



Gyanmanjari
Innovative University

Course Syllabus
Gyanmanjari Institute of Technology
Semester-2

Subject : Smart City Development & Automation - METCP12516

Type of course: Minor Stream

Prerequisite: NIL

Rationale: smart city development and automation lies in leveraging technology to enhance urban efficiency, sustainability, and quality of life. By integrating advanced digital infrastructure, data analytics, and connectivity, smart cities aim to optimize resource use, improve service delivery, and reduce environmental impact. Automation plays a crucial role in streamlining operations, from transportation and energy management to public services and governance.

Smart city initiatives aim to address urban challenges such as traffic congestion, pollution, and inadequate infrastructure through innovative solutions like IoT-enabled sensors, AI-driven systems, and predictive analytics. These technologies not only enhance operational efficiency but also promote inclusivity and accessibility for all residents. Moreover, smart city development fosters economic growth by attracting investments in technology and infrastructure, creating opportunities for innovation and entrepreneurship. Ultimately, the goal is to create sustainable, resilient urban environments that improve the overall well-being and satisfaction of citizens while paving the way for future-oriented, digitally integrated cities.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P		C	Theory Marks		Practical Marks		
			ESE		MSE	V	P	ALA	
4	0	2	5	60	30	10	20	30	150

Legends: CI-Class Room Instructions; T- Tutorial; P - Practical; C - Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V - Viva; CA - Continuous Assessment; ALA- Active Learning Activities.



Course Content:

Sr. No	Course content	Hrs	% Weightage
1	Smart City Planning, Development and Management: Introduction to smart city planning, stakeholders, key trends in smart city developments, dimension of smart city, global standards and performance benchmarks, practice codes, financing, governance, maintenance and management.	10	10%
2	Sustainable Smart Cities: Concept of sustainability, rating systems, planning of sustainable smart cities, application of computer in planning and management.	10	10%
3	Energy Efficient Building Design and Building Automation: Introduction, intelligent architecture and structure, Intelligent Building criteria –the internet of things, intelligent homes. Natural building design consideration, energy efficient design strategies, contextual factors-longevity and process assessment, renewable energy sources and design, advanced building technologies, smart, energy efficient and environment friendly building, thermal phenomena, thermal-comfort, indoor air quality, passive heating and cooling systems.	14	30%
4	Control Systems in Building: Lighting and other electrical system, automatic control systems, control issues related to energy conservation, air quality, thermal comfort, ventilation., advanced plumbing systems, fire safety, monitoring system, use of mobile applications, automation in parking system.	14	30%
5	Automation and Robotics in Construction Industry: Need and Benefit of automation and robotics in construction industry with respect to time, cost, quality, safety, Use of robots for construction activities, 3D Scanner for surveying and project management, Virtual Reality, Augmented Reality, Building Information Modeling (BIM).	12	20
Total		60	100

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	Prepare smart city plan: Faculty will give the area for smart city planning. Student will prepare the smart city plan in software(e.g. AutoCAD, Sketch-UP, etc.) and upload on GMIU Web Portal.	10
2	Building Automation: Faculty will assign the individual student to design their own home convert	10



	into possible building automation. Students will prepare the plan of building automation in software and upload it on GMIU Web Portal.	
3	Learning Software: Faculty will assign to learn students to learn the Building Information Model software. Student will learn the mention software and prepare the layout given by faculty and upload on GMIU Web Portal.	10
Total		30

Suggested Specification table with Marks (Theory):60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	NA	NA	NA	NA	NA	NA

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course, the students should be able to:	
CO1	analyse trends, apply standards, and strategize financing for effective smart city development.
CO2	integrate sustainability concepts, apply rating systems, and use technology for planning resilient smart cities.
CO3	incorporate IoT, renewables, and passive systems for energy-efficient building designs.
CO4	design advanced control systems, integrate sensors, and ensure efficient building operations.
CO5	implement automation, robots, and digital tools for efficient construction processes.

List of Assignment

Assignment and tutorial base on above mention topic.



Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Text Books:

- [1] A city for all: valuing differences and working with diversity, Jo Beall, Zed book
- [2] Smart Buildings Systems for Architects, Owners and Builders, James M. Sinopoli, Butterworth-Heinemann
- [3] Smart City technology and portfolio of smart services, Dr. Deepak S. Gade

