

I - SEMESTER

INTEGRATED SUSTAINABLE STUDIO - I			
Course Code	22ASH11	CIE Marks	50
Teaching Hours/Week (L:S:SDA)	05:05:05	Viva Marks	50
Total Hours of Pedagogy	10*16 = 160 hrs	Total Marks	100
Credits	10	Exam Hours	Min 30 mins/Student
<p>Course Learning objectives:</p> <ul style="list-style-type: none"> To provide a design solution addressing financial constraint from a profitability standpoint. To provide a design solution addressing environmental constraint from a least impact standpoint. To provide a design solution providing a strong livability index for the user. <p>The students will develop a design solution that is sustainable on a small scale that looks at it as a team exercise of 2-4 persons. The project will aim to provide a design solution that addresses the above three objectives.</p>			
Module-1			
<p>1. Create a real world problem with a go to market strategy for a small scale building project with the following goals:</p> <ol style="list-style-type: none"> Environmental impact - aim to keep it low - with strong use of passive solutions and select use of active solutions and good response to natural parameters. Economically viable - should be profitable - if a greater cost is invested in it, there should be improved returns to justify the investment unless it is a basic market standard. Livability and lifestyle choices - the more the better to improve the customer satisfaction, but finding the point where this balances the cost and environmental impact is critical. 			
Teaching-Learning Process	<p>Teaching Process</p> <ol style="list-style-type: none"> Start by defining a problem statement and target market - and submit (1 week) Do a benchmarking case study for similar projects locally and from around the world - and submit (2 weeks) Develop a business plan, an environmental response plan and livability index on a measurable scale as a rating for the project (4 weeks) Create a design solution that will satisfy as much of the key goals of the project. (5 weeks) Staff will evaluate the technical competence of the project on each of the three areas and work with the students to optimize design (1 week) Teams will then evaluate each other's performance - to see if they have achieved the performance benchmarks set for themselves in the planning stage - as a potential customer by rating their achievement against targeted benchmarks. (1 week) Staff will moderate the "customer responses" and evaluate all stages together to provide a final score after customer feedback is incorporated in the design. (2 week). 		

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Viva voce is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in Viva is 50% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and Viva- Voce taken together.

Continuous Internal Evaluation:

CIE marks shall be awarded by a committee comprising of Principal/Dean, PG Course Coordinator/HOD and Guide/Co-guide of the department. The CIE marks awarded for PSC (professional supportive course), shall be based on the progress of the student throughout the semester, presentation skills in seminars and submission of the report.

Viva voce Examination:

1. The student needs to submit his/her report done throughout the semester, including the data collection for the Viva examination, at least one day prior to the Viva examination to the PG course coordinator/HOD.
2. The Viva-voce will be evaluated by two external examiners appointed by the University along with PG Course coordinator/ guide/ co-guide or an internal examiner.
3. The viva-voce marks awarded for PSC (Professional supportive course), shall be based on the evaluation of report submission, presentation skill and performance in Question-and-Answer session in the ratio 30:10:10.
4. The viva-voce marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution.

Suggested Learning Resources:**Books**

- Sustainable Design Architecture, Planning, and Ecology by Orr, David W., Williams, Wiley; 1st edition.
- Greening Asia – emerging principles for sustainable architecture. Singapore: BCI Asia.
- Alan of Auroville Communication Centre. 2004: Auroville Architecture – Towards new forms for a new consciousness.

Web links and Video Lectures (e-Resources):

NPTEL Lecture - Inputs to scheduling:
<https://youtu.be/psls4kgau8c>

Work Breakdown Structure in project management
https://www.youtube.com/watch?v=9mOXdcgdf_U

Skill Development Activities Suggested

- Guest Lecture from expert.
- Case Studies :
To choose building projects as case studies (local and global) where scope of learning measurable outcomes from projects related to sustainable design is more.

Course Outcomes

At the end of the course the student will be able to:

Sl. No.	Particulars	Blooms Level
CO1	Students will be able to understand the importance of relating design decisions based on financial constraints.	
CO2	Students will be able to understand incorporating of different kinds of energy based solutions along with and also including natural parameters to get the desired impact.	
CO3	Students will learn to provide user conducive solutions that undertake livability index as one of the most critical parameter..	

Program Outcome of the SHH/SA Program

Sl. No.	Particulars	POs
1	The design project will take them through a whole project journey from formulation of a project idea to taking it to market, evaluating it and presenting it to customers and the client management team.	PO1
2	The aim is to understand effectively the process, analyzing the changing circumstances and findings along the way.	PO2
3	To realize that the goals set at the beginning may have to change and evolve and be interpreted differently by the time the project solution is arrived at, but that the goals are still achievable to a large extent.	PO3
4	The importance of measurable outcomes and justifiable decisions on projects related to sustainable design.	PO4

Mapping of COS and POS

		PO1	PO2	PO3	PO4
CO1		H	M	L	H
CO2		H	L	M	L
CO3		H	L	M	L
CO4		H	L	M	L
CO5		H	L	M	L

H - High , M - Medium, L - Low

I-SEMESTER

INTRODUCTION TO SUSTAINABILITY AND ENVIRONMENT			
Course Code	22ASH12	CIE Marks	50
Teaching Hours/Week (L:S:SDA)	01:00:01	SEE Marks	50
Total Hours of Pedagogy	02*16 = 32hrs	Total Marks	100
Credits	02	Exam Hours	3
Course Learning objectives:			
The Course aims to provide incoming students an overview of the concept of sustainability in a holistic manner. The larger ideas and concepts of Lifecycle costs, impact on ecology around them, and the impact of these choices on users is brought to their attention.			
<ul style="list-style-type: none"> To understand lifestyle practices as seen through the lens of day to day experiences, cultural influences, regional and local contexts. To present a balance between economic, ecological and empathetic considerations of individuals by using the above study. 			
Module-1			
Introduction: Understanding Sustainability as a holistic idea, and not limited to their industry background, Learning the importance of regional and local contexts both climatic and cultural.			
Teaching-Learning Process	<p>Direct method: The lecture supported by the conventional method of Blackboard and chalk to introduce sustainability as a holistic idea. Discussions, Debate, Industry interactions, and research paper/newspaper reading and inferences from the same.</p> <p>Blended learning: Power point presentation to elaborate more on key topics/online video's/ TED talks</p>		
Module-2			
Examples from daily life such as food sourcing, selection of garment fabrics, use of construction materials, sourcing water and climatic responses and the idea of sustainability in choices related to it.			
<ol style="list-style-type: none"> Economics as a driver for considerations in decision making in daily lives Ecology as a driver for decision making in daily lives Empathetic choices for the greater good in decision making in daily lives 			
Teaching-Learning Process	<p>Direct method: : Lecture supported by conventional method of Blackboard and chalk to introduce the concepts Discussions, Debate, Industry interactions, and research paper/new s paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation to elaborate more on key topics/online video's/ TED talks/ Debate Forums.</p>		
Module-3			
Natural selection process The idea of "Natural Selection" through sustainable evolution of practices in a culture			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts followed by academic games.</p> <p>Blended learning: Power point presentation to elaborate more on key topics/online video's/ TED talks/ Debate Forums.</p>		
Module-4			
Sustainability in Small business Being able to understand sustenance in a business decision making process through role play for small businesses such as pottery, handicrafts or service providers like a rice mill.			

Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts followed by interviews and business project proposal.</p> <p>Blended learning: Power point presentation to elaborate more on key topics/online video's/ TED talks/ Debate Forums.</p>
Module-5	
<p>Ecological protection</p> <p>Understanding the cost of Ecological protection or conservation when it comes to issues like farming practices - such as clearing, crop rotation, seasonal response, conservation etc.</p>	
Teaching-Learning Process	<p>Collaborative and Cooperative learning: Students should work on individual work. The research and learning are be shared with the class.</p> <p>Site visits, Interaction with NGOs and Experts from the field.</p>
<p>Assessment Details (both CIE and SEE)</p> <p>The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.</p> <p>Continuous Internal Evaluation:</p> <p>Three Unit Tests each of 20 Marks (duration 01 hour 30 min)</p> <ol style="list-style-type: none"> 1. First test at the end of 5th week of the semester 2. Second test at the end of the 10th week of the semester 3. Third test at the end of the 13th week of the semester <p>Two assignments each of 10 Marks</p> <ol style="list-style-type: none"> 4. First assignment at the end of 4th week of the semester 5. Second assignment at the end of 9th week of the semester <p>Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 20 Marks(duration 01 hours)</p> <ol style="list-style-type: none"> 6. At the end of the 13th week of the semester <p>The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be scaled down to 50 marks</p> <p>Semester End Examination:</p> <p>Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (duration 03 hours)</p> <ol style="list-style-type: none"> 1. The question paper will have ten questions. Each question is set for 20 marks. 2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module. <p>The students have to answer 5 full modules, selecting one full question from each module. Marks scored by the student will be scale down to 50 Marks</p>	

Suggested Learning Resources:				
Books				
1. Carson Rachel. 1962: Silent Spring. Penguin				
2. Brundtland, 1987, 2009: Our Common Future. Oxford Uni Press (OUP)				
3. Principles of Sustainability by Simon Dresner , 2005, Earth Scan				
4. Sustainable Architecture by Simon Guy and Steven Moore 2005, SPON Press				
Web links and Video Lectures (e-Resources):				
NPTEL Lecture https://www.youtube.com/watch?v=RQNZWCl6eXI&list=PLBd76GK9sWTwVXm9FIVHOTXXbGY2vZR8z				
NPTEL Lecture https://www.youtube.com/watch?v=RjOA7AxOVj8				
Skill Development Activities Suggested				
<ul style="list-style-type: none"> • Guest Lecture from expert. • Case Studies : Visiting NGOs or offices to understand the concept of sustainability and environment from those individuals or organizations who are practicing various concepts. 				
Course Outcomes				
At the end of the course the student will be able to:				
Sl. No.	Particulars	Blooms Level		
C01	The students shall delve into climatic considerations regarding choices made by people in different places based on local context and apply it on the current situation.			
C02	Understanding the relationship between availability of resources and materials such as construction materials, agricultural produce and basic issues like access to water as drivers of development.			
C03	Understanding how cultures and cultural practices represent and showcase a sustainable response of communities and people over generations to their context - whether climatic or economic.			
C04	Studying and analyzing the impact of artificial forces (typically economic or external influence) on sustainable practices in a culture changing or evolving - eg: trade, embargoes, taxes and war.			
Program Outcome of the SHH/SA Program				
Sl. No.	Particulars	POs		
1	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to short term impact as an exercise in a given context and timeframe.	PO1		
2	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to medium term impact as an exercise in a given context and timeframe.	PO2		
3	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to long term impact as an exercise in a given context and timeframe.	PO3		
Mapping of COS and POS				
		PO1	PO2	PO3
C01		H	0	L
C02		H	H	M
C03		H	L	L
C04		0	L	M
C05		M	L	M
C06		M	M	L

I-SEMESTER

SUSTAINABILITY AND PARADOX OF DEVELOPMENT			
Course Code	22ASH13	CIE Marks	50
Teaching Hours/Week (L:S:SDA)	02:01:00	SEE Marks	50
Total Hours of Pedagogy	3*16= 48 hrs	Total Marks	100
Credits	3	Exam Hours	3
Course Learning objectives:			
The Course aims to create an understanding of the dichotomies surrounding an act of “Development”, and how there is impact - both positive and negative to any given initiative.			
<ul style="list-style-type: none"> To understand simple practices based on energy and material consumption at a micro level. To understand simple practices based on resource and pollution impact at Industry level. To learn the ways to balance rural and urban disparities and variables by designing opportunities. 			
Module-1			
Defining Development as an act that will change the current status quo of given place or practice			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, and research paper/newspaper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-2			
Understanding that changing the way we do simple everyday things can change the world around us from an energy and material consumption, economic impact and lifestyle perspective.			
Domestic practices and changes - an evolution with impact eg: washing machines increased water consumption, chemical use, freed up time for women to work.			
Workplace changes such as going digital from paper, reduced cutting of trees but increased energy consumption, social disconnection and improved lifestyles and access to information.			
Teaching-Learning Process	<p>Direct method : : Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. Discussing case studies nationally and globally to expose students to relevant practices and audit them for learnings.</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-3			
Industrialized Manufacturing and Virtual Economies - Comparing the two ends of doing business. Spatial needs, physical resource use and direct impact pollution - Manufacturing Industry			
Reduced space, higher returns, decoupled energy, space and pollution - Virtual Economy			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</p> <p>Blended learning: Power point presentation to elaborate more on key topics.</p>		
Module-4			
Industrialized Manufacturing and Virtual Economies (continued)			
Proximal Impact vs. Remote Impact - Purchasing Green Credits to Data Centers & Solar Farms Manufacturing as a job creator vs Manufacturing needing automation and reduced wastage Easy Information access and remote working vs unhealthy lifestyle and high energy demand			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</p> <p>Blended learning: Power point presentation and webinars.</p>		

Module-5	
Understanding the problems of Rural Urban Migration, Growing Cities, and Economic Opportunities, and the need to balance the variables and disparities while ensuring sustenance of agriculture, manufacturing and Service industries while improving lifestyles across the spectrum in an effort to improve the ecological balance needed to sustain the development.	
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</p> <p>Collaborative and Cooperative learning: Students should work on as individual work. The research and learning to be share with the class.</p>
<p>Assessment Details (both CIE and SEE)</p> <p>The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.</p> <p>Continuous Internal Evaluation:</p> <p>Three Unit Tests each of 20 Marks (duration 01 hour 30 min)</p> <ol style="list-style-type: none"> 1. First test at the end of 5th week of the semester 2. Second test at the end of the 10th week of the semester 3. Third test at the end of the 13th week of the semester. <p>Two assignments each of 10 Marks</p> <ol style="list-style-type: none"> 4. First assignment at the end of 4th week of the semester 5. Second assignment at the end of 9th week of the semester <p>Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 20 Marks(duration 01 hours)</p> <ol style="list-style-type: none"> 6. At the end of the 13th week of the semester <p>The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be scaled down to 50 marks</p> <p>Semester End Examination:</p> <p>The question paper will have ten questions.</p> <p>Each full question is for 20 marks.</p> <p>There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.</p> <p>Each full question with sub questions will cover the contents under a module.</p> <p>Students will have to answer 5 full questions, selecting one full question from each module</p>	

Suggested Learning Resources:**Books**

1. Sustainable Urban Environments – An Ecosystem Approach by Ellen Bueren, and others, 2012, Springer
2. Sustainable Cities – Governing Urban Innovation by Simon Joss 2015 Macmillan
3. Sustainability in architecture and urban design by Carl Bovill, 2015, Routledge

Web links and Video Lectures (e-Resources):

NPTEL Lecture

<https://www.youtube.com/watch?v=RQNZWCl6eXI&list=PLBd76GK9sWTwVXm9FIVHOTXXbGY2vZR8z>

Web Link

<https://www.udemy.com/course/contracts-management-in-construction-projects/>**Course outcome (Course Skill Set)**

At the end of the course the student will be able to :

Sl. No.	Particulars	Blooms Level
CO1	The students shall look at specific cases in the way small changes in lifestyle choices impact big changes in the environment, in terms of economic engagement and quality of life.	
CO2	The idea that when we strive to be more efficient shows development and prosperity, but that comes at a cost, for the benefit enjoyed - being able to analyze and justify these is the primary task.	
CO3	Being able to evaluate and achieve a balance between the good intent of development, and the havoc it can have on the other end of the spectrum whether locally or in a remote location.	
CO4	Applying the smaller examples and knowledge in understanding the larger global issues to see how one positive initiative in one place can cause both a positive and a negative issue somewhere else. (eg: mining rare earth metals and the tech world)	

Program Outcome of the SHH/SA Program

Sl. No.	Particulars	POs
1	To clearly understand the dichotomies of development, its impact while bringing the sustainability approach to design and planning.	PO1
2	Encompass the ability to work in collaboration with interdisciplinary teams.	PO2
3	Demonstrate creativity in the problem-solving process through professional qualitygraphic presentations and technical drawings.	PO3
4	Acquire outstanding knowledge & software skills for design statistics resource management etc.	PO4
5	Understanding the diverse values and systems of society and providing sustainable solutions versus government policies.	PO5
6	Appraise professional standards and ethical responsibilities as a team member.	PO6

Mapping of COS and POS

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	L	M	L	0	0
CO2	H	L	L	L	0	0
CO3	H	L	L	M	0	0
CO4	H	L	L	L	0	0

H - High , M - Medium, L - Low

I-SEMESTER

ECOLOGY OF CITY & REGION			
Course Code	22ASH14	CIE Marks	50
Teaching Hours/Week (L:P:SDA)	01:01:00	SEE Marks	50
Total Hours of Pedagogy	2*16 = 32 Hrs	Total Marks	100
Credits	2	Exam Hours	3
Course Learning objectives:			
The Course aims to focus on the relationship between an urban area and the regional context within which it is situated. It aims to better understand sustainable issues related to people, the environment and the economic impact.			
Module-1			
Urban Area - a net consumer of resources			
Understanding that an urban area is a net consumer of resources and materials in the form of fuel, energy, water, construction material, food products etc., and is a net exporter of waste - in terms of waste water, sewage, garbage, air pollution etc			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/newspaper reading and inferences from the same</p> <p>Blended learning: Power point presentation and webinars from waste management experts.</p>		
Module-2			
Connecting the Urban area to regional ecological and environmental as a point of reference			
Connecting the Importance of the Urban area to regional ecological and environmental riches such as minerals, climate, geographic advantage etc. to understand its existence within a point of reference.			
Teaching-Learning Process	<p>Direct method : : Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</p> <p>Blended learning: Power point presentation and webinars from Natural Resource Management experts.</p>		
Module-3			
Absence of resources – a threat to Urban Development			
Understanding the absence of resources and other natural advantages pose a threat to the Urban development, that it tries to mitigate through economic activity and transactions to secure its sustenance.			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</p> <p>Blended learning: Power point presentation to elaborate more on key topics from Urban Planners, Working with Urban Economics.</p>		
Module-4			
Impact Study through Case studies of various economically oriented urban developments			
Studying the impact of urban areas through case studies of various economically oriented urban developments from around the world such as - Agricultural Centers, Trading Hubs, Industrial Towns, Financial Centers, Technology Hubs etc. and their connection to, or disconnect from, their larger regions (state or district).			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</p> <p>Blended learning: Power point presentation and webinars from Experts who mitigate resource projects and economics between the rural and the urban.</p>		

Module-5	
Understanding the urban form in relation to regional context	
Understanding the urban form in relation to response to climate and terrain, as well as regional connect and types of goods and services exchanged between the city and its regional context. Evidence of infrastructure as a connected existence to regional context vs. absence reflecting a major disconnect with regional context and dependency on external factors.	
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</p> <p>Collaborative and Cooperative learning: Students should work on as individual work. The research and learning to be shared with the class.</p>
Assessment Details (both CIE and SEE)	
<p>The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.</p>	
Continuous Internal Evaluation:	
Three Unit Tests each of 20 Marks (duration 01 hour 30 min)	
<ol style="list-style-type: none"> 1. First test at the end of 5th week of the semester 2. Second test at the end of the 10th week of the semester 3. Third test at the end of the 13th week of the semester. 	
Two assignments each of 10 Marks	
<ol style="list-style-type: none"> 4. First assignment at the end of 4th week of the semester 5. Second assignment at the end of 9th week of the semester 	
Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 20 Marks(duration 01 hours)	
<ol style="list-style-type: none"> 6. At the end of the 13th week of the semester 	
The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be scaled down to 50 marks	
Semester End Examination:	
Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (duration 03 hours)	
<ol style="list-style-type: none"> 1. The question paper will have ten questions. 2. Each full question is for 10 marks. 3. There will be 2 full questions (with a maximum of four sub questions in one full question) from each module. 4. Each full question with sub questions will cover the contents under a module. 5. Students will have to answer 5 full questions, selecting one full question from each module. 	

Suggested Learning Resources:**Books**

Planning for Climate Change ed by SiminDavoudi, Jenny Crawford, AbidMehmood, 2009 Earth Scan
 An urban approach to climate sensitive design by Rohinton emmanuel 2005 Span press
 Ecological Urbanism ed by Mohsen Mostafavi et al, 2016, Lars Mueller
 The ecoedge- Urban design challenges in building sustainable cities ed by Esther Charles worth et al 2011
 Routledge

Web links and Video Lectures (e-Resources):

NPTel Lecture

<https://www.youtube.com/watch?v=RSnNrQUTeNY&list=PLyqSpQzTE6MkG-Lwpb4UUxYUQ-garG1>
<https://www.youtube.com/watch?v=2B7DhQvL8kw&list=PLwdnzlV3ogoVGSUhx4VzW-dGz7DqQFoj>

Web Link https://onlinecourses.nptel.ac.in/noc19_ce44/preview

Skill Development Activities Suggested

- Guest Lecture from expert.
- Site visits to new rural urban projects and typologies in a city.

Course Outcomes

Sl. No.	Description	Blooms Level
CO1	Students will be able to understand Cities as a center of Human Economic Activity with a significant ecological impact but strong sociological benefits.	
CO2	Being able to clearly recognize the idea of sustenance of an urban center depends as much on itself and its physical regional roots to potentially seeing the need for something more to secure its own future through trade and economic relations.	
CO3	Being able to quantify impact, calculate the difference in energy and resource balance as an input / output scenario and identifying the Urban area's ecological debt in terms of economic need - such as how much energy, tons of food etc. that need to be supplied to sustain it and how much area of forest/farms/ rivers etc. are needed to keep it alive.	
CO4	Applying the knowledge on smaller examples to see how one community can be planned/developed and investigate what impact or regional dependence it will need to have.	

Program Outcomes of the SHH/SA Program:

Sl. No.	Description	POs
1	Understanding the correlation and mitigation of resources between rural and urban.	PO1
2	Exposing the student to projects based in cities and rely on non urban resources.	PO2
3	Develop skill to collate data and perspectives from several stakeholders.	PO3

Mapping of COS and POS

	PO1	PO2	PO3
CO1	M	L	M
CO2	H	L	L
CO3	H	L	L
CO4	H	L	L
CO5	H	M	M

H - High , M - Medium, L - Low

I - SEMESTER

COMMUNITY, NATURE AND LIVABILITY			
Course Code	22ASH15	CIE Marks	50
Teaching Hours/Week (L:P:SDA)	01:00:00	SEE Marks	50
Total Hours of Pedagogy	3*16= 48	Total Marks	100
Credits	3	Exam Hours	3
Course Learning objectives:			
The Course aims to use the scale of a community to study aspects of sustainability and how codependency is critical to achieving a balance between economic activity planned and the nature around it, while focusing on livability.			
Module-1			
Livability, Interdependency and Quality			
Understanding Livability as a science and an appreciation of the needs and wants of the human population pegged on the idea that a certain quality life is expected by all.			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-2			
Livability : an evolving concept			
Looking at Livability as an evolving concept from the time of Hunter-gatherers to the tech-enabled world, with a potential to keep changing with the times.			
Teaching-Learning Process	<p>Direct method: : Lectures and discussions to introduce the concepts.</p> <p>ICT and Digital support: : Power point presentation to elaborate more on key topics.</p>		
Module-3			
Communities and Social Constructs – Defining different nuances of livability			
Realizing the importance of Communities and their social constructs and how this defines social strata, level of service and infrastructure development planning			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</p> <p>Blended learning: Power point presentation to elaborate more on key topics.</p>		
Module-4			
Economic Drivers			
Understanding the economic drivers of a community, their importance and impact, recognizing disparities and the roles of the primary and supporting economic drivers.			
Realizing Nature as the primary resource industry for urbanization initially, then leads to diversification due to improved lifestyle demands and choices that arise from economic growth and trade.			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts., Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same</p> <p>Blended learning: Power point presentation and webinars.</p>		

Module-5		
Ecological Balances		
Eventually looking at Nature today as a displaced and curated entity in an Urban setting and how balancing its presence and its natural systems need to be achieved.		
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</p> <p>Collaborative and Cooperative learning: Students should work on as individual work. The research and learning to be share with the class.</p>	
Assessment Details (both CIE and SEE)		
The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.		
Continuous Internal Evaluation:		
<ul style="list-style-type: none"> • Three Unit Tests each of 20 Marks (duration 01 hour 30 min) • First test at the end of 5th week of the semester • Second test at the end of the 10th week of the semester • Third test at the end of the 13th week of the semester. 		
Two assignments each of 10 Marks		
First assignment at the end of 4th week of the semester		
Second assignment at the end of 9th week of the semester		
Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 20 Marks(duration 01 hours)		
At the end of the 13th week of the semester		
The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be scaled down to 50 marks.		
Question paper pattern:		
<ul style="list-style-type: none"> • The question paper will have ten questions. • Each full question is for 10 marks. • There will be 2 full questions (with a maximum of four sub questions in one full question) from each module. • Each full question with sub questions will cover the contents under a module. • Students will have to answer 5 full questions, selecting one full question from each module 		
Web links and Video Lectures (e-Resources):		
NPTEL Lecture		
https://www.youtube.com/watch?v=RSnNrQUTEnY&list=PLyqSpQzTE6M k G-Lwpb4UUxYUQ-garG1		
https://www.youtube.com/watch?v=2B7DhQvL8kw&list=PLwdnzlV3ogoVGSUhx4VzW-dGz7DqQFoj		
Web Link https://onlinecourses.nptel.ac.in/noc19_ce44/preview		
Course Outcomes		
Sl. No.	Description	Blooms Level
1	Students will be able to understand urbanization as a need for economic interdependence between communities arising out of an inability to sustain themselves in an isolated manner purely from the riches of the earth - agricultural, mineral and other natural wealth available.	
2	Looking at prosperity as an enabler to improve lifestyle independently - disconnected from nature and community, but not necessarily livability.	
3	Being able to recognize that Livability is a balanced outlook, and not a purely material understanding, and quality of life is about providing economic opportunity while staying connected to nature and community.	
4	Understanding Social stratification and Social consciousness that leads to evolving outlooks on sustainability and the need for sustenance. The idea of existence in time - a lifestyle vs. timeless existence - a culture.	

5	Evaluating communities and their social compositions and how this affects livability, access to infrastructure and the idea of a basic level of service expectation for communities to achieve sustainability.	
Program Outcomes of SHH/SA Program		
Sl. No.	Description	POs
1	To be able to comprehend the interdependency of all its stakeholders, in order to understand sustainability	PO1
Skill Development Activities Suggested		
<ul style="list-style-type: none"> • Guest Lecture from expert. • Site visits to major construction sites to understand the site setup process and managing constructionWastes, auditing, and reclamation 		
Mapping of COS and POS		
		PO1
C01		H
C02		H
C03		H
C04		H
C05		H
H High, M Medium , L Low		

I - SEMESTER**ECOLOGICAL DESIGN AND TECHNIQUES**

Course Code	22ASH16	CIE Marks	50
Teaching Hours/Week (L:P:SDA)	01:01:01	SEE Marks	50
Total Hours of Pedagogy	3 * 16 Hrs = 48 hrs	Total Marks	100
Credits	02	Exam Hours	3

Course Learning objectives:

The Course aims to introduce design of habitable environments that are in sync with nature and the ecological context of a development.

Module-1

Introduction:

Introduction to Climatic Design and the principles of designing with nature - Active and Passive Design.

Teaching-Learning Process

Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts
Blended learning: Power point presentation and webinars.

Module-2

Revisiting natural ventilation systems, wind directions, wind scoops and wind energy
Understanding Solar Gain, mitigating heat gain, use of energy storage devices, generating solar energy, Solar shading and solutions to managing better access to light, light wells and use of reflected light.

Teaching-Learning Process

Direct method : : Lecture supported by conventional method of Blackboard and chalk to introduce the concepts
ICT and Digital support: : Power point presentation to elaborate more on key topics.

Module-3

Material selection and sourcing - local resources and palettes, availability by region.
Analysis of Design - Introduction to digital design analysis and software tools: Shading studies, Solar radiation studies, Lighting studies, Wind studies ,other simulations and studies

Teaching - Learning Process

Direct method: Lecture supported by conventional method and introduction of analytical softwares to assess heat gain and air movement.
Blended learning: Power point presentation to elaborate more on key topics.

Module-4

Analyze, Design and validate different opening conditions using available software's to understand scientific approach.

Teaching-Learning Process

Direct method: Lecture supported by conventional method and introduction of analytical softwares to assess heat gain and air movement.
Blended learning: Power point presentation to elaborate more on key topics.

Module-5	
Preserving nature and its integrity, while pursuing development in a responsible manner Optimizing Active interventions and increasing passive response to reduce impact.	
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</p> <p>Collaborative and Cooperative learning: Students should work on as individual work. The research and learning to be share with the class.</p>
<p>Assessment Details (both CIE and SEE)</p> <p>The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.</p> <p>Continuous Internal Evaluation:</p> <p>Three Unit Tests each of 20 Marks (duration 01 hour 30 min)</p> <ol style="list-style-type: none"> 1. First test at the end of 5th week of the semester 2. Second test at the end of the 10th week of the semester 3. Third test at the end of the 13th week of the semester <p>Two assignments each of 10 Marks</p> <ol style="list-style-type: none"> 4. First assignment at the end of 4th week of the semester 5. Second assignment at the end of 9th week of the semester <p>Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 20 Marks(duration01 hours)</p> <ol style="list-style-type: none"> 6. At the end of the 13th week of the semester <p>The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be scaled down to 50 marks.</p> <p>Semester End Examination:</p> <p>. Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (duration 03 hours)</p> <ol style="list-style-type: none"> 1. The question paper will have ten questions. 2. Each full question is for 20 marks. 3. There will be 2 full questions (with a maximum of four sub questions in one full question) from each module. 4. Each full question with sub questions will cover the contents under a module. 5. Students will have to answer 5 full questions, selecting one full question from each module. <p>The students have to answer 5 full modules, selecting one full question from each module. Marks scored by the student will be scale down to 50 Marks</p>	

Suggested Learning Resources:**Books**

1. Building to suit the climate – a handbook. Gerhard Hausladen, Petra Liedl , Birkhauser Architecture 2012
Emmanuel Rohinton. 2005: An Urban Approach to climate sensitive design – strategies for the tropics.
Spon Press
2. Konya Allan and Vandenberg Maritz. 2011: Design primer for hot climates. UK: Archimedia Press
3. Hyde Richard. 2000: Climate responsive Design – study of buildings in moderate and hot humid climate.
Spon Press.

Web links and Video Lectures (e-Resources):

NPTEL Lecture

<https://www.youtube.com/watch?v=rz30rRfManE&list=PLdj5pVg1kHiOypKNUmO0NKOfvoIThAv4N>

Web Link

https://onlinecourses.nptel.ac.in/noc22_ge08/preview**Skill Development Activities Suggested**

- Guest Lecture from expert.
- Attending webinars.

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

Sl. No.	Description	Blooms Level
CO1	Students will be able to understand design responses to climatic contexts at a building level as well as community and larger planning levels.	
CO2	Students shall be able to differentiate between different ecological factors and developing a repertoire of design responses to them based on context, climate and local features, flora and fauna.	
CO3	Understand that larger Urban solutions may differ from smaller individual designs as they may respond much more to terrain, regional water and catchment solutions as well as infrastructure planning and connectivity.	
CO4	Students will be able to recognize and evaluate the use of natural resources and naturally occurring solutions to the advantage of the place while creating added impact in design	

Program outcomes of SHH/SA course

Sl. No.	Description	POs
1	The student will be able to understand how to mitigate between natural environments and development.	PO1
2	They will be introduced to climate design that integrates principals of active and passive design.	PO2

Mapping of COS and POS

	PO1	PO2
CO1	H	M
CO2	H	M
CO3	H	M
CO4	H	0

I SEMESTER**DIALOGUE BASED AUGMENTED CASE STUDY**

Course Code	22ASH17	CIE Marks	100
Teaching Hours/Week (L:P:SDA)	01:02:01	Term work	--
Total Hours of Pedagogy	3hrs *16 = 48 hrs	Total Marks	100
Credits	3		

Course Learning objectives:

The Course is designed as a forum for dialogue and critical thinking, with a focus on promoting engagement, action and change from the grassroots. The core aim is to develop arguments from multiple perspectives on specific case studies identified by students - to develop, modify and change the narrative to improve sustainability.

Module-1

Dialogue is the gateway to change and having a healthy and constructive one is important to ensure clear presentation of ideas, and translation of ideas into reality.

Developing understanding of multiple perspectives on a megaproject identified as a case study will provide for arguments and critical thinking around all aspects of the project. The idea of an "augmented" case study is to go beyond the facts and look at the areas for improvement of sustainable practices

Teams of 3-4 students will develop and present detailed case studies of projects and present a sustainability analysis and evaluation system for the project. The Evaluation system will have inputs from the Value Propositions Management course to ensure that the ideas can be applied to existing and live projects as well.

Teaching-Learning Process

Blended learning: Power point presentation and webinars.

Assessment Details (both CIE and Viva voce)

The weightage of Continuous Internal Evaluation (CIE) is 100%. The minimum passing mark for the CIE is 50% of the maximum marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% of the CIE (Continuous Internal Evaluation).

Continuous Internal Evaluation:

CIE marks shall be awarded by a committee comprising of Principal/Dean, PG Course Coordinator/HOD and Guide/Co-guide of the department. The CIE marks awarded for MC (Mandatory Course), shall be based on the progress of the student throughout the semester, presentation skills in seminars and submission of the report.

Semester End Examination:

Viva-voce Examination:

The student needs to submit his/her report done throughout the semester, including the data collection for the Viva examination, at least one day prior to the Viva examination to the PG course coordinator/HOD.

The term work will be evaluated by external examiners appointed by the University along with PG Course coordinator/guide/ co-guide or an internal examiner.

The term work marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution.

Course Learning Outcomes:

Sl. No.	Description	Blooms Level
CO1	The students will be able to evaluate and identify areas of improvement creating opportunities to develop solutions through dialogue for each of the "Stakeholders" through role play.	
CO2	Students will be able to develop ability to argumentatively stand ground for key sustainable initiatives and show and prove the value propositions associated with choices being made.	
CO3	The role play aspect will ensure an understanding of the costs of such initiatives to or for other stakeholders and provide a platform for developing consensus and tradeoffs.	

Program Outcome for SHH/SA:

Sl. No.	Description	POs

Web links and Video Lectures (e-Resources):

Video Tutorial https://www.youtube.com/watch?v=5v_42_4Vl2o
Web Link https://www.tutorialspoint.com/ms_project/index.htm

Skill Development Activities Suggested

- Guest Lecture from expert.
- Attending webinars.

Mapping of COS and POS

	P01	P02	P03	P04	P05	P06	P07	P08
C01	H	M	L	H	0	L	L	0
C02	H	0	L	H	0	L	L	0
C03	H	0	L	H	0	L	L	0
C04	H	0	L	H	0	0	L	0
C05	H	0	L	H	0	0	L	0

H - High, M - Medium, L - Low

I - SEMESTER

AUDIT COURSE- I			
A. URBAN DESIGN & INFRASTRUCTURE			
Course Code	22ASH18A	CIE Marks	--
Teaching Hours/Week (L:P:SDA)	--	Viva Marks	--
Total Hours of Pedagogy	--	Total Marks	--
Credits	--		
Course Learning objectives:			
This audit course aims to develop an understanding of design of public infrastructure and the associated urban design facilities for sustainability - how urban design promotes better use of and access to infrastructure.			
Module-1			
Introduction:			
Urban design has always been seen as a magnet for and activator for public spaces and infrastructure. Development of a method for infrastructure-centered publicness in the design of urban public space by looking into the relationship between infrastructure and public space, changes in the concept of publicness in the age of globalization and personalization			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-2			
Use of Urban design in the context of public safety - view to the street, CCTV, security and activity define safe cities and clarify the role of urban planning and design and their elements on safe cities. Importance of planning and design elements that reduce the opportunities for crime like: street planning, land use, building density, and role of management and good governance, in addition to urban design concepts. Use of Urban design for promoting a healthy and active lifestyle in public spaces and parks. Natural corridors and environments in urban and suburban areas, along with recreational, transportation and nature education opportunities for urban residents			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-3			
Urban Mobility and the development of a whole pedestrian ecosystem with dense neighborhoods. intelligent networking of vehicles, mobility models, Better public transport systems, Networked traffic systems			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-4			
Connected cities and access to amenities and public conveniences, to shape cities so they connect the local populations with their environment. Collaborative effort that spans architecture, public space, sustainability, social equity, transportation and other aspects of city life			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		

Module 5	
Digital lifestyle, connectivity and continuity of virtual experience and attention span changes and the design responses needed to deal with a connected world. Smart technology as the base of futuristic design, Practical implications of technology in urbanization, New modes of transport and energy sources	
Teaching-Learning Process	<i>Blended learning: Power point presentation and webinars.</i>
Assessment Details Attendance is mandatory for the course.	
Suggested Learning Resources:	
Books	
<ol style="list-style-type: none"> 1. The eco edge - Urgent design challenges in building sustainable cities by Esther Charlesworth, Rob Adams;2013Routledge 2. UDPMI Guidelines, Part I and Part II, 1996, Ministry of Urban development and Poverty Alleviation, Government of 3. India. 4. Douglas Farr 'Sustainable Urbanism Urban Design With Nature' 2007 5. Carmona Mathew et al, 'Public Places Urban Spaces- The Dimensions of Urban Design',2003 	
Web links and Video Lectures (e-Resources):	
Video Tutorial https://www.youtube.com/watch?v=0LNklcBhl_Q&list=PLp6ek2hDcoNCb0R8gk1WzpTN94eXs9vb	
Web Link https://guides.smartbuildingsacademy.com/building-automation-system	
Skill Development Activities Suggested	
<ul style="list-style-type: none"> • Guest Lecture from expert. Attending webinars. 	
Course Learning Outcomes:	
<ol style="list-style-type: none"> 1. Students will be able to recognize that urban design is needed to engage better with the public in giving them a full range of experiences to use public infrastructure 2. Students will be able to create solutions that will drive improved footfalls in retail districts and Transit Oriented Development areas that will improve use of public transport, and reduce last mile travel solutions. 3. Understanding that changing lifestyles will mean people's responses to external stimuli are changing, workplaces can be in the open, and public social engagement becomes important to urban dwellers to maintain real world social connections, while still being connected virtually. 4. Students will be to generate impactful solutions that reflect that - More time on hand improves productivity and social engagement in other activities for people. 5. Ensuring Security and Safety as areas of utmost importance - Passive and active solutions for monitoring and management. 	

I SEMESTER

AUDIT COURSE - II			
B. IMPACTS OF REAL ESTATE			
Course Code	22ASH18B	CIE Marks	--
Teaching Hours/Week (L:P:SDA)	00:00:00	SEE Marks	--
Total Hours of Pedagogy	--	Total Marks	--
Credits	--	Exam Hours	--
Course Learning objectives:			
This audit course aims to develop an understanding of the impact of real estate development. The idea of price sensitive development and associated impacts on sustainable development. Current challenges in terms of technology, response to problems at different scale of developments and price points in India.			
Module-1			
Why are all buildings the same in the residential space, and is there any real value proposition related to price points - or is it just the difference only in land values?			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-2			
Understanding the market and its response to changes in value of products - pure price to a value proposition. Are there such market differentiators? How many players in the market have a unique proposition that is significantly different?			
Teaching-Learning Process	<p>Direct method: Lecture supported by the conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research news paper reading and inferences from the same.</p> <p>Blended learning: Powerpoint presentation and webinars.</p>		
Module-3			
Is sustainable design a value proposition to the investor - as a social cause, a lifestyle mantra or is it seen in terms of a price point as being something additional?			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-4			
As a Real Estate Professional - the costs of being sustainable and the commitments towards it from a time and investment perspective.			

<p>Teaching-Learning Process</p>	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</p> <p>Blended learning: Power point presentation and webinars.</p>
<p>Module-5</p>	
<p>Legal obligations towards sustainable design from code compliances, permits and infrastructure standpoint.</p>	
<p>Teaching-Learning Process</p>	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</p> <p>Blended learning: Power point presentation and webinars.</p>
<p>Assessment Details</p>	
<p>Attendance is mandatory for the course.</p>	
<p>Suggested Learning Resources:</p>	
<p>Chambers Robert. Can we know better – reflections for development. Routledge Handbook of Sustainable</p>	
<p>Course Learning Outcomes:</p>	

II-SEMESTER

INTEGRATED SUSTAINABLE STUDIO - II			
Course Code	22ASH21	CIE Marks	50
Teaching Hours/Week(L:S:SDA)	05:05:05	Viva Marks	50
Total Hours of Pedagogy	10*16 = 160 hrs	Total Marks	100
Credits	10	Exam Hours	Min 30 mins/Student
<p>Course Learning objectives:</p> <ul style="list-style-type: none"> To provide a solution based on value position using ecological architecture design principle. To value and rate a building against rating system To provide necessary analysis as proof for the targeted rating system such as product information, source of material, product composition, energy consumption, day lighting analysis, ventilation and cooling load assessment etc. <p>The students will develop a design solution that is sustainable on a medium scale that looks at it as a team exercise of 2-4 persons. The project will aim to provide a design solution that addresses the above three objectives.</p>			
Module			
<ol style="list-style-type: none"> The project will be a small scale building and has to be designed keeping in mind ecological architectural design principles. Goals to be set by the students for the programmatic and sustainability aspect of the project and have to be validated and approved by the staff. Project deliverables: <ol style="list-style-type: none"> Benchmarking case study. Business plan, environmental response plan, livability index Target for rating system and evidence to substantiate the claim. 			
Teaching-Learning Process	<p>Teaching Process</p> <ol style="list-style-type: none"> Do a benchmarking case study for similar projects locally and from around the world - and submit (2 weeks) Develop a business plan, an environmental response plan and livability index on a measurable scale as a rating for the project (3 weeks) Create a design solution that will satisfy as much of the key goals of the project. (5 weeks) Present the target against the select rating system for archiving a benchmark rating for the project (1 week) Provide supplementary evidence through software and calculation based analysis for the project to substantiate the claim. (2 week) Provide a brochure for the project, present the submission for certification for rating system and a pitch for the project to win over client and investor. (2 week). 		
<p>Assessment Details (both CIE and SEE)</p> <p>The weightage of Continuous Internal Evaluation (CIE) is 50% and for Viva voce is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in Viva is 50% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and Viva-Voce taken together.</p> <p>Continuous Internal Evaluation:</p> <p>CIE marks shall be awarded by a committee comprising of Principal/Dean, PG Course Coordinator/ HOD and Guide/ Co-guide of the department. The CIE marks awarded for PSC(professional supportive course),shall be based on the progress of the student throughout the semester, presentation skills in seminars and submission of the report.</p>			

Viva voce Examination:

5.The student needs to submit his/her report done throughout the semester, including the data collection for the Viva examination, at least one day prior to the Viva examination to the PG course coordinator/HOD.

6.The exam shall be conducted as a panel jury exam which shall be minimum of 30 mins/student, where the student shall present the works in form of sheets.

7.Discussions, presentation and the studies should cover all the topics.

Suggested Learning Resources:**Books**

- Sustainable Design Architecture, Planning, and Ecology by Orr, David W., Williams, Wiley; 1st edition.
- Greening Asia – emerging principles for sustainable architecture. Singapore: BCI Asia.

Web links and Video Lectures(e-Resources):

NPTEL Lecture -Inputs to scheduling:<https://youtu.be/psls4kgau8c>

Work Breakdown Structure in project managementhttps://www.youtube.com/watch?v=9mOXdcgdf_U

Course Outcomes

At the end of the course the student will be able to:

Sl. No.	Particulars	Blooms Level
C01	Students will be able to formulate the project viable for achieving rating against specific system like IGBC and GRIHA.	M
C02	The aim will be to test the design skill balance between passive and active design to tackle issues related to ecological design	M
C03	Students will be able to analysis and test the performance of the design, which shall exhibit ecological skills using software and an understandings of proof of concept and technical competence.	H

Program Outcome of the SH/SA Program

Sl. No.	Particulars	POs
1	The design project will take them through a whole project journey from formulation of a project idea to taking it to market, evaluating it and presenting it to customers and the client management team.	PO1
2	The aim is to understand effectively the process, analyzing the changing circumstances and findings along the way.	PO2
3	To realize that the goals set at the beginning may have to change and evolve and be interpreted differently by the time the project solution is arrived at, but that the goals are still achievable to a large extent.	PO3
4	The importance of measurable outcomes and justifiable decisions on projects related to sustainable design.	PO4

Mapping of COS and POS

	PO1	PO2	PO3	PO4
C01	H	M	L	H
C02	H	L	M	L
C03	H	L	M	L

H – High , M – Medium, L - Low

II - SEMESTER

VALUE PROPOSITION MANAGEMENT & ANALYTICAL TECHNIQUES			
Course Code	22ASH22	CIE Marks	50
Teaching Hours/Week (L:P:SDA)	03:00:00	SEE Marks	50
Total Hours of Pedagogy	3*16=48	Total Marks	100
Credits	03	Exam Hours	3
Course Learning objectives: The Course aims to create the awareness of the need to show measurable impact for decision makers and to be able to discern value and impact of decisions in multiple ways to evaluate sustainable solutions.			
Module-1			
Understanding holistic value - as being more than monetary and linked to long term benefits that are less tangible. The idea that intangibles can be evaluated through certain metrics as well and to arrive at such methods and principles for structuring that comparative analysis			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. Discussions, Debate, Industry interactions, and research paper/newspaper reading and inferences from the same.</p> <p>Blended learning: Power point presentation, expert lectures and webinars.</p>		
Module-2			
Introduction to evaluation through rubrics and analytical models for comparison and understanding of variables that can be used for presenting an argument. Economics - direct capital costs, cost of financing, terms of borrowing, O&M costs, cash flow, returns on investment, impact on developer / financing institution / end user, life cycle costs Ecology - CO2 absorption, green area and typology, native species, air quality indices, carbon footprints, water quality, soil fertility, waste evaluation, biodiversity, embedded energy etc. Livability - Improved health parameters, improvement in productivity, Happiness index, social engagement, level of fitness, education and engagement, utilization of time for leisure etc			
Teaching-Learning Process	<p>Direct method: Lecture supported by the conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research news paper reading and inferences from the same.</p> <p>Blended learning: PowerPoint presentation, expert lectures and webinars.</p>		
Module-3			
Creating a balanced Evaluation chart for a project as test case to conduct evaluations against decisions Understanding that each component can change the whole balance across the matrix.			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-4			
Review and understand standardized scoring and evaluation systems of various green building rating systems across the world such as GRIHA, LEED, WELL, GREENMARK, LIVEABLE CITIES and others. Management Decision making and how its driven by objective and clear facts to showcase value.			

Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</p> <p>Blended learning: Power point presentation and webinars.</p>
Module-5	
Management controls and systems for monitoring and evaluation for projects and progress to showcase to investors, customers etc. and to ensure tracking and alignment with core values	
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</p> <p>Blended learning: Power point presentation and webinars.</p>
<p>Assessment Details (both CIE and SEE)</p> <p>The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.</p> <p>Continuous Internal Evaluation:</p> <p>Three Unit Tests each of 20 Marks (duration 01 hour 30 min)</p> <ol style="list-style-type: none"> 1. First test at the end of 5th week of the semester 2. Second test at the end of the 10th week of the semester 3. Third test at the end of the 13th week of the semester <p>Two assignments each of 10 Marks</p> <ol style="list-style-type: none"> 4. First assignment at the end of 4th week of the semester 5. Second assignment at the end of 9th week of the semester <p>Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 20 Marks(duration 01 hours)</p> <ol style="list-style-type: none"> 6. At the end of the 13th week of the semester <p>The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be scaled down to 50 marks</p> <p>Semester End Examination:</p> <p>Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (duration 03 hours)</p> <ol style="list-style-type: none"> 1. The question paper will have ten questions. Each question is set for 20 marks. 2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module. <p>The students have to answer 5 full modules, selecting one full question from each module. Marks scored by the student will be scale down to 50 Marks.</p>	
<p>Suggested Learning Resources:</p> <p>Books</p> <ol style="list-style-type: none"> 1. GRIHA; Griha Manual, Vol 1 to 5,TERI Publication 2. IGBC Manuals, CII Publication 3. LEED Manuals 4. ECBC Manual 5. Mehta M ; Commentary on water and air pollution with environmental protection law 	

Web links and Video Lectures (e-Resources):			
Video Tutorial https://www.youtube.com/watch?v=0LNklcBhl_Q&list=PLp6ek2hDcoNCb0R8gk1WzpTN94eXs9vb			
Web Link https://guides.smartbuildingsacademy.com/building-automation-system			
Skill Development Activities Suggested			
<ul style="list-style-type: none"> • Guest Lecture from expert. • Attending webinars. 			
Course outcome (Course Skill Set)			
At the end of the course the student will be able to:			
Sl. No.	Particulars	Blooms Level	
C01	Student will be able to evaluate and develop constructive metrics for objective decision making.		
C02	Student will be able to create and design evaluation systems with a holistic understanding of impact.		
C03	Understanding the pros/cons of various standardized evaluation systems.		
C04	Knowing value additions with tangible benefits to end user and client is more important for sustainability than simplistic standardized certification.		
C05	Looking at creating custom solutions for clients/end users to present their case strongly for sustainability and defend justifiable decision making using objective metrics.		
C06	Students will be able to make Management decision, justification of stand and progress to investors and customers, and being able to prove and ensure being on track for goals set for the project.		
Program Outcome of the SH/SA Program			
Sl. No.	Particulars	POs	
1.	Choice of evaluation methods seeking balanced sustainable benefits that are long term and not based on certification.		
2.	To take position of an approach and be able to stand by it.		
3.	Management of customized solutions to ensure completion of goals set for the project.		
Mapping of COS and POS			
	PO1	PO2	PO3
C01	H	L	L
C02	H	L	L
C03	H	M	M
C04	H	M	0
C05	H	M	L
C06	H	L	L
C07	H	M	L
H - High , M - Medium, L - Low			

II SEMESTER

ECOLOGICAL ARCHITECTURE			
Course Code	22ASH23	CIE Marks	50
Teaching Hours/Week (L:P:SDA)	03:00:00	SEE Marks	50
Total Hours of Pedagogy	3*16=48	Total Marks	100
Credits	03	Exam Hours	3
Course Learning objectives: The Course is designed to showcase ecologically friendly and responsive architectural designs, taking forward from the techniques learnt in the previous semester.			
Module-1			
Understanding Ecological Architecture and Application of techniques of Ecological Architecture in sample sites and specific locations			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-2			
Analysis of performance based metrics for comfort, light, humidity, temperature and air movement. Utilization of value proposition techniques to understand choices being made in terms of capital investment in passive solutions and aesthetic choices in comparison to the cost of maintaining comfort through use of active systems, through testing specific comparable solutions to understand potential extremes			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-3			
Group Design of a simple project such as a small 2-bed residence in the 6 different climatic zones of India to see the changes in design response and language of architecture through use of passive solutions			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts., Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-4			
Group Design of a simple 3 storey office building in the 6 different climatic zones of India, with a specific aim to understand active control systems and smart devices such as kinetic facades, rotating solar panels and active humidification systems and air conditioning			

Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same</p> <p>Blended learning: Power point presentation and webinars.</p>
Module-5	
<p>Group Design of a hybrid solution for maximum impact in development of a small 10 room guest house and club facility in a complex climatic condition that will need both active and passive systems to become completely off-grid.</p>	
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</p> <p>Blended learning: Power point presentation and webinars.</p>
<p>Assessment Details (both CIE and SEE)</p> <p>The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.</p> <p>Continuous Internal Evaluation:</p> <p>One Unit Tests each of 20 Marks (duration 01 hour 30 min)</p> <ol style="list-style-type: none"> 1. First test at the end of 5th week of the semester 2. Second test at the end of the 10th week of the semester 3. Third test at the end of the 13th week of the semester. <p>Three assignments each of 20 Marks</p> <ol style="list-style-type: none"> 4. First assignment at the end of 4th week of the semester 5. Second assignment at the end of 9th week of the semester <p>Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 20 Marks(duration 01 hours)</p> <ol style="list-style-type: none"> 6. At the end of the 13th week of the semester <p>The sum of one test, three assignments, and quiz/seminar/group discussion will be out of 100 marks and will be scaled down to 50 marks</p> <p>Semester End Examination:</p> <p>Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (duration 03 hours)</p> <ol style="list-style-type: none"> 1. The question paper will have ten questions. Each question is set for 20 marks. 	

2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.
The students have to answer 5 full modules, selecting one full question from each module. Marks scored by the student will be scale down to 50 Marks.

Suggested Learning Resources:

Books

1. Design Ecologies- essays on nature of design by Lisa and Beth, 2010, Princeton
2. Ecological Architecture- World Classics pub by Phoenix Pub ltd, 2012
3. Building Ecology by Peter Graham 2003 Blackwell
4. The ecology of Architecture by Laura Zeiher 1996 Whitney Library

Web links and Video Lectures (e-Resources):

Video Tutorial

<https://www.youtube.com/watch?v=2B7DhQvL8kw&list=PLwdnzlV3ogoVGSUhx4VzW-dGz7DqQFoj>

Web Link

<https://lecturenotes.in/subject/202/construction-equipments-planning-and-management-cepm/note>

Skill Development Activities Suggested

- Guest Lecture from expert.
- Attending webinars.

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

Sl. No.	Particulars	Blooms Level
C01	Students will be able to understand the value of climatic response through design.	
C02	Students will be able to apply technical choices in an informed manner through object evaluation.	
C03	Being able to respond in a completely passive manner to any given problem, while also ensuring that active design solutions may be needed to compensate in some areas.	
C04	To foster the ability in formulating design briefs for projects to respond to different climates and locations using key parameters to define comfort, financial impact and environmental response	

Program Outcome of the SH/SA Program

Sl. No.	Particulars	POs
1	To take critical decisions regarding choice of active or passive systems.	PO1
2	To have the ability to formulate design brief for different climatic parameters.	PO2
3	Application of technical details of climate responsive devices	PO3

Mapping of COS and POS

	PO1	PO2	PO3
C01	H	L	L
C02	H	L	L
C03	H	L	L
C04	H	M	L

H - High , M - Medium, L - Low

II Semester- II

ACTIVISM & INNOVATION IN ECOLOGICAL PERSPECTIVES			
Course Code	22ASH24	CIE Marks	50
Teaching Hours/Week (L:P:SDA)	03:00:00	SEE Marks	50
Total Hours of Pedagogy	3 * 16 = 48	Total Marks	100
Credits	03	Exam Hours	3
The Course is designed to develop an understanding on how sustainable activism and innovation go hand in hand with the ability to use them to drive ecologically sustainable responses in simple things from operations of a business to design of cities and infrastructure projects - when a new perspective comes into play.			
Module-1			
Understanding Activism and the movement to drive awareness and bring to light problems of people and the environment.			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-2			
Looking at Innovation as a change in mode of engagement and incorporating creative approaches to project structuring, setup of management processes and evaluation systems to ensure optimal sustainable responses (rather than just technological innovation).			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-3			
Identifying opportunities within projects to create specific areas of Impact that may be aligned with UNSDGs, or other key program parameters of National and State organizations to see if they can be addressed with independent models.			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-4			
Looking at Social and Ecological subset of Infrastructure investment projects as potential opportunities in their own right - eg: development of a self-sustaining rehabilitation projects for native population in the case of building dams, highways etc., development of protected eco-sensitive areas with self-sustaining capabilities as part of larger regional and urban plans with opportunity for monetization, and promotion of research and development			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p>		

	Blended learning: Power point presentation and webinars.
Module-5	
Understanding sustainable urban farming and greening of underutilized areas of cities with sustainable business models and revenue streams.	
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>
<p>Assessment Details (both CIE and SEE)</p> <p>The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.</p> <p>Continuous Internal Evaluation:</p> <p>Three Unit Tests each of 20 Marks (duration 01 hour 30 min)</p> <ol style="list-style-type: none"> 1. First test at the end of 5th week of the semester 2. Second test at the end of the 10th week of the semester 3. Third test at the end of the 13th week of the semester <p>Two assignments each of 10 Marks</p> <ol style="list-style-type: none"> 4. First assignment at the end of 4th week of the semester 5. Second assignment at the end of 9th week of the semester <p>Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 20 Marks(duration 01 hours)</p> <ol style="list-style-type: none"> 6. At the end of the 13th week of the semester <p>The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be scaled down to 50 marks</p> <p>Semester End Examination:</p> <p>Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (duration 03 hours)</p> <ol style="list-style-type: none"> 1. The question paper will have ten questions. Each question is set for 20 marks. 2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module. <p>The students have to answer 5 full modules, selecting one full question from each module. Marks scored by the student will be scale down to 50 Marks</p>	

Suggested Learning Resources:**Books**

Watts Alan.1970, 1998: Does it Matter – essays on man’s relation to materiality. California: New World Library
This changes everything by Naomi Klein 2014 Penguin

Web links and Video Lectures (e-Resources):

Video Tutorial
Safety Management
https://www.youtube.com/watch?v=Bh_LYZh3KH4
<https://www.youtube.com/watch?v=ypTiYyh7YT0>
Web Link

Skill Development Activities Suggested

- Guest Lecture from expert.
- Attending webinars.

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

Sl. No.	Particulars	Blooms Level
CO1	Students will be able to understand that social and ecological responses are not a charitable effort alone, but that significant opportunities exist to create business models around it that will allow for sustainable management and long-term security for these commitments.	
CO2	Students will be able to understand that social welfare is not limited to offering basic shelter for rehabilitated people, but ensuring a new way of life, with economic opportunities and creation of a full sustainable ecosystem around them including training, hand-holding and potential go-to market strategies for new economic activities.	
CO3	To ensure that the concept of activism is not left at awareness creation, but extended to developing sustainable solutions for action and improvement on the ground in a time bound manner to reduce impact on the lives of the people and the environment..	

Program Outcome of the SH/SA Program

Sl. No.	Particulars	POs
PO 1	To be able to mobilize the approach to sustainability with stake holders and clients	
PO2	To understand that activism is beyond basic needs but offers an opportunity to design new way of life	

Mapping of COS and POS

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H	0	L	0	0	0	L	0
CO2	H	0	L	L	0	0	L	0
CO3	H	0	0	L	0	0	L	0
CO4	H	0	L	L	0	0	L	0
CO5	H	L	L	L	L	0	L	0
CO6	H	L	L	L	L	0	L	0
CO7	H	L	0	0	0	M	M	L

H - High , M - Medium, L - Low

II - SEMESTER

GREEN BUILDINGS CONCEPT - RATING SYSTEM			
Course Code	22ASH25	CIE Marks	100
Teaching Hours/Week (L:P:SDA)	03:00:00	SEE Marks	00
Total Hours of Pedagogy	03*16=48	Total Marks	100
Credits	03	Exam	03
The Course is designed to create awareness and understanding of Green Building Rating systems, classification and understanding of why standardized ratings are needed for industries and corporate to prove their commitment to sustainability .			
Module-1			
In depth study of the Green Rating Systems from India and across the world such as GRIHA, LEED INDIA, LEED USGBC, WELL, GREENMARK and others.			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-2			
Understanding the need for third party certification and audits in such scenarios and why this becomes critical for many businesses to prove corporate commitment to investors, shareholders etc			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-3			
Implication of rated products, services and facilities to the larger industry. Issues faced by small businesses and handicraft industries in being able to get certified or registered			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-4			
Choosing between Active Systems or Passive solutions and evaluating their ability to score on a rating system for many test cases - is this choice critical to scoring to better or do they perform equally.			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same</p>		

	Blended learning: Power point presentation and webinars.
Module-5	
Going beyond the limits of a rating system to ensure client's sustainability interests.	
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts, Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same..</p> <p>Blended learning: Power point presentation and webinars.</p>
<p>Assessment Details (CIE Marks)</p> <p>The weightage of Continuous Internal Evaluation (CIE) is 100% The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 50% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.</p> <p>Continuous Internal Evaluation:</p> <p>Three Unit Tests each of 20 Marks (duration 01 hour 30 min)</p> <ol style="list-style-type: none"> 1. First test at the end of 5th week of the semester 2. Second test at the end of the 10th week of the semester 3. Third test at the end of the 13th week of the semester <p>Two assignments each of 10 Marks</p> <ol style="list-style-type: none"> 4. First assignment at the end of 4th week of the semester 5. Second assignment at the end of 9th week of the semester <p>Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 20 Marks(duration 01 hours)</p> <ol style="list-style-type: none"> 6. At the end of the 13th week of the semester <p>The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks.</p>	
<p>Suggested Learning Resources:</p> <p>Books</p> <p>GRIHA; Griha Manual, Vol 1 to 5,TERI Publication</p> <p>IGBC Manuals, CII Publication</p> <p>LEED Manuals</p>	
<p>Web links and Video Lectures (e-Resources):</p> <p>Video Tutorial</p> <p>https://www.youtube.com/watch?v=Rk1OF2qB5Ag&list=PLccFEq6jzqernMuP0HmlsGz37Tm9T7vg0</p> <p>Web Link</p> <p>https://cementconcrete.org/building-construction/functional-components-building-structure/3246/</p>	
<p>Skill Development Activities Suggested</p> <p>Guest Lecture from expert.</p> <p>Attending webinars.</p>	

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

Sl. No.	Particulars	Blooms Level
C01	Students will be able to understand various rating systems and their applications and working mechanisms, evaluation criteria and rubrics.	
C02	Students will be able to analyse and evaluate the corporate commitment vs. small industry needs and understanding how to incorporate and preserve traditional methods and solutions and engage the handicraft industry and artisans effectively while ensuring rating requirements are met.	
C03	Students will be able to understand that sometimes Rating systems cannot address all needs, and that a Client's needs outweigh the systems available if they are truly committed to making a difference - using Value Proposition Management and Analytical techniques to create a trackable evaluation and monitoring system for the client that can be audited as alternative commitments for unique solutions to showcase for innovative points on a rating system or to investors and stakeholders to prove compliance and capability.	

Program Outcomes of the SH/SA Program:

Sl. No.	Particulars	POs
1	Introduction to Green rating systems as third party assessment. Its use specially for large projects	PO1
2	To assist small scale sectors to comply and commit to sustainable design decisions. This will enable students to use hybrid systems of traditional knowledge and newer mechanisms.	PO2

Mapping of COS and POS

	PO1	PO2
C01	H	0
C02	H	0
C03	H	0

H - High , M - Medium, L - Low

II - Semester

URBANISATION AND SUSTAINABILITY			
Course Code	22ASH26	CIE Marks	50
Teaching Hours/Week (L:P:SDA)	02:00:00	Term work	50
Total Hours of Pedagogy	02*16=32	Total Marks	100
Credits	02	Exam	03
Course Learning objectives: The Course is designed to understand the huge challenge that faces South, South East Asia and Central Africa as Urbanization pushes about 2 billion people out of a rural economy into Urban economies. The course addresses the aspect of sustainable economy through architectural perspective.			
Module-1			
Urbanization through migration for jobs and opportunities - a study of major metropolitan cities in India and the world.			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-2			
Urbanization through growth of rural centers and impact of a changing economy and affordability in regional centers with growing population.			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-3			
The need to manage the physical growth of larger metropolitan areas and limit their growth and increase densities to ensure better balance with their regional ecological impact. The need to allow for growth of new economies by seeding industries away from major urban centers to push growth into rural centers.			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-4			
With growing demand for food and produce, enhancing the rural economy with mechanization, food processing and improved logistics to create higher levels of economic opportunity, while improving productivity			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-5			

With growing flexibility of tech jobs and need for more construction and infrastructure in lower tier Urban areas and Rural areas, the reverse movement of population needs to be seeded for distributed growth.	
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>
<p>Assessment Details (Viva voce)</p> <p>The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 50% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.</p> <p>Continuous Internal Evaluation:</p> <p>CIE marks shall be awarded by a committee comprising of Principal/Dean, PG Course Coordinator/HOD and Guide/Co-guide of the department. The CIE marks awarded for PSC (professional supportive course), shall be based on the progress of the student throughout the semester, presentation skills in seminars and submission of the report.</p> <p>Viva voce Examination:</p> <ol style="list-style-type: none"> 1. The student needs to submit his/her report done throughout the semester, including the data collection for the Viva examination, at least one day prior to the Viva examination to the PG course coordinator/HOD 2. The term work will be evaluated by external examiners appointed by the University along with PG Course coordinator/ guide/ co-guide or an internal examiner. 3. The term work marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution. 	
<p>Suggested Learning Resources:</p> <p>Books</p> <p>Saskia Sassen. 2001: The global City. Princeton Uni press Sustainable Infrastructure by Charles Ainger 2014 ICE London Sustainable Residential Development: Planning and Design for Green Neighborhoods, Avi Friedman. McGraw-Hill, New York, 2007</p>	
<p>Web links and Video Lectures (e-Resources):</p> <p>Video Tutorial https://www.youtube.com/watch?v=c6GbkT10hZ8</p> <p>Web Link https://mindmajix.com/primavera-p6-tutorial</p>	

Skill Development Activities Suggested		
<ul style="list-style-type: none"> • Guest Lecture from expert. • Attending webinars. 		
Course outcome (Course Skill Set)		
At the end of the course the student will be able to:		
Sl. No.	Particulars	Blooms Level
CO1	Challenges of Urbanisation through migration impacting sustainable growth	
CO2	Identifies architectural means to address sustainable economy	
Program Outcomes of the SH/SA Program:		
Sl. No.	Particulars	POs
1	Real time understanding of urbanization impacting economy that can be addressed through architecture.	PO1
Mapping of COS and POS		
		PO1
CO1		H
CO2		H
H - High , M - Medium, L - Low		

II-SEMESTER

RESEARCH METHODOLOGY & IPR			
Course Code	22ASH27	CIE Marks	50
Teaching Hours/Week (L:P:SDA)	01:01:01	Viva Marks	50
Total Hours of Pedagogy	3*16=48 hours	Total Marks	100
Credits	02	Exams	03
<p>Course Learning objectives:</p> <p>To understand the meaning of research. Types and research approaches</p> <p>To develop understanding of conducting literature review, its methodology and reviewing the Existing literature.</p> <p>To familiarize about sampling techniques and data collection methods.</p> <p>To study about testing of hypothesis.</p> <p>To learn about interpreting the data and report writing.</p>			
Module-1			
<p>Research Methodology: Introduction, Meaning of Research, Objectives of Research, Motivation in Research, Types of Research, Research Approaches, Significance of Research, Research Methods versus Methodology, Research and Scientific Method, Importance of Knowing How Research is Done, Research Process, Criteria of Good Research, and Problems Encountered by Researchers in India.</p> <p>Defining the Research Problem: Research Problem, Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem, An Illustration</p>			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-2			
<p>Reviewing the literature: Place of the literature review in research, Bringing clarity and focus to your research problem, Improving research methodology, Broadening knowledge base in research area, Enabling contextual findings, How to review the literature, searching the existing literature, reviewing the selected literature, Developing a theoretical framework, Developing a conceptual framework, Writing about the literature reviewed.</p> <p>Research Design: Meaning of Research Design, Need for Research Design, Features of a Good Design, Important Concepts Relating to Research Design, Different Research Designs, Basic Principles of Experimental Designs, Important Experimental Designs</p>			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-3			
<p>Design of Sampling: Introduction, Sample Design, Sampling and Non-sampling Errors, Sample Survey versus Census Survey, Types of Sampling Designs.</p> <p>Measurement and Scaling: Qualitative and Quantitative Data, Classifications of Measurement Scales, Goodness of Measurement Scales, Sources of Error in Measurement Tools, Scaling, Scale Classification Bases, Scaling Techniques, Multidimensional Scaling, Deciding the Scale.</p> <p>Data Collection: Experimental and Surveys, Collection of Primary Data, Collection of Secondary Data, Selection of Appropriate Method for Data Collection, Case Study Method</p>			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		

Module-4	
<p>Testing of Hypotheses: Hypothesis, Basic Concepts Concerning Testing of Hypotheses, Testing of Hypothesis, Test Statistics and Critical Region, Critical Value and Decision Rule, Procedure for Hypothesis Testing, Hypothesis Testing for Mean, Proportion, Variance, for Difference of Two Mean, for Difference of Two Proportions, for Difference of Two Variances, P-Value approach, Power of Test, Limitations of the Tests of Hypothesis.</p> <p>Chi-square Test: Test of Difference of more than Two Proportions, Test of Independence of Attributes, Test of Goodness of Fit, Cautions in Using Chi Square Tests</p>	
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>
Module-5	
<p>Interpretation and Report Writing: Meaning of Interpretation, Technique of Interpretation, Precaution in Interpretation, Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Types of Reports, Oral Presentation, Mechanics of Writing a Research Report, Precautions for Writing Research Reports.</p> <p>Intellectual Property: The Concept, Intellectual Property System in India, Development of TRIPS Complied Regime in India, Patents Act, 1970, Trade Mark Act, 1999, The Designs Act, 2000, The Geographical Indications of Goods (Registration and Protection) Act 1999, Copyright Act, 1957, The Protection of Plant Varieties and Farmers' Rights Act, 2001, Trade Secrets, Utility Models, IPR and Biodiversity, The Convention on Biological Diversity (CBD) 1992, Competing Rationales for Protection of IPRs, Leading International Instruments Concerning IPR, World Intellectual Property Organization (WIPO), WIPO and WTO, Paris Convention for the Protection of Industrial Property, National Treatment, Right of Priority, Common Rules, Patents, Marks, Industrial Designs, Trade Names, Indications of Source, Unfair Competition, Patent Cooperation Treaty (PCT), Advantages of PCT Filing, Berne Convention for the Protection of Literary and Artistic Works, Basic Principles, Duration of Protection, Trade related Aspects of Intellectual property rights (TRIPS) agreement, covered under TRIPS agreement, features of the agreement, protection of Intellectual property under TRIPS. Copyright and related rights, trademarks, Geographical indications, Industrial Designs, Patents, Patentable Subject Matter, Rights Conferred, Exceptions, Term of protection, Conditions on Patent Applicants, Process Patents, Other Use without Authorization of the Right Holder, Protection of Undisclosed Information, Enforcement of Intellectual Property Rights, UNSECO.</p>	
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>
<p>Assessment Details (CIE and Viva voce)</p> <p>The weightage of Continuous Internal Evaluation (CIE) is 50% and for viva-voce examination is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in viva voce examination is 50% of the maximum marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and viva voce marks taken together..</p> <p>Continuous Internal Evaluation:</p> <p>CIE marks shall be awarded by a committee comprising of Principal/Dean, PG Course Coordinator/HOD and Guide/Co-guide of the department. The CIE marks awarded for PSC (professional supportive course), shall be based on the progress of the student throughout the semester, presentation skills in seminars and submission of the report.</p> <p>Semester End Examination:</p> <ol style="list-style-type: none"> 1. The student needs to submit his/her report done throughout the semester, including the data collection for the Viva examination, at least one day prior to the Viva examination to the PG course coordinator/HOD. 2. The Viva-voce will be evaluated by external examiners appointed by the University along with PG Course coordinator/ guide/ co-guide or an internal examiner. 3. The viva-voce marks awarded for PEC (Professional elective course), shall be based on the evaluation of report submission, presentation skill and performance in Question-and-Answer session in the ratio 30:10:10. <p>The viva-voce marks list generated is to be signed by both internal and external examiners and submitted to VTU</p>	

in the sealed cover through the Principal of the institution.

Suggested Learning Resources:

Books

Research Methodology: Methods and Techniques, C.R. Kothari, GauravGarg, New Age International, 4th Edition, 2018.

Research Methodology a step-by-step guide for beginners. (For the topic Reviewing the literature under module 2),

RanjitKumar, SAGE Publications, 3rd Edition, 2011.

Study Material (For the topic Intellectual Property under module 5), Professional Programme Intellectual Property Rights,

Law and Practice, The Institute of Company Secretaries of India, Statutory Body Under an Act of Parliament, September 2013.

Research Methods: the concise knowledge base, Trochim, Atomic Dog Publishing, 2005.

Conducting Research Literature Reviews: From the Internet to Paper, Fink A, Sage Publications, 2009

Web links and Video Lectures (e-Resources)

Video Tutorial

<https://www.youtube.com/watch?v=ZRaZVLRXctU>

Web Link

<https://www.henryharvin.com/blog/what-is-international-project-management/>

Skill Development Activities Suggested

Guest Lecture from expert.

Attending webinars.

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

Sl. No.	Particulars	Blooms Level
CO1	Research methods utilizing, components like reviews, samples, testing of hypothesis understood.	
CO2	Quantitative and Qualitative research data made available for design.	
CO3	Learning to present research for use.	

Program Outcomes of the SH/SA Program:

Sl. No.	Particulars	Blooms Level
1	Acquired skill to conduct Research data for implying design.	PO1
2	Making research available for laying the foundation to design.	PO2

Mapping of COS and POS

	PO1	PO2
CO1	H	M
CO2	H	O
CO3	H	M

H – High, M – Medium, L – Low

II SEMESTER (Audit Course)

AUDIT COURSE A - TRADITIONAL KNOWLEDGE SYSTEMS			
Course Code	22ASH28A	CIE Marks	00
Teaching Hours/Week (L:P:SDA)	00:00:00	Viva Marks	00
Total Hours of Pedagogy		Total Marks	00
Credits	00	Exam	00
The Course is designed as an audit course with the focus on understanding the idea of sustenance as being maintainable over a long time. Traditional Knowledge systems allow for us to understand lifestyle and cultural choices that have become ingrained in people from simple dietary choices to planning principles based on resource availability to infrastructure management.			
Module-1			
Urban design has always been seen as a magnet for and activator for public spaces and infrastructure. Development of a method for infrastructure-centered publicness in the design of urban public space by looking into the relationship between infrastructure and public space, changes in the concept of publicness in the age of globalization and personalization.			
Teaching-Learning Process	<p><i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</i></p> <p><i>Blended learning: Power point presentation and webinars.</i></p>		
Module-2			
Use of Urban design in the context of public safety - view to the street, CCTV, security and activity define safe cities and clarify the role of urban planning and design and their elements on safe cities. Importance of planning and design elements that reduce the opportunities for crime like: street planning, land use, building density, and role of management and good governance, in addition to urban design concepts. Use of Urban design for promoting a healthy and active lifestyle in public spaces and parks. Natural corridors and environments in urban and suburban areas, along with recreational, transportation and nature education opportunities for urban residents.			
Teaching-Learning Process	<p><i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same</i></p> <p><i>Blended learning: Power point presentation and webinars.</i></p>		
Module-3			
Urban Mobility and the development of a whole pedestrian ecosystem with dense neighborhoods. intelligent networking of vehicles, mobility models, Better public transport systems, Networked traffic systems			
Teaching-Learning Process	<p><i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</i></p> <p><i>Blended learning: Power point presentation and webinars.</i></p>		
Module-4			
Connected cities and access to amenities and public conveniences, to shape cities so they connect the local populations with their environment. Collaborative effort that spans architecture, public space, sustainability, social equity, transportation and other aspects of city life.			

Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same</p> <p>Blended learning: Power point presentation and webinars.</p>	
Module-5		
<p>Digital lifestyle, connectivity and continuity of virtual experience and attention span changes and the design responses needed to deal with a connected world. Smart technology as the base of futuristic design, Practical implications of technology in urbanization, New modes of transport and energy sources.</p>		
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>	
Suggested Learning Resources:		
<p>Books</p> <ul style="list-style-type: none"> • Traditional Ecological Knowledge: Learning from Indigenous Practices for Environmental Sustainability, Melissa K. Nelson, Daniel Shilling • Sustaining Traditional Agricultural Practices for Food Security, V K Dubey , ShailendraNathGhosh 		
<p>Web links and Video Lectures (e-Resources):</p> <p>Video Tutorial https://www.youtube.com/watch?v=x9noZ4xEXyg&list=PLNRGMg8U7bLdPXyqgUHSzjL58kH3urQN1</p> <p>Web Link https://www.constrofacilitator.com/repair-and-rehabilitation-of-structure/</p>		
Skill Development Activities Suggested		
<ul style="list-style-type: none"> • Guest Lecture from expert. • Attending webinars. 		
Course outcome (Course Skill Set)		
At the end of the course the student will be able to:		
Sl. No.	Particulars	Blooms Level
CO1	Students will be able to appreciate and understand the sustained practices over time, in keeping with local availability, response to climate and other basic aspects that drove the traditional knowledge systems to be enshrined as a baseline standard of practice for the context and location.	
CO2	Students will be able to understand why some traditional practices were timeless and sustained over a long period and an examination into the external influences that changed, attempted to influence or caused evolution of certain practices over time.	
CO3	Students will be able to determine why change and sustenance go hand in hand, and how external influences tend to evolve and change, and their acceptance or adoption rates vary depending on efficacy, economic access and perceived improvement to livability indices.	
CO4	Gaining an understanding that the original founding principles of a traditional knowledge system may continue to be valid, and still may continue to evolve - some aspects of how it is interpreted or achieved given changes in technology, financial affordability etc.	

Program Outcomes of the SH/SA Program:

Sl. No.	Particulars	Blooms Level
1	To be able to adapt to indigenous practices that are rooted in context – climate, resources, terrain and are tested over time.	PO1
2	To mitigate between old practices with new information, technology and lifestyles.	PO2

Mapping of COS and POS

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
C01	H	L	0	M	0	0	M	0
C02	H	L	0	M	0	0	M	0
C03	H	L	0	M	0	0	M	0
C04	H	L	0	M	0	0	M	0
C05	H	L	0	M	0	L	M	0

H - High , M - Medium, L - Low

II Semester

AUDIT COURSE B - DESIGNING WITH NATURE			
Course Code	22ASH28B	CIE Marks	00
Teaching Hours/Week (L:P:SDA)	00:00:00	Viva Marks	00
Total Hours of Pedagogy		Total Marks	100
Credits	00	Exam	00
The Course is designed as an elective with the foundational thought anchored in being able to design with nature and what it has to offer. The idea that we can use nature, climate and natural systems and materials to improve our livability and comfort, while being economically responsible is critical to being sustainable.			
Module-1			
Understanding Nature and its components - Flora, Fauna, Climate, Land, Water, Materials and Minerals etc.			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-2			
Use of natural systems and processes in design - evaporative cooling, shading using landscapes, drought resistant plants, native species, soil properties for water storage and harvesting, stone and other natural materials for use in processes like filtration, heat absorption and other aspects, use of natural symbiotic species for pest control etc.			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-3			
Identifying natural materials for construction in difficult locations and environments - use of easily available and harvestable materials with short growth cycles such as bamboo, use of naturally produced wastes as a result of other mineral and material manufacturing such as fly ash, slag and other products.			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module-4			
Designing with physical constraints posed by nature - such as position and size of natural features - trees, water bodies, rocks, cliffs, rivers and other natural features.			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p> <p>Blended learning: Power point presentation and webinars.</p>		
Module - 5			
Design of and Regulatory frameworks for allowing use of temporary and permanent construction based on location, natural features and impact to the environment. Understanding of design and development of standalone built modular systems that may be positioned completely off-grid. Designing in protected areas such as CRZ zones with limited development rights, Forest edge areas and low impact zones.			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</p>		

Blended learning: Power point presentation and webinars.								
Suggested Learning Resources: Olsen Richard. 2012: Handmade Houses – a century of earth friendly houses. Rizzoli. Asquith Lindsay and Velinga Marcel. 2006: Vernacular Architecture in the 21st Century. Taylor and Francis (T&F) Hassan Fathy - Architecture for the Poor: An Experiment in Rural Egypt Rudofsky Bernard. 1964, 1987: Architecture without architects. Uni of New Mexico Press								
Course outcome (Course Skill Set)								
At the end of the course the student will be able to:								
Sl. No.	Particulars	Blooms Level						
C01	Students will be able to gain understanding of natural features, and components of nature and learning to use them effectively for sustenance of the development as an intrinsic part of the program and plan.							
C02	Students will be able to use and create natural systems and processes effectively to gain from them passively and at relatively low cost.							
C03	Students will be using materials and wastes that are from nature that can be given back, or reused more effectively without being discarded as wastes or pollutants.							
C04	The ability to de-link a development and build off-grid facilities in nature that respect it and become a part of it, while using it to gain required energy and resources to sustain itself							
Program Outcomes of the SH/SA Program:								
Sl. No.	Particulars	POs						
1	To understand and apply optimization of resources, material and durability observed in nature, natural phenomena, natural processes.	PO1						
2	To bring this knowledge relating to symbiotic dependence as a means of sustenance.	PO2						
Mapping of COs and POs:								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
C01	H	L	0	M	0	0	M	0
C02	H	L	0	M	0	0	M	0
C03	H	L	0	M	0	0	M	0
C04	H	L	0	M	0	0	M	0
C05	H	L	0	M	0	L	M	0
H - High , M - Medium, L - Low								

III-SEMESTER

SUSTAINABLE MANAGEMENT & DESIGN STUDIO (SMART)			
Course Code	22ASH31	CIE Marks	50
Teaching Hours/Week(L:S:SDA)	05:05:05	Viva Marks	50
Total Hours of Pedagogy	10*16 = 160 hrs	Total Marks	100
Credits	10		

Course Learning objectives:

- To be able to understand mega project and to develop EIA and Environment clearance related submissions.
- To understand impact of a project in terms of social, environmental and business sustenance standpoints.
- To provide solution based on smart management design propositions using ecological architectural design principles.

The students will develop a design solution that is sustainable on a large scale that looks at it as an individual exercise.

Module

1. The project will be conceived as a large development to be undertaken for which an Environmental and Social sustainability plan needs to be developed.
2. Project deliverables:
 - a. Social commitment to stakeholders.
 - b. Environmental commitment to stakeholders.
 - c. Business case for developer.

Teaching-Learning Process

Teaching Process

- a. *Environment and social sustainability plan as well as business management plan to be developed with commitments for preparing EIA Environmental Clearance related submission (1 week)*
- b. *Understanding the impact of the project, its stakeholders and impacted parties need to be assessed, their demands for commitments from an environmental, social and business sustenance standpoint needs to be addressed and brief drawn up as problem statement. (2 weeks)*
- c. *Social Commitments to stakeholders - such as existing community (rehabilitation and resettlement (R&R) and community future), users of proposed development (their demands for best in class facilities, and ease of doing business and managing and reporting their commitments on environmental compliance etc.), company employees and staff involved in the project (safety, security, amenities during the construction phase) etc. (3weeks)*
- d. *Environmental Commitment to Stakeholders - Development of assets for use by people under R&R, facilities and as sets for ease of doing business and ensuring compliance to environmental commitments by new users (Centralized CETP, Pollution monitoring, certified services, Zero Liquid discharge, Green belt development and maintenance, water and flood management etc. (3weeks).*
- e. *Business case for developer and ability to maximize revenues and values through commitments made for social and environmental reasons. Alternate revenue streams from Environmental assets, potential to use additional economic assets created in support of the R&R community as revenue streams for the development/business case (3weeks)*
- f. *Final presentation (1 week in 3 sessions)*
 - a. *Presentation 1 - To a viva committee and peers that will act as the "Company Board"; changes to be incorporated before going to presentation 2.*
 - b. *Presentation 2 - To a viva committee and peers that will act as the "Environmental agency" ; changes to be incorporated before going to presentation 3.*
 - c. *Presentation 3 - To a viva committee and peers that will act as local political and community leaders wanting to ensure that the local population is*

addressed effectively.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Viva voce is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in Viva is 50% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and Viva-Voce taken together.

Continuous Internal Evaluation:

CIE marks shall be awarded by a committee comprising of Principal/Dean, PG Course Coordinator/ HOD and Guide/ Co-guide of the department. The CIE marks awarded for PSC (professional supportive course), shall be based on the progress of the student throughout the semester, presentation skills in seminars and submission of the report.

Viva voce Examination:

1. The student needs to submit his/her report done throughout the semester, including the data collection for the Viva examination, at least one day prior to the Viva examination to the PG course coordinator/HOD.
2. The exam shall be conducted as a panel jury exam which shall be minimum of 30 mins/student, where the student shall present the works in form of sheets.
3. Discussions, presentation and the studies should cover all the topics.

Suggested Learning Resources:

Books

Design and management of sustainable built environment by Runming Yao 2013 Springer-Verlag

Weblinks and Video Lectures (e-Resources):

NPTEL Lecture - Inputs to scheduling: <https://youtu.be/psls4kgau8c>

Work Breakdown Structure in project management https://www.youtube.com/watch?v=9mOXdcgdf_U

Course Outcomes

At the end of the course the student will be able to:

Sl. No.	Particulars	Blooms Level
C01	Students will be able to create a strong case for mega project and seek approvals from a business success perspective as a developer.	M
C02	Students will be able to build a strong case for environmental commitments to ensure ease of doing business, compliance and certification for these aspects to ensure management and process control throughout the life of the project and an implementation plan that will benefit all stakeholders.	M
C03	Students will be able to create a strong case to the local community in a way that protect their interests and shows them a secure and potentially improved lifestyle opportunity with strong commitments and sustainability of a new life - rather than just one time payout.	M

Program Outcome of the SH/SA Program

Sl. No.	Particulars	POs
1	The design project will take them through a whole project journey from formulation of a project idea to taking it to market, evaluating	PO1

	it and presenting it to customers and the client management team.	
2	The aim is to understand effectively the process, analyzing the changing circumstances and findings along the way.	PO2
3	To realize that the goals set at the beginning may have to change and evolve and be interpreted differently by the time the project solution is arrived at, but that the goals are still achievable to a large extent.	PO3
4	The importance of measurable outcomes and justifiable decisions on projects related to sustainable design.	PO4

Mapping of COS and POS

	PO1	PO2	PO3
CO1	H	0	L
CO2	H	H	M
CO3	H	L	L
CO4	0	L	M
CO5	M	L	M
CO6	M	M	L

III-SEMESTER

SUSTAINABLE MANAGE SYSTEM AND CONTROL			
Course Code	22ASH32	CIE Marks	50
Teaching Hours/Week (L:S:SDA)	01:01:01	SEE Marks	50
Total Hours of Pedagogy	02*16 = 32hrs	Total Marks	100
Credits	02	Exam Hours	3
Course Learning objectives: The Course aims to bring to attention the continuity of the idea of sustenance - one that requires constant maintenance and upkeep. Operations, Management and Maintenance are critical to remain sustainable. To achieve this all levels of processes, governance and control mechanisms need to be in place.			
Module-1			
Understanding that Sustainability is by definition longterm process and not one-time effort means that a lot of continued energy and effort needs to be spent ensuring its success.			
Teaching - Learning Process	<p>Direct method: The lecture supported by the conventional method of Blackboard and chalk to introduce sustainability as a long term process and not one time effort. Discussions, Debate, Industry interactions for the same.</p> <p>Blended learning: Power point presentation to elaborate more on key topics/online video's/ live example of projects etc.</p>		
Module-2			
Management as concept - from organizational goals and values - to operations management and reporting - from awareness creation and education - to process based change management. The aim is to understand project based and organization based systems for management.			
Teaching - Learning Process	<p>Direct method: : Lecture supported by conventional method of Blackboard and chalk to introduce management as concept. Discussions, Debate, Industry interactions, and research paper inferences from the same.</p> <p>Blended learning: Power point presentation to elaborate more on key topics.</p>		
Module-3			
Understanding the use of data and performance metrics in defining base line performance and monitoring change and evolution of systems, processes etc. to achieve set goals such as energy conservation, water discharge etc.			
Teaching - Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts followed by introduction to performance metrics analysis.</p> <p>Blended learning: Power point presentation to elaborate more on key topics/online video's to demonstrate the process of performance analysis.</p>		
Module-4			
Optimization and the role of managing activities within a business or project based on time, effort and sequencing to ensure sustainability in terms of energy consumption, wait times and efficiency of operations. These may be quantified using measures of Carbon footprint, time spent and energy utilized or resources utilized.			
Teaching - Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts followed by introduction to energy audit and measuring carbon footprint.</p> <p>Blended learning: Power point presentation to elaborate more on key topics/online video's on energy audit and case study demonstrating the same.</p>		

Module-5	
<p>Understanding types of Control systems and the use of IBMS, Smart Sensors and Command and Control Centers for efficiently monitoring, and using feedback systems to manage and control utilities, services and production processes. Smart Infrastructure - use of sensors for leak detection, motion detection, heat loss, light emittance, conductivity and other factors to identify issues with performance and detection of technical faults, pilferage and other issues.</p>	
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts followed by introduction to building management system.</p> <p>Blended learning: Power point presentation to elaborate more on key topics and case study on performance audit for various building.</p>
<p>Assessment Details (both CIE and SEE)</p> <p>The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.</p> <p>Continuous Internal Evaluation:</p> <p>Three Unit Tests each of 20 Marks (duration 01 hour 30 min)</p> <ul style="list-style-type: none"> - First test at the end of 5th week of the semester - Second test at the end of the 10th week of the semester - Third test at the end of the 13th week of the semester <p>Two assignments each of 10 Marks</p> <ul style="list-style-type: none"> - First assignment at the end of 4th week of the semester - Second assignment at the end of 9th week of the semester <p>Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 20 Marks(duration 01 hours)</p> <p>At the end of the 16th week of the semester, the sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be scaled down to 50 marks</p> <p>Semester End Examination:</p> <p>Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (duration 03 hours)</p> <ul style="list-style-type: none"> ● The question paper will have ten questions. ● Each question is set for 20 marks. ● There will be 2 questions (with a maximum of four sub question in one full question) from each module. ● Each full question will sub questions will cover the contents under a module. ● The students have to answer 5 full modules, selecting one full question from each module. 	

Suggested Learning Resources:**Books**

1. Design and management of sustainable built environment by Runming Yao 2013 Springer, Verlag
2. Principles of management by Harild Kroontz 2009 lata McGraw Hill

Web links and Video Lectures (e-Resources):

NPTEL Lecture

<https://www.youtube.com/watch?v=RQNZWCl6eXI&list=PLBd76GK9sWTwVXm9FIVHOTXXbGY2vZR8z>

NPTEL Lecture

<https://www.youtube.com/watch?v=RjOA7AxOVj8>**Skill Development Activities Suggested**

- Guest Lecture from expert.
- Case Studies to understand energy audit, performance audit of various building.

Course Outcomes

At the end of the course the student will be able to:

Sl. No.	Particulars	Blooms Level
C01	Students will be able to understand that Managing Sustainability to last through the life of a project or process is key to its success.	
C02	Students will be able understand and will be able to develop methodologies and processes that manage the outcomes is key to achieving sustainability - as it is based on long term impact and not just short term solutions	
C03	Develop an understanding and ability to understand that Management and control is needed to ensure that sustainable practices can achieve guaranteed outcomes. If not an intended solution can cause more harm if left unused or not managed and maintained overtime - eg: Rain water harvesting pits if not maintained can lead to stagnation and flooding.	

Program Outcome of the SH/SA Program

Sl. No.	Particulars	POs
1	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to short term impact as an exercise in a given context and timeframe.	PO1
2	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to medium term impact as an exercise in a given context and timeframe.	PO2
3	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to long term impact as an exercise in a given context and timeframe.	PO3

Mapping of COS and POS

	P01	P02	P03
C01	H	0	L
C02	H	H	M
C03	H	L	L
C04	0	L	M
C05	M	L	M
C06	M	M	L

III-SEMESTER

ADMINISTRATION, GOVERNANCE AND IMPLEMENTATION IN SUSTAINABILITY			
Course Code	22ASH33	CIE Marks	50
Teaching Hours/Week (L:S:SDA)	01:01:01	SEE Marks	50
Total Hours of Pedagogy	02*16 = 32hrs	Total Marks	100
Credits	02	Exam Hours	3
Course Learning objectives: The Course aims to create awareness about Climate change impacts that are promised at a global level and how efforts are being made to ensure that those commitments are honored and implemented. The process of Administration and Governance is key to ensuring implementation of intent. The process is difficult but necessary.			
Module-1			
Global Climate Change commitments such as the Paris Accord, trade agreements, WHO commitments regarding health and safety, ILO commits for workers, FAO commitments regarding food production and impact in many other areas such as Emission control, hunting and fishing laws etc.			
Teaching-Learning Process	<p>Direct method: The lecture supported by the conventional method of Blackboard and chalk to introduce various climate change commitments.</p> <p>Collaborative and Cooperative learning: Students should work on various commitments. The research and learning are be shared with the class.</p>		
Module-2			
Governance is a key to understanding policies related to industry and development - a study of Environmental regulations at a National Level - Ministry of Environment and Forests / Ministry of Commerce and Industry, Ministry of Housing and Urban Affairs etc .			
Teaching-Learning Process	<p>Direct method: : Lecture supported by conventional method of Blackboard and chalk to introduce to various national level policy.</p> <p>Collaborative and Cooperative learning: Students will research on various national level policy and the research and learning are be shared with the class.</p>		
Module-3			
Governance and implementation of Sustainable Green Design practices - Green mark Singapore as a case study for continuous monitoring vs. LEED as a case of one time implementation and changing trends. Implementation of policies and timelines as commitments - Study of GRIHA as a standard of practice to be adopted by government buildings and enforcement of the same.			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts followed by discussion on Green mark, LEED and GRIHA.</p> <p>Blended learning: Power point presentation to elaborate more on key topics, cae example of successful implementation of sustainable design practices across the globe.</p>		
Module-4			
Environmental Impact Assessment and Environmental Clearances at state and Central level for monitoring commitment for industries and development works - current practices, and international best practices - one time commitment over long term monitoring and enforcement. Indian practices, European practices.			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts of Environmental Impact Assesment followed by introduction to enviromental clearance.</p> <p>Blended learning: Power point presentation to elaborate more on key topics/online video's on current practise and case study buildings for EIA and EC.</p>		

Module-5	
<p>Public awareness and transparency to ensure ease of enforcement through societal pressure, as opposed to drastic clean up measures and shut down as solutions for long term success. Use of the idea of Community Buy-in and Stakeholder Engagement as opposed to open activism.</p>	
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts.</p> <p>Blended learning: Power point presentation to elaborate more on key topics.</p>
<p>Assessment Details (both CIE and SEE)</p> <p>The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.</p> <p>Continuous Internal Evaluation:</p> <p>Three Unit Tests each of 20 Marks (duration 01 hour 30 min)</p> <ul style="list-style-type: none"> - First test at the end of 5th week of the semester - Second test at the end of the 10th week of the semester - Third test at the end of the 13th week of the semester <p>Two assignments each of 10 Marks</p> <ul style="list-style-type: none"> - First assignment at the end of 4th week of the semester - Second assignment at the end of 9th week of the semester <p>Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 20 Marks(duration 01 hours)</p> <p>At the end of the 16th week of the semester, the sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be scaled down to 50 marks</p> <p>Semester End Examination:</p> <p>Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (duration 03 hours)</p> <ul style="list-style-type: none"> ● The question paper will have ten questions. ● Each question is set for 20 marks. ● There will be 2 questions (with a maximum of four sub question in one full question) from each module. ● Each full question will sub questions will cover the contents under a module. ● The students have to answer 5 full modules, selecting one full question from each module. 	

Suggested Learning Resources:**Books**

1. GRIHA; Griha Manual, Vol 1 to 5, TERI Publication
2. Y.Abhi&S.Jain; Handbook on energy audit and environmental management
3. Petts Judith; Handbook on Environmental Impact Assessment
4. Larry Canter, Environmental Impact Assessment

Web links and Video Lectures (e-Resources):

- Recommended EIA Reports from MoEF website
- <https://moef.gov.in/en/division/environment-divisions/environmental-impact-assessment-eia/introduction/>

Skill Development Activities Suggested

- Guest Lecture from expert.

Course Outcomes

At the end of the course the student will be able to:

Sl. No.	Particulars	Blooms Level
C01	Students will be able to understand that Managing Sustainability to last through the life of a project or process is key to its success	
C02	Understand and able to develop methodologies and processes that manage the outcomes is key to achieving sustainability - as it is based on long term impact and not just short term solutions	
C03	Students will be able to understand that larger impact from a governance perspective - whether for an organization, a city, state or country, these measures will define the path to success.	
C04	Having Goals and targets be measurable, enforcing policies and regulations with strict adherence measures and mandates will be key.	

Program Outcome of the SH/SA Program

Sl. No.	Particulars	POs
1	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to short term impact as an exercise in a given context and timeframe.	PO1
2	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to medium term impact as an exercise in a given context and timeframe.	PO2
3	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to long term impact as an exercise in a given context and timeframe.	PO3

Mapping of COS and POS

	P01	P02	P03
C01	H	0	L
C02	H	H	M
C03	H	L	L
C04	0	L	M
C05	M	L	M
C06	M	M	L

III-SEMESTER

LIFE CYCLE ANALYSIS (PROJECT & PRODUCT)			
Course Code	22ASH34	CIE Marks	50
Teaching Hours/Week (L:S:SDA)	02:01:01	SEE Marks	50
Total Hours of Pedagogy	02*16 = 32hrs	Total Marks	100
Credits	03	Exam Hours	3
<p>Course Learning objectives: The Course aims to create a clear understanding of the actual impact on the environment that we have in everything that we do. It is measured by understanding all the inputs that go into making a product then tracked through its lifecycle and ultimately the waste it generates and what can be done with it.</p>			
Module-1			
Introduction to Life cycle cost analysis a biological metaphor and how it applies to products and projects			
Teaching-Learning Process	<p><i>Direct method: The lecture supported by the conventional method of Blackboard and chalk to introduce life cycle analysis.</i></p>		
Module-2			
<p>Lifecycle of a Product</p> <ol style="list-style-type: none"> Into a product during manufacture - time, energy and material and how this is measured. Logistics and Sales - the logistics, go to market, sale and handover to user. The Actual Use Life Cycle - From purchase till discarded or breakdown - the use of material, energy and time by the product and how it's broken down . Post Use - When material is disassembled, can it be recycled, sent to landfill, repaired and reused - what are the options and how it is factored. 			
Teaching-Learning Process	<p><i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concept of Lifecycle of a product.</i></p> <p><i>Collaborative and Cooperative learning: Students will research on various product and understand the lifecycle of it and the research, learning are be shared with the class.</i></p>		
Module-3			
<p>Lifecycle of Projects</p> <ol style="list-style-type: none"> Conception of a project and its - time, cost and material inputs Pre-implementation inputs - Consultancy, Permits, Approvals, Surveys and testing and other processes as part of feasibility, design and engineering. Implementation phase - Focus more on the materials, their individual make up and lifecycle cost, environmental impact and social benefit - as individual components (such as bricks, concrete, steel etc) Impact Evaluation - Is the sum of the parts larger than the whole - As a finished project - what are the Time, Energy and Material needs it has during operations and its impact on the larger world around it. Does it only add to the impact, or does it give back as well? Post-Use Scenario - Can the project be upgraded and used, can it be replaced fully, what happens to waste generated and other components? 			

Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concept of Lifecycle of a building/project.</p> <p>Blended learning: Power point presentation to elaborate more on key topics and case example of projects where lifecycle assessment is successful implemented for the project.</p>
Module-4	
Understanding Life Cycle Costs Analysis, and Life Cycle Impact Analysis.	
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts.</p> <p>Blended learning: Power point presentation to elaborate more on key topics .</p>
Module-5	
UNSDGs and their acceptable measures.	
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts.</p> <p>Blended learning: Power point presentation to elaborate more on key topics.</p>
<p>Assessment Details (both CIE and SEE)</p> <p>The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.</p> <p>Continuous Internal Evaluation:</p> <p>Three Unit Tests each of 20 Marks (duration 01 hour 30 min)</p> <ul style="list-style-type: none"> - First test at the end of 5th week of the semester - Second test at the end of the 10th week of the semester - Third test at the end of the 13th week of the semester <p>Two assignments each of 10 Marks</p> <ul style="list-style-type: none"> - First assignment at the end of 4th week of the semester - Second assignment at the end of 9th week of the semester <p>Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 20 Marks(duration 01 hours)</p> <p>At the end of the 16th week of the semester, the sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be scaled down to 50 marks</p> <p>Semester End Examination:</p> <p>Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (duration 03 hours)</p> <ul style="list-style-type: none"> ● The question paper will have ten questions. ● Each question is set for 20 marks. ● There will be 2 questions (with a maximum of four sub question in one full question) from each module. ● Each full question will sub questions will cover the contents under a module. ● The students have to answer 5 full modules, selecting one full question from each module. 	

Suggested Learning Resources:**Books**

1. Carbon Foot Print by Ramesh Menon 2014 TERI
2. Sustainability Assessment Ed. By Alan Bond et al 2013 Routledge
3. Life Cycle Assessment by Kathrina Simonen 2014 Routledge
4. Y.Abbi & S.Jain; Handbook on energy audit and environmental management
5. Talwar; Environmental management.

Web links and Video Lectures (e-Resources):

- Recommended EIA Reports from MoEF website
- <https://moef.gov.in/en/division/environment-divisions/environmental-impact-assessment-eia/introduction/>

Skill Development Activities Suggested

- Guest Lecture from expert.

Course Outcomes

At the end of the course the student will be able to:

Sl. No.	Particulars	Blooms Level
CO1	Students will be able to describe what lifecycle inputs constitute, and understanding that the comparison of the impact during production, lifetime of product use and final disposal are key to determining its value proposition.	
CO2	Students will be able to analyse and evaluate as a project, how is it different being just a product, and how impact is now measured both in simple terms, as well in larger social and ecological terms with UNSDGs coming into play.	

Program Outcome of the SH/SA Program

Sl. No.	Particulars	POs
1	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to short term impact as an exercise in a given context and timeframe.	PO1
2	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to medium term impact as an exercise in a given context and timeframe.	PO2
3	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to long term impact as an exercise in a given context and timeframe.	PO3

Mapping of COS and POS

	PO1	PO2	PO3
CO1	H	O	L
CO2	H	H	M
CO3	H	L	L
CO4	O	L	M
CO5	M	L	M
CO6	M	M	L

III-SEMESTER

ENVIRONMENTAL ECONOMICS			
Course Code	22ASH35	CIE Marks	50
Teaching Hours/Week (L:S:SDA)	01:01:01	SEE Marks	50
Total Hours of Pedagogy	02*16 = 32hrs	Total Marks	100
Credits	02	Exam Hours	3
Course Learning objectives: The Course is structured to create an understanding of the value of the environment in terms of economic impact and potential. With a marked shift that underlines the traditional approach of looking at Economic impact of environmental policies to recognizing economic potential of the environment.			
Module-1			
Environmental Economics - The traditional Approach - Environmental policies and their impact on doing business. a. Addressing pollution and its impact on construction, automobiles and transportation b. Control in Mining and resource exploitation and impact on material costs, availability and access c. Sustainability as a corporate initiative and the impact on cost of construction			
Teaching - Learning Process	<i>Direct method: The lecture supported by the conventional method of Blackboard and chalk to introduce environmental economics. Discussions, Debate, Industry interactions, and research paper reading and inferences from the same.</i> <i>Blended learning: Power point presentation to elaborate more on key topics/online video's/ TED talks</i>		
Module-2			
New Age Environmental Considerations and the study of the potential for economic advantages without exploitation of environmental resources. a. Sustainability driven by sustenance industries and their value growth, potential and scalability (handmade products, natural low value materials, waste material re-use etc.) b. Local economy at grass roots level and potential to scale, innovate and create increased value opportunities c. New industries for use, repurposing and processing of underutilized resources, unused waste and other types of opportunities - eg: fly-ash bricks, carbon tiles, m-sand and others.			
Teaching - Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concept.</i> <i>Collaborative and Cooperative learning: Students will research on various possibility of economic advantage without exploitation of environmental resources and the research, learning are be shared with the class. Case study from the same to be explored.</i>		
Module-3			
Understanding and Developing an economic structure for low-impact living in a sustainable ecosystem.			
Teaching - Learning Process	<i>Blended learning: Power point presentation to elaborate on key topics and case example of projects with low impact living is successful implemented.</i> <i>Site visits, Interaction with NGOs and Experts from the field.</i> <i>Collaborative and Cooperative learning: Students should work on individual work. The research and learning are be shared with the class.</i>		
Module-4			
Creating economic frameworks with sustainable multivariate income streams for relocated and rehabilitated communities, with opportunities for jobs, growth and development.			

Teaching - Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts.</p> <p>Blended learning: Power point presentation to elaborate more on key topics .</p>
Module-5	
Environmentally sustainable and renewable practices in farming, forestry and post-disaster curation efforts	
Teaching-Learning Process	<p>Collaborative and Cooperative learning: Students should work on individual work. The research and learning are be shared with the class.</p> <p>Blended learning: Site visits, Interaction with NGOs and Experts from the field.</p>
<p>Assessment Details (both CIE and SEE)</p> <p>The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.</p> <p>Continuous Internal Evaluation:</p> <p>Three Unit Tests each of 20 Marks (duration 01 hour 30 min)</p> <ul style="list-style-type: none"> - First test at the end of 5th week of the semester - Second test at the end of the 10th week of the semester - Third test at the end of the 13th week of the semester <p>Two assignments each of 10 Marks</p> <ul style="list-style-type: none"> - First assignment at the end of 4th week of the semester - Second assignment at the end of 9th week of the semester <p>Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 20 Marks(duration 01 hours)</p> <p>At the end of the 16th week of the semester, the sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be scaled down to 50 marks</p> <p>Semester End Examination:</p> <p>Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (duration 03 hours)</p> <ul style="list-style-type: none"> ● The question paper will have ten questions. ● Each question is set for 20 marks. ● There will be 2 questions (with a maximum of four sub question in one full question) from each module. ● Each full question will sub questions will cover the contents under a module. ● The students have to answer 5 full modules, selecting one full question from each module. 	

Suggested Learning Resources:**Books**

1. Hanley N, Shogren JF and White B, Environmental Economics in Theory and Practice, Macmillan India Ltd., 1997
2. Roger Perman, Yue Ma and James Mc Gilvery, Natural Resource and Environmental Economics, Addison Wesley Longman Ltd., 1997
3. Bromley D.W. Hand book of Environmental Economics, Blackwell 1995
4. Sankar U (ed) Environmental Economics, OUP, 2000

Web links and Video Lectures (e-Resources):

- <https://www.epa.gov/environmental-economics#:~:text=Within%20this%20discipline%2C%20environmental%20and,effectiveness%20of%20its%20environmental%20policies.>
- Recommended EIA Reports from MoEF website
- <https://moef.gov.in/en/division/environment-divisions/environmental-impact-assessment-eia/introduction/>

Skill Development Activities Suggested

- Guest Lecture from expert.
- Site visit

Course Outcomes

At the end of the course the student will be able to:

Sl. No.	Particulars	Blooms Level
C01	Students will be able to understand that the Environment is a resource with potential for recurring economic returns in a sustainable manner.	
C02	Students will be able to understand the ability to monetize environmental assets by valuing them as significant and needing protection, while reducing intrusive development and promoting low-impact development in harmony with nature.	
C03	Students will be able to evaluate economic impact of environmental measures that reduce economic performance in traditional models, but also will be able to develop alternate revenue sources to reward the commitment to environmental protection and promote them with incentives.	

Program Outcome of the SH/SA Program

Sl. No.	Particulars	POs
1	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to short term impact as an exercise in a given context and timeframe.	PO1
2	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to medium term impact as an exercise in a given context and timeframe.	PO2
3	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to long term impact as an exercise in a given context and timeframe.	PO3

Mapping of COS and POS

	PO1	PO2	PO3
C01	H	0	L
C02	H	H	M
C03	H	L	L
C04	0	L	M
C05	M	L	M
C06	M	M	L

III-SEMESTER

BUSINESS SUSTAINABILITY & RESILIENCE			
Course Code	22ASH36	CIE Marks	50
Teaching Hours/Week (L:S:SDA)	02:01:01	SEE Marks	50
Total Hours of Pedagogy	02*16 = 32hrs	Total Marks	100
Credits	03	Exam Hours	3
Course Learning objectives: The Course is developed to focus on the impact of environmental and social sustainability on Business Sustainance and Resilience.			
Module-1			
Understanding that commitment towards the environment and social responsibility will add to the cost of doing business. Being able to plan for and mitigate adverse impact on business sustainance is critical for long term success.			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts.</p> <p>Blended learning: Power point presentation to elaborate more on key topics .</p>		
Module-2			
<p>Costs of Environmental commitments and the factors that affect it - Infrastructure, Logistics, material sourcing, energy use and location of business, building performance etc.</p> <p>Costs / Benefits of Social Responsibility to various stakeholders - employees, neighborhood and community, clients and product users and suppliers of raw materials.</p>			
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts.</p> <p>Blended learning: Power point presentation to elaborate more on key topics .</p>		
Module-3			
<p>Doing business in a sustainable manner - Environmental Initiatives - ensuring continuity, development of alternative sources, ensuring reliability, replenishment of sources and renewing the land for alternate beneficial uses etc.</p> <p>Costs of doing business in a sustainable manner - Social Initiatives - being able to ensure livelihoods and meet economic aspirations, promotion of continued engagement, ensuring economic security, education and training, up skilling, rights to individual freedoms, benefits such as insurance, safety, security and equality etc.</p>			
Teaching-Learning Process	<p>Blended learning: Power point presentation to elaborate on key topics and case example of projects with low impact living is successful implemented. Site visits, Interaction with NGOs and Experts from the field.</p> <p>Collaborative and Cooperative learning: Students should work on individual work. The research and learning are be shared with the class.</p>		
Module-4			
<p>Businesses and their collective conscious responsibility - ethical businesses, responsible businesses, eco-friendly businesses, Corporate Social Responsibility (as continued legacies instead of one off attempts for sustenance of initiatives) and other forms of corporate commitments and types that are used today to define sustainable business practices.</p>			

Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts.</p> <p>Blended learning: Power point presentation to elaborate more on key topics .</p>
Module-5	
<p>Business Sustainability as an economic endeavor alone, and the need for social and environmental commitments today in that context to understand why even traditional businesses rely on these aspects for maximum longevity and sustenance in their key markets. Trading in Green Bonds, Financing through Green Bonds, Carbon Credit trading and other monetization methods for Business Resilience against commitments to sustainability.</p>	
Teaching-Learning Process	<p>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts.</p> <p>Blended learning: Power point presentation to elaborate more on key topics .</p>
<p>Assessment Details (both CIE and SEE)</p> <p>The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.</p> <p>Continuous Internal Evaluation:</p> <p>Three Unit Tests each of 20 Marks (duration 01 hour 30 min)</p> <ul style="list-style-type: none"> - First test at the end of 5th week of the semester - Second test at the end of the 10th week of the semester - Third test at the end of the 13th week of the semester <p>Two assignments each of 10 Marks</p> <ul style="list-style-type: none"> - First assignment at the end of 4th week of the semester - Second assignment at the end of 9th week of the semester <p>Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 20 Marks(duration 01 hours)</p> <p>At the end of the 16th week of the semester, the sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be scaled down to 50 marks</p> <p>Semester End Examination:</p> <p>Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (duration 03 hours)</p> <ul style="list-style-type: none"> ● The question paper will have ten questions. ● Each question is set for 20 marks. ● There will be 2 questions (with a maximum of four sub question in one full question) from each module. ● Each full question will sub questions will cover the contents under a module. ● The students have to answer 5 full modules, selecting one full question from each module. 	

Suggested Learning Resources:			
Books			
<ol style="list-style-type: none"> Corporate Sustainability in the 21st Century: Increasing the Resilience of Social-Ecological Hanley N, Shogren JF and White B, Environmental Economics in Theory and Practice, Macmillan India Ltd., 1997 The Nature of Business: Redesign for Resilience 			
Web links and Video Lectures (e-Resources):			
<ul style="list-style-type: none"> https://www.epa.gov/environmental-economics#:~:text=Within%20this%20discipline%2C%20environmental%20and,effectiveness%20of%20its%20environmental%20policies. Recommended EIA Reports from MoEF website https://moef.gov.in/en/division/environment-divisions/environmental-impact-assessment-eia/introduction/ 			
Skill Development Activities Suggested			
<ul style="list-style-type: none"> Guest Lecture from expert. 			
Course Outcomes			
At the end of the course the student will be able to:			
Sl. No.	Particulars	Blooms Level	
C01	Students will be able to gain an understanding of what costs are associated with sustainable commitments, why these have to be long term and ingrained into a business culture and identity, as much as being part of normal best practices.		
C02	Social Welfare and Business performance as drivers in sustainability		
C03	Students will be able to reflect on environmental commitments and how it can offset carbon, and provide alternative green financing opportunities for businesses at lower interest rates, carbon credits for trading and other benefits.		
C04	Students will be able to understand that rated and certified sustainability commitments can also benefit from lower interest, better bond valuation and increased ability to do carbon trading to raise financing for businesses.		
Program Outcome of the SH/SA Program			
Sl. No.	Particulars	POs	
1	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to short term impact as an exercise in a given context and timeframe.	PO1	
2	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to medium term impact as an exercise in a given context and timeframe.	PO2	
3	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to long term impact as an exercise in a given context and timeframe.	PO3	
Mapping of COS and POS			
	PO1	PO2	PO3
C01	H	0	L
C02	H	H	M
C03	H	L	L
C04	0	L	M
C05	M	L	M
C06	M	M	L

III-SEMESTER

PROFESSIONAL ELECTIVE			
A. SUSTAINABLE DEVELOPMENT LAWS IN INDIA			
Course Code	22ASH37A	CIE Marks	100
Teaching Hours/Week (L:S:SDA)	01:01:01	SEE Marks	
Total Hours of Pedagogy	02*16 = 32hrs	Total Marks	100
Credits	02	Exam Hours	-
<p>Course Learning objectives: The Course is developed to focus on regulatory mechanisms and commitments to environmental protection and regulation, while ensuring that long terms goals of country can be achieved - a perspective on why regulation is needed in the larger scheme of things, while we also look at how and what day to day impacts are there on businesses, development and implementation of projects.</p>			
Module / Outline			
<p>1. International Treaties and Commitments for Sustainable Environments for long term goals –</p> <ol style="list-style-type: none"> a. Aarhus convention b. Basel Convection c. Convention on the protection and use of Transboundary watercourse and International lakes d. Framework convention on climate change e. International treaty on Plant genetic resources for food and agriculture f. Kyoto Protocol g. United nations Framework convention on climate change h. Vienna convention for the protection of the Ozone layer i. Nagoya protocol on access and benefit sharing 2010 Japan j. United Nations Convention to Combat desertification <p>2. Indian Laws and Regulations - Centrally Imposed</p> <ol style="list-style-type: none"> a. Environmental protection act 1986 b. Central Pollution Control Board - Standards and Regulations c. State Pollution Control Board - Standards and Regulations d. Ministry of Environment and Forests - Guidelines for different environmental Protection areas e. Bureau of Energy Efficiency (BEE) Energy Conservation Building Codes (ECBC) f. Mandates for PWD / other governmental agencies for GRIHA rated development g. Guidelines for tax relief / or other benefits - Green Energy, Green Mobility, Zero Liquid Discharge, soil protection, etc. <p>3. Looking at regulatory frameworks for Business Commitments as costs vs. potential opportunities for alternate revenue streams.</p> <p>4. Looking at Environmental protection requirements and seeding new business opportunities.</p> <p>5. Ecological Commitment vs. Better lifestyle and environment for all stakeholders - eg: healthier employees leading to better productivity.</p>			
Teachi ng-Learnin g Process	<p>Collaborative and Cooperative learning: Students should work on various international and national treaties/Law as an individual work. The research and learning are be shared with the class.</p> <p>Blended learning: Power point presentation to elaborate more on key topics . Interaction with experts from the field, Discussions, Debate, Industry interactions, and research paper and inferences from the same.</p>		
Assessment Details (CIE)			
The weightage of Continuous Internal Evaluation (CIE) is 100%. The minimum passing mark for the CIE is 50% of the maximum marks.			

Continuous Internal Evaluation:

Two assignments each of 20 Marks

- First assignment at the end of 4th week of the semester
- Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 10 Marks(duration 01 hours)

At the end of the 16th week of the semester, the sum of two assignments, and quiz/seminar/group discussion will be out of 50 marks.

Suggested Learning Resources:**Books**

1. Leela Krishnan; Environmental Law in India
2. Mehta M ; Commentary on water and air pollution with environmental protection law
3. Sarkar S; Legal aspects of regulations in South Asia
4. Birnie PW and Boyle; International law and the Environment
5. Chalifour N; Land use law for sustainable development
6. Saksena K.D ; Environmental policies and programs in India

Course Outcomes

At the end of the course the student will be able to:

Sl. No.	Particulars	Blooms Level
C01	Students will be able to understand various regulatory frameworks, and the abilities of a governmental agency to implement change towards tangible goals	
C02	Compliance and convenience to industry in achieving these commitments. Ease of Doing Business, Improved Lifestyles and living standards and secondary benefits for businesses as well as the community.	
C03	Students will be able to reflect on the Job creation vs. environmental protection, job creation vs. lifestyle improvement, lifestyle improvement vs. environmental contribution. Understanding cyclic growth, momentum building and snowball effects of regulatory commitments - both good and bad	

Program Outcome of the SH/SA Program

Sl. No.	Particulars	POs
1	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to short term impact as an exercise in a given context and timeframe.	PO1
2	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to medium term impact as an exercise in a given context and timeframe.	PO2
3	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to long term impact as an exercise in a given context and timeframe.	PO3

Mapping of COS and POS

	P01	P02	P03
C01	H	0	L
C02	H	H	M
C03	H	L	L
C04	0	L	M
C05	M	L	M
C06	M	M	L

III-SEMESTER

PROFESSIONAL ELECTIVE B. EMERGING GLOBAL SCENARIO			
Course Code	22ASH37B	CIE Marks	100
Teaching Hours/Week (L:S:SDA)	01:01:01	SEE Marks	
Total Hours of Pedagogy	02*16 = 32hrs	Total Marks	100
Credits	02	Exam Hours	-
Course Learning objectives: The Course is developed to focus on understanding the various approaches being taken globally for sustainability and how the solutions have come about in their local context of geography, climate, political need, lifestyle and culture, people's expectations and environmental importance.			
Module / Outline			
<p>1. International Projects -</p> <ul style="list-style-type: none"> i) Award winning Architectural Projects from around the world as a case study ii) Sustainable cities and infrastructure, solutions for scale, increasing urbanization, population iii) Large scale sustainability - limiting transit, alternate mobility, technology impacts such as work from home, greening productively - urban farming, other unique scalable solutions. iv) Global examples for rural, semi-urban and peri-urban development - low cost, local and eco-friendly solutions - beyond basic sustenance to creative ideation for and rejuvenated, reinterpreted, reused and repurposed solutions from traditional, local lifestyle and systems. v) Public Housing Solutions for low density-low-rise, high density-low-rise, high density-high-rise environments and lifestyles, economic opportunities and other solutions can be better resolved in such scenarios for best and most sustainable solutions for the people whose lives are being transformed. <p>2. International Comparatives and potential contextual Application: A look at international building regulations, standards and sustainability indices to see how they provide better or more unique solutions for their context - and how this may apply to our context - whether it is for the constantly changing Mumbai's high density urban skyline or for the ancient low rise high density Varanasi or a clean and green 20th century planned city like Bhubaneswar / Chandigarh seeking to reinvent its economic positioning.</p> <p>3. Building new Greenfield cities (Songdo, Korea; Punggol, Singapore; Putrajaya&PetalingJaya,Malaysia; Amaravati & Naya Raipur, India; Ciudad Guyana, Venezuela; King Abdullah Economic City, Saudi Arabia; Dubai & Abu Dhabi, UAE) vs. rebuilding old ones through interventions in building codes and performance solutions (New York, USA, Copenhagen, Denmark; Amsterdam, The Netherlands; Lisbon, Portugal)</p> <p>4. Activism and Stakeholder engagement</p> <ul style="list-style-type: none"> a. Global upheavals against development in specific areas, reactions, guidelines development and solutions that they have come up with b. Comparative study of developing nations and high impact projects from the last 20-30 years that can be revisited with new age ideas to be more sustainable (case study style exercise - using current scenario vs. application of another solution to overcome issues with a case study of that to prove its applicability) Recommended in Groups of 3-4. 			
Teaching-Learning Process	<p>Collaborative and Cooperative learning: Students should work on various casestudy of international projects, greenfield cities as an individual work. The research and learning are be shared with the class.</p> <p>Blended learning: Power point presentation to elaborate more on key topics . Interaction with experts from the field, Discussions, Debate, Industry interactions, and research paper and inferences from the same.</p>		
Assessment Details (CIE)			
The weightage of Continuous Internal Evaluation (CIE) is 100%. The minimum passing mark for the CIE is 50% of the maximum marks.			
Continuous Internal Evaluation:			
Two assignments each of 20 Marks			
- First assignment at the end of 4th week of the semester			

- Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 10 Marks(duration 01 hours)

At the end of the 16th week of the semester, the sum of two assignments, and quiz/seminar/group discussion will be out of 50 marks.

Suggested Learning Resources:

Books

International and National projects Detailed project reports

Course Outcomes

At the end of the course the student will be able to:

Sl. No.	Particulars	Blooms Level
CO1	Student will be able to understand multiple scenarios in the developed and developing world as we transform India.	
CO2	Students will also be able to understand that context and impact go hand in hand and all solutions have a level of application that is very dependent on local context, culture and lifestyles of people.	
CO3	Students will be able to reflect on to where the initiative is being taken up, solutions may vary significantly - globalized urban high density developments may need some cultural and contextual modifications to make them suitable for use, while peri-urban and rural areas can gain better infrastructure and services, while appreciating and better understanding the cultural values while bringing in the improved lifestyle to ensure that one does not wipe out the other.	

Program Outcome of the SH/SA Program

Sl. No.	Particulars	POs
1	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to short term impact as an exercise in a given context and timeframe.	PO1
2	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to medium term impact as an exercise in a given context and timeframe.	PO2
3	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to long term impact as an exercise in a given context and timeframe.	PO3

Mapping of COS and POS

	P O 1	P O 2	P O 3
CO1	H	0	L
CO2	H	H	M
CO3	H	L	L
CO4	0	L	M
CO5	M	L	M
CO6	M	M	L

III-SEMESTER

**PROFESSIONAL ELECTIVE
C. PLANNING FOR ECO TOURISM**

Course Code	22ASH37C	CIE Marks	100
Teaching Hours/Week (L:S:SDA)	01:01:01	SEE Marks	
Total Hours of Pedagogy	02*16 = 32hrs	Total Marks	100
Credits	02	Exam Hours	-

Course Learning objectives:

The Course is developed to focus on creating an ecotourism industry and the challenges around it - from the impact on the environment, the construction materials and operational choices - how this industry needs to give back to ensure the ecological context is preserved, protected and to potentially even fund or finance the research and development in the area

Module / Outline

- 1) Bringing in People to monetize an asset and its implications -
 - a) How many people is too many people, is the local context capable of supporting a certain number of people, what are the limiting factors, how can they be mitigated, is it possible to segregate interference, protect the environment or is it easier to control the tourists by keeping them contained.
 - b) Case studies of Safaris, endangered species protected areas, natural environments - such as mangroves, unique grasslands, nesting grounds etc.
 - c) Monetary returns - can the cost of development of eco-sensitive measures be recovered through ticketing, one-time fundraising, overall taxation of the hospitality industry with local cess or other special project development fees.
- 2) What is target audience, positioning and level of service from a design, and planning perspective
 - a) How do we curate environments for specific user groups to ensure that we can provide different solutions for different economic segments, age groups of visitors and other specific expectations of the targeted audience for the businesses.
 - b) Can planning ensure separation of exclusivity and open public access while ensuring that we benefit and serve the maximum audience, but ensure viability, exclusivity and where needed.
 - c) How can research tourism and other niche segments help through partnership building
- 3) Actual impacts of development, infrastructure and supplementary products
 - a) Going from small scale issues to large scale - how do specific Operational choices such as in soaps, reuse of towels and sheets and chemical treatment for pools, lighting and energy efficiency etc. affect the overall sustainability performance of a development. Can we reduce the negative impact from pollution by using natural products rather than chemicals
 - b) The potential for off grid self-contained solutions vs. grid connected infrastructure and cost of providing that connectivity in terms of environmental impact - is it good or bad based on location and density of use planned
 - c) Construction and Capital investment - choice of materials, equipment and development densities and phasing
(short disturbance to environment vs. prolonged disturbance)

Teaching-Learning Process

Collaborative and Cooperative learning: Students should work on various topics as an individual work. The research and learning are be shared with the class.

Blended learning: Power point presentation to elaborate more on key topics . Interaction with experts from the field, Discussions, Debate, Industry interactions, and research paper and inferences from the same.

Assessment Details (CIE)

The weightage of Continuous Internal Evaluation (CIE) is 100%. The minimum passing mark for the CIE is 50% of the maximum marks.

Continuous Internal Evaluation:

Two assignments each of 20 Marks

- First assignment at the end of 4th week of the semester

- Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 10 Marks(duration 01 hours)

At the end of the 16th week of the semester, the sum of two assignments, and quiz/seminar/group discussion will be out of 50 marks.

Suggested Learning Resources:

Books

1. International Cases in Sustainable Travel & Tourism
2. Green Growth and Travelism: Letters from Leaders, by Geoffrey Lipman , Terry DeLacy , Shaun Vorster , Rebecca Hawkins , Min Jiang
3. Taking Responsibility for Tourism by Harold Goodwin, 2011
4. Sustainable Tourism in Island Destinations, Rachel Dodds and Sonya Graci

Course Outcomes:

At the end of the course the student will be able to:

Sl. No.	Particulars	Blooms Level
C01	Students will be able to reflect on multiple user, owner, operator and environmentalist perspectives on such initiatives.	
C02	Students will be able to analyse and interpret the potential for these fund research and development, protection and environmental upkeep, vs. just being a private business driver for profiteering.	
C03	Students will be able to come up with solutions on how we can do it without causing much harm, while supporting R&D, protection and other environmental initiatives.	

Program Outcome of the SH/SA Program

Sl. No.	Particulars	POs
1	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to short term impact as an exercise in a given context and timeframe.	PO1
2	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to medium term impact as an exercise in a given context and timeframe.	PO2
3	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to long term impact as an exercise in a given context and timeframe.	PO3

Mapping of COS and POS

	PO1	PO2	PO3
C01	H	0	L
C02	H	H	M
C03	H	L	L
C04	0	L	M
C05	M	L	M
C06	M	M	L

III-SEMESTER**PROFESSIONAL TRAINING / INTERNSHIP**

Course Code	22ASH38	CIE Marks	-
Teaching Hours/Week (L:S:SDA)	-	SEE Marks	100
Total Hours of Pedagogy	-	Total Marks	100
Credits	03	Exam Hours	-

Objectives:

To provide exposure to the various aspects of Sustainable development and Architecture practice. Internship/Professional practice provide students the opportunity of hands-on experience that include personal training, time and stress management, interactive skills, presentations, budgeting, marketing, liability and risk management,

paperwork, equipment ordering, maintenance, responding to emergencies etc. The objective are further,

- To expand thinking and broaden the knowledge and skills acquired through course work in the field.
- To relate to, interact with, and learn from current professionals in the field.
- To gain a greater understanding of the duties and responsibilities of a professional.
- To understand and adhere to professional standards in the field.
- To gain insight to professional communication including meetings, memos, reading, writing, public speaking, research, client interaction, input of ideas, and confidentiality.
- To identify personal strengths and weaknesses.
- To develop the initiative and motivation to be a self-starter and work independently

Module / Outline

The student will be exposed to preparation of sustainable drawings, detailed project reports, preparation of feasibility report, computer applications in design and drafting, filing system in respect of documents, drawing and preparation of tender documents.

Assessment Details (SEE - VIVA)

The weightage for Semester End Exam (SEE) is 50%. Minimum passing marks in SEE is 50% of the maximum marks of SEE.

- The exam shall be conducted as a panel jury exam, which shall be minimum of 30mins/ student, where the student shall present the work in the form of sheets.
- Discussions, presentations, and studies will cover all the topics.
- The portfolio covering all the assignments shall be presented for term work

Course Outcomes

- Training Report: This shall contain copies of only such drawings, which have been dealt, drafted or designed by student. It shall also contain a brief description of works handled during the training.
- Report Study – This shall include a detailed critical study of a project from the office related to Sustainable development.

At the end of the course the student will be able to:

Sl. No.	Particulars	Blooms Level
CO1	Gain practical experience within industry in which the internship is done.	
CO2	Acquire knowledge of the industry, experience the activities and functions of professionals.	
CO3	Develop and refine oral and written communication skills.	
CO4	Identify areas for future knowledge and skill development.	
CO5	Expand intellectual capacity, credibility, judgment, intuition	

Program Outcome of the SH/SA Program

Sl. No.	Particulars	POs
1	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to short term impact as an exercise in a given context and timeframe.	PO1
2	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to medium term impact as an exercise in a given context and timeframe.	PO2
3	Remembering and developing a summary of positive - negative attributes for economic drivers, ecological -drivers and empathetic drivers in decision making and correlating them to long term impact as an exercise in a given context and timeframe.	PO3

Mapping of COS and POS

	PO1	PO2	PO3
CO1	H	0	L
CO2	H	H	M
CO3	H	L	L
CO4	0	L	M
CO5	M	L	M
CO6	M	M	L

H - High , M - Medium, L - Low

IV Semester

THESIS PROJECT			
Course Code	22ASH41	CIE Marks	50
Teaching Hours/Week (L:P:SDA)	05:10:16*	VIVA Marks	50
Total Hours of Pedagogy	15*16=240	Total Marks	100
Credits	18	Exam hours	Min 30 mins / students

Course Learning objectives:

The Course aims to give the students an opportunity to go through the entire process of project conception, and development of a sustainable project from conception to realization. They will be on a path to present a case for a project, justify the decision making from an economic, environmental and empathetic perspective. They will go through the process of handling various panels of review to get their project cleared for success.

Module

1. A project will have to be conceived individually (ideate over the semester break + initial discussion with advisor followed by 2 weeks to formulate and update the problem statements as below)
 - a. a Business Plan needs to be created defining its mission, goals and objectives
 - b. an Environmental Plan needs to be created with commitments, overall vision and objectives
 - c. a Social Sustainability Plan will have to be created that outlines cultural and social impacts
 2. Outlining the goals, commitment and performance metrics for each of the plans to be submitted after doing conceptual plans of the project and schematics. These will be held as key commitments for performance at the second viva. (4 weeks). Project deliverables (applicable for each stage):
 - a. Social Commitments to stakeholders - such as existing community (rehabilitation and resettlement (R&R) and community future), users of proposed development (their demands for best in class facilities, and ease of doing business and managing and reporting their commitments on environmental compliance etc.), company employees and staff involved in the project (safety, security, amenities during the construction phase) etc.
 - b. Environmental Commitment to Stakeholders - Development of assets for use by people under R&R, facilities and assets for ease of doing business and ensuring compliance to environmental commitments by new users (Centralized CETP, Pollution monitoring, certified services, Zero Liquid discharge, Green belt development and maintenance, water and flood management etc.
 - c. Business case for developer/owner and ability to maximize revenues and values through commitments made for social and environmental reasons. Alternate revenue streams from Environmental assets, potential to use additional economic assets created in support of the R&R community as revenue streams for the development / business case.
 3. (The deliverables will be presented as drawings, schematics, flow charts, business plans, regulatory compliance checklists and associated written strategies - explained with necessary technological, engineering, architectural, planning diagrams, references and schematics, organization structure, policies and procedures, calculations and financial plans as needed to clearly convey the ideas.)
 4. The first Viva - Present the case to a panel providing the case for all three aspects - to get a business approval from “the Board” to go ahead with the project, to get “environmental clearance” through commitments made, and “political buy in” to make sure that locals affected will be provided a new and promising lifestyle ahead (1 week)
 - a. Presentations: (in three sessions)
 - i. Presentation 1 - to a viva committee and peers that will act as the “Company Board”; changes to be incorporated before going to presentation 2.
 - ii. Presentation 2 - to a viva committee and peers that will act as the “Environmental agency”;
 - iii. Presentation 3 - to a viva committee and peers that will act as “local political and community leaders” wanting to ensure that the people’s social needs are addressed effectively.
1. Outlining the goals, commitment and performance metrics for each of the plans to be submitted after doing the detailed version of the proposals. These will be evaluated against the commitments

made earlier. (4 weeks).

2. The Second Viva - Present the case to the same panels with their feedback incorporated into the various aspects with the Detailed version of the proposal working out all aspects to the extent necessary to convince them of the project providing the case for all three aspects - to get a business approval from “the Board” to go ahead with the project, to get “environmental clearance” through commitments made, and “political buy in” to make sure that locals affected will be provided a new and promising lifestyle ahead (1 week)
 - a. Final Presentations: (in three sessions)
 - i. Presentation 1 - to a viva committee and peers that will act as the “Company Board”; changes to be incorporated before going to presentation 2.
 - ii. Presentation 2 - to a viva committee and peers that will act as the “Environmental agency”; changes to be incorporated before going to presentation 3.
 - iii. Presentation 3 - to a viva committee and peers that will act as local political and community leaders wanting to ensure that the local population is addressed effectively.
3. A post-mortem analysis of the process, its sufficiency and areas where there are hurdles that need to be resolved - both good and bad -
 - a. Potential issues with regard to regulations, guidelines and rating systems that do not allow you to present your compliance effectively for “environment clearance” and areas that though have been addressed do not make an impact when evaluated.
 - b. Areas where the systems and process favored the implementation, but you felt the impact could have been better, but you were unable to stretch yourselves within the limited regulatory requirements to convince “the board” to spend on those initiatives.
 - c. Areas where the regulations do not call for and environmental guidelines do not address the needs for the people but given the chance the business case will still allow something like that if we were to stretch the business case by adding an additional business initiative that could function successfully. Provide a presentation on this to the advisor (3 weeks).
4. Incorporate some of the suggestions made by you into the overall Business Plan, Environmental Plan and Social Sustainability Plan that will enhance the overall intent of the project - and suggest additional means and methods that could be used to ensure that all three are sustainable - such as use of government grants or schemes to fund aspects of it, adding a new supplementary business plan to address some social or environmental causes, additional environmental protections or such initiatives that could be funded using additional local taxes, cess, regulatory fees which will still be feasible. (3 weeks)
5. Final Viva - presenting your finding, the improvements made and potential scope of stretching the solutions beyond the ordinary requirements to make it fully sustainable. All previous Panelists and Advisor will be part of the final Viva (1 week)

Note to Guides and Students in Project Selection for Thesis:

It is important to look at the complexity of the overall project in the context of issues to be addressed and the flow of arguments that will build this narrative for it and the solutions that can be provided. The student’s success is not necessarily linked to the complexity of scale of the project but more on the issues that need to be overcome and the value additions that can be made to the process - hence everything from a rural rehabilitation scheme to eco-tourism, industrial parks, smart cities (Greenfield or Brownfield) can be taken up pursuant to the ability of the student to address all of these steps as a process and come through it with an understanding of how to truly be sustainable

VIVA pattern:

- The exam shall be conducted as a panel jury exam which shall be minimum of 30 mins/ student, where the student shall present the work in the form of sheets.
- Discussions, presentations, and studies will cover all the topics.
- The portfolio covering all the assignments shall be presented for term work

Suggested Learning Resources:

All books/ Journals/ Magazines/ unpublished thesis related to the topic selected by the individual student.

Web links and Video Lectures (e-Resources):

<http://www.ndmaindia.nic.com>

<http://www.nidm.gov.in>

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

<u>Sl No.</u>	<u>Particulars</u>	<u>Blooms Level</u>
<u>C01</u>	Students will be able to develop a strong project outline, without applied thoughts to all aspects of the project	
<u>C02</u>	Present a compliant case that covers all technical requirements of the project with strategies that will show technical acumen in being able to respond to the requirements of the regulatory frameworks, rating systems and other evaluation systems available	
<u>C03</u>	Students will be able to go beyond the normal and understand how this can be stretched to maximize sustainability in the given context by addressing out of the box ideas and developing solutions to resolve them - not just compliant by being truly sustainable.	

Program Outcome for SH/ SA Program:

<u>Sl No.</u>	<u>Particulars</u>	<u>POs</u>
<u>1</u>		
<u>2</u>		
<u>3</u>		

Mapping of COs and POs:

	PO1	PO2	PO3
C01	M	L	M
C02	H	H	H
C03	M	H	H
C04	H	H	H
C05	L	M	L
C06	M	-	L

H – High , M – Medium, L – Low

IV Semester

DISASTER MITIGATION & MANAGEMENT			
Course Code	22ASH42	CIE Marks	50
Teaching Hours/Week (L:P:SDA)	01:01:00	Viva Marks	50
Total Hours of Pedagogy	02*16=36	Total Marks	100
Credits	2	Exam Hours	---
Course Learning objectives:			
The Course is developed to focus on environmental and social sustainability focused disaster mitigation and management as opposed to being only driven by calamities of a natural disaster..			
Module-1			
Understanding what constitutes a disaster and defining its parameters. The point of no-return beyond which the sustenance of the project, current way of life etc. are threatened to come to an end because it cannot be sustained economically, environmentally or culturally			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to understand the basic components of risk management. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same</i>		
Module-2			
Understanding that Disaster Scenarios are many, and when we look at it from a sustainability perspective, our responses to them change significantly			
Teaching-Learning Process	<i>ICT and Digital support: Power point presentations to explain the risk identification process, response and communication. Blended learning: Risk identification in live projects and preparing the probability matrix using software.</i>		
Module-3			
Cultural change and its impact on sustenance leading to disaster scenarios. The abandonment of a lifestyle or practice as it is deemed non-lucrative, non-respectable or culturally demeaning. What are such scenarios, how can this be changed, and what kind of training, incentives - either monetary or otherwise be used to mitigate these circumstances			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Group assignments and case studies to be presented to discuss the various construction risks involved and safety programmes for same.</i>		
Module-4			

Economic Disaster - when the current way of life, environment or business cannot be continued due to it being unviable economically, what can be done to position the initiatives better, improve the situation on the ground, develop alternative business models and potentially look at funded, subsidized or grant based models for boosting short term to long term recovery solutions needed for them.

Teaching-Learning Process	Collaborative and Cooperative learning: Knowledge sharing of students through seminars and presentations.
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Module-5

Environmental Disaster - destruction of the environment, threat to species from man, business or other natural causes, devising protection against human interference if appropriate, from businesses by legislation, regulation or incentives, from nature itself such as building protective measures (anti-erosion sea walls, afforestation de-silting etc.)

Teaching-Learning Process	Collaborative and Cooperative learning: Preparing a detailed report of risk assessment, response and mitigation for a live / hypothetical project.
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ASSESSMENT DETAILS (BOTH CIE AND VIVA-VOCE):

The weightage of Continuous Internal Evaluation (CIE) is 50% and for viva-voce examination is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in viva voce examination is 50% of the maximum marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and viva voce marks taken together.

Continuous Internal Evaluation:
CIE marks shall be awarded by a committee comprising of Principal/Dean, PG Course Coordinator/HOD and Guide/Co-guide of the department. The CIE marks awarded for PEC (professional elective course), shall be based on the progress of the student throughout the semester, presentation skills in seminars and submission of the report.

Viva-voce Examination:

1. The student needs to submit his/her report done throughout the semester, including the data collection for the Viva examination, at least one day prior to the Viva examination to the PG course coordinator/HOD.
2. The Viva-voce will be evaluated by external examiners appointed by the University along with PG Course coordinator/ guide/ co-guide or an internal examiner.
3. The viva-voce marks awarded for PEC (Professional elective course), shall be based on the evaluation of report submission, presentation skill and performance in Question-and-Answer session in the ratio 30:10:10.
4. The viva-voce marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution.

Web links and Video Lectures (e-Resources):

- ☒ Project risk management |PMP certification
https://youtu.be/HyGb_eaT-U8
- ☒ Lecture 51: Occupational Health & Safety Management Systems(OH&SMS) and OHSAS 18001-Part I
<https://youtu.be/Rr-xFmErOTk>

Skill Development Activities Suggested:

- Guest lectures
- Case studies of live projects
- Webinars / seminars

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

<u>Sl No.</u>	<u>Particulars</u>	<u>Blooms Level</u>
<u>CO1</u>	Students will be able to analyse and understand that giving importance to the stakeholders, the economic scenarios and the environment is equally important for success	
<u>CO2</u>	Responses that are not sensitive to potentially adverse outcomes or are not fully resolved from all three perspectives will fail due to the inability to either fund, protect or continue to enjoy and take pride in doing what they do.	

Program outcomes of SH/SA course

<u>Sl No.</u>	<u>Particulars</u>	<u>POs</u>
<u>1</u>	To view disaster management as an ongoing process and mitigate environmental deterioration.	PO1
<u>2</u>	To identify ongoing depletion of resources and energy and base course study on this premise.	PO2

Mapping of COS and POs:

	PO1	PO2
CO1	H	M
CO2	H	M

H - High , M - Medium, L - Low

PROFESSIONAL ELECTIVE II			
Course Code	22ASH43X	CIE Marks	00
Teaching Hours/Week (L:P:SDA)	01:01:00	Viva Marks	00
Total Hours of Pedagogy	02*16=32	Total Marks	100
Credits	02	Exam	Min 30 mins / students
ASSESSMENT DETAILS (BOTH CIE AND VIVA-VOCE):			
<p>The weightage of Continuous Internal Evaluation (CIE) is 50% and for viva-voce examination is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in viva voce examination is 50% of the maximum marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and viva voce marks taken together.</p> <p>Continuous Internal Evaluation: CIE marks shall be awarded by a committee comprising of Principal/Dean, PG Course Coordinator/HOD and Guide/Co-guide of the department. The CIE marks awarded for PEC (professional elective course), shall be based on the progress of the student throughout the semester, presentation skills in seminars and submission of the report.</p> <p>Viva-voce Examination:</p> <ol style="list-style-type: none"> The student needs to submit his/her report done throughout the semester, including the data collection for the Viva examination, at least one day prior to the Viva examination to the PG course coordinator/HOD. The Viva-voce will be evaluated by external examiners appointed by the University along with PG Course coordinator/ guide/ co-guide or an internal examiner. The viva-voce marks awarded for PEC (Professional elective course), shall be based on the evaluation of report submission, presentation skill and performance in Question-and-Answer session in the ratio 30:10:10. The viva-voce marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution. 			
Suggested Learning Resources:			
1.			

Web links and Video Lectures (e-Resources):

- ☒ Project risk management |PMP certification
https://youtu.be/HyGb_eaT-U8
- ☒ Lecture 51: Occupational Health & Safety Management Systems(OH&SMS) and OHSAS 18001-Part I
<https://youtu.be/Rr-xFmErOTk>

Skill Development Activities Suggested:

- Guest lectures
- Case studies of live projects
- Webinars / seminars on infrastructure management
- Certification course on site safety management

