geospatial Technology.

He served in ISRO, Delhi & Jodhpur (May,2002-Jan.2023) as Deputy General Manager and Scientist more nearly 21 years. He served as Faculty in the Department of Earth Sciences for nearly 7 years.

His qualifications include :

1996 Ph.D. (Earth Sciences)	–	IIT-Roorkee
1987 M.Sc. (Applied Geology)	–	IIT-Roorkee
1984 B.Sc.(H) (Geol, Phy, Chem)	–	Ranchi Univ.

ISRO Team Excellence Award (2012)-NGLM
ISRO Team Excellence Award (2010)-India-WRIS
DST Young Scientist Project Award (1998)

Roles and responsibilities (Engagement)

- (a) Involve in the development and designing of courses and curriculum.
- (b) Introduce new courses/programmes and deliver lectures as per institutional policies.
- (c) To encourage students in innovation and entrepreneurship projects & provide necessary mentorship for these activities.
- (d) To focus on enhanced industry-academia collaborations.
- (e) Conduct jointly in collaboration with regular faculty member of the institution, workshops, seminars, deliver special lectures and training programmes.
- (f) Carryout joint research project or consultancy services in collaboration with the regular faculty members.
- (g) Helping in the Establishment of Centre for Excellence in Geoinformatics at TERI SAS.

(d) Dr Deb Jyoti Pal

Brief profile

Dr. Pal has over 24 years of experience in the IT and Geospatial fields, including extensive experience in Research & Consultancy for the development of enterprise level Geospatial projects. He started his career as a Scientist in a government organization and was selected as Young Scientist by International Association of Geomorphologists.

He has an established reputation for his excellence in management and commitment to maintaining excellent quality standards in large-scale GIS projects. Over the span of his career, he has accumulated expertise in the application of geospatial technologies across

sectors, including Defence, Utilities, Government, Exploration, Telecoms, Environment and Land Use.

He currently heads the Geospatial Business Unit, and is responsible for all aspects of needs identification, strategy planning, delivery management and quality governance.

Roles and responsibilities (Engagement)

- (a) Involve in the development and designing of courses and curriculum.
- (b) Networking with industry experts who can contribute in delivering of lectures in various courses at the University, Introduce new courses/programmes and deliver lectures as per institutional policies.
- (c) To encourage students in innovation and entrepreneurship projects & provide necessary mentorship for these activities.
- (d) To focus on enhanced industry-academia collaborations.
- (e) Conduct jointly in collaboration with regular faculty member of the institution, workshops, seminars, deliver special lectures and training programmes.
- (f) Carryout joint research project or consultancy services in collaboration with the regular faculty members.
- (g) Helping in the Establishment of Centre for Excellence in Data Science at TERI SAS.

(e) Dr A.K. Mitra

Brief profile

Dr. Ashis Kumar Mitra, is currently the Head of ‘National Centre for Medium Range Weather Forecasting’ (NCMRWF), Ministry of Earth Sciences, Government of India. Dr. Mitra has 35 years of experience in Numerical Modelling for Weather /Climate, Data Assimilation, Monsoon Research and developing Applications for various sectors. He has published around 100 research papers in peer reviewed reputed journals. He has a Ph.D in Ocean Modelling from IIT Delhi. Dr. Mitra has worked as visiting scientist in FSU, USA and UKOM, UK. His current research interests are coupled modelling for S2S prediction of Monsoon, ocean-atmosphere modelling and data assimilation, gridded rainfall data preparation and, model validation/ diagnostics. He is an associate editor of RMS journal QJRMS and is serving as member of several national and international committees related to weather and climate

Roles and responsibilities (Engagement)

- (a) Involve in the development and designing of courses and curriculum.
- (b) Networking with industry experts who can contribute in delivering of lectures in various courses at the University, Introduce new courses/programmes and deliver lectures as per institutional policies.
- (c) To encourage students in innovation and entrepreneurship projects & provide necessary mentorship for these activities.
- (d) To focus on enhanced industry-academia collaborations.
- (e) Conduct jointly in collaboration with regular faculty member of the institution, workshops, seminars, deliver special lectures and training programmes.

- (f) Carryout joint research project or consultancy services in collaboration with the regular faculty members.
- (g) Helping in the Establishment of Centre for Excellence in Climate Science at TERI SAS.

(f) Col Sanjay Kumar Srivastava (Retd)

Brief profile

Col Sanjay Kumar Srivastava (Retd.)- a war decorated veteran from Air Defence branch of Armed forces has held prestigious operational and instructional appointments in field and MoD level . Post Armed Forces, he was instrumental in setting up Disaster Management in Jharkhand. He has also worked with UN institutions like UNDP and other international bodies like FEMA, KOICA (South Korea) etc.

He is an MBA (Human Resource), Master in Business Administration from IIM Ahmedabad and MTech (Armament).

Col Sanjay hails from Ranchi, Jharkhand and is alumni of St. Xavier's College Ranchi, IIM Ahmedabad , Defence Institute of Advance Technology Pune, , Berhampur University , II9 Fire and Rescue Services South Korea etc. He is a prolific writer and specializes on strategic and real time issues on climate change. Doordarshan, All India Radio and Discovery have made short documentaries on his exemplary work. He has 56 publications to his credit and is a key writer/speaker in media.

Roles and responsibilities (Engagement)

- (a) Involve in the development and designing of courses and curriculum.
- (b) Networking with industry experts who can contribute in delivering of lectures in various courses at the University. Introduce new courses/programmes and deliver lectures as per institutional policies.
- (c) To encourage students in innovation and entrepreneurship projects & provide necessary mentorship for these activities.
- (d) To focus on enhanced industry-academia collaborations.
- (e) Conduct jointly in collaboration with regular faculty member of the institution, workshops, seminars, deliver special lectures and training programmes.
- (f) Carryout joint research project or consultancy services in collaboration with the regular faculty members.
- (g) Helping in the Establishment of Centre for Excellence in Disaster Management at TERI SAS.

(g) Dr Sumit Sharma

Brief profile

Dr. Sumit Sharma is currently working as Programme Officer, United Nations Environment Programme, New Delhi since August 2021. Prior to that, he served in TERI, New Delhi from 2003-2021 as a Senior Fellow & Director (Earth Science and Climate Change Division).

He has done his PhD in Environmental Engineering from the Department of Civil Engineering, Indian Institute of Technology, Delhi in the year 2018; M.Tech in Energy & Environmental Management, Centre for Energy Studies, Indian Institute of Technology (IIT), Delhi, India, 2006 and Bachelors in Engineering (Environment) from Delhi College of Engineering, New Delhi, India in 2002.

Dr Sharma has also been associated with TERI School of Advanced Studies since 2019 and had taken a 3-credit course on Air quality modelling and assessment. He was a Guest Lecture at TERI School of Advanced Studies and at Lady Irwin College, University of Delhi

Role and responsibilities (Engagement)

- (a) Involve in the development and designing of courses and curriculum.
- (b) To encourage students in innovation and entrepreneurship projects & provide necessary mentorship for these activities.
- (c) Conduct jointly in collaboration with regular faculty member of the institution, workshops, seminars, deliver special lectures and training programmes.
- (d) Carryout joint research project or consultancy services in collaboration with the regular faculty members.
- (e) Helping in the Establishment of Centre for Excellence in Air Quality Simulation and Modelling at TERI SAS.

(h) Gp Capt (Dr) S N Mishra (Retd)

Brief profile

Gp Capt. S N Mishra (Retd.) has done Ph.D in Met and Environmental Sciences from Bharathiar University in 2006, M.Phil in Meteorology and Environmental Sciences and M.Sc in Physics.

Gp Capt. Mishra has more than three decades of experience in climate sciences, climate change and sustainability in diverse roles of climate risk analysis and extreme weather events forecasting and mitigation, adaptation and finding strategic and sustainable solutions for issues arising out of climate crises, planning and execution.

Role and responsibilities (Engagement)

- (a) Involve in the development and designing of courses and curriculum.
- (b) Networking with industry experts who can contribute in delivering of lectures in various courses at the University, introduce new courses/programmes and deliver lectures as per institutional policies.
- (c) To encourage students in innovation and entrepreneurship projects & provide necessary mentorship for these activities.
- (d) To focus on enhanced industry-academia collaborations.
- (e) Conduct jointly in collaboration with regular faculty member of the institution, workshops, seminars, deliver special lectures and training programmes.
- (f) Carryout joint research project or consultancy services in collaboration with the regular faculty members.

- (g) Helping in the Establishment of Centre for Excellence in Climate Science/Meteorology at TERI SAS.

Enclosure 7**Number of Seats**

Sl. No.	Academic Programmes	Number of seats
1.	Four Year Under-Graduate Programme in Data Science (BSc Honours/BSc Honours with Research)	40
2.	Four Year Under-Graduate Programme in Environmental Studies (BSc Honours/BSc Honours with Research)	40
3.	Five Year Integrated Post-Graduate Programme in Data Science (MSc in Data Science)	30
4.	Five Year Integrated Post-Graduate Programme in Environmental Studies (MSc in Environmental Studies)	30
5.	Four Year Under-Graduate Programme in Economics (BSc Honours /BSc Honours with research)	60
6.	Four Year Under-Graduate Programme in Business Administration (BBA Honours/ BBA Honours with research)	120

TERI SAS follows a 5% affirmative policy covering all non-general categories for admission to all UG programmes.