GTU E-Courses on

Smart Cities Development

(In context of 100 Smart Cities Initiative in India)

Available E-Courses

1. *Smart Cities Planning and Development*
2. *Project Management in Smart Cities*
3. *Application of Solar Energy for Smart Cities*
4. *Green Buildings in Smart Cities*

Course Duration: 16 weeks (Starting from Jan 2016)
Course fee: INR 12,000/-
Mode of Delivery: Online
Last Date of Application: January 22, 2016

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Graduate School of Smart Cities Development

Gujarat Technological University

AHMEDABAD INDIA

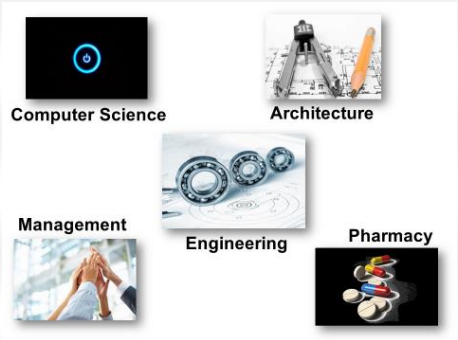
About GTU

Gujarat Technological University (GTU) is the largest government university in Gujarat, catering to the fields of Engineering, Business Management, Computer Science, Pharmacy and Architecture. GTU is having a pool of more than 4,50,000 students and 18,000 professors teaching in 461 affiliated institutes across the state of Gujarat.

GTU has initiated a number of innovative policies and it has put in place systems to develop GTU into a great university. Today GTU is considered to be the benchmark among the technological universities of India. Its industry-oriented academic programs and its efforts for establishing and maintaining an active relationship with industries and businesses through GTU Innovation Council has been recognized as the most successful effort in the country. Its Internationalization effort, its Student Start-up Support System (S4) and its programs for dissemination of knowledge about IPR are by far the best and most extensive university programs in India.

GTU has established fourteen Post-graduate Research Centres, including the Centre for Infrastructure, Transport and Water Management, Centre for Environmental and Green Technologies and Centre for Environment and Energy Efficiency. It has sixteen Research Groups and four Boards for Research & Development Boards.

The Innovation Council of GTU is well known in the country for its initiatives in grass root innovation work by the engineering students for solving problems of SME industrial units located throughout Gujarat. Intensive innovation efforts have resulted in many patentable outcomes. GTU's Policy Documents for Student Start-up Development and for Skill Development Mission are being used by universities all over India.



About GTU-Graduate School of Smart Cities Development (GGSSCD)

Gujarat Technological University has set up the Graduate School of Smart Cities Development (GSSCD) so as to create a resource centre for the nation which understands the requirement of the cities and citizens and helps in the smart development by producing required human resource, relevant research and by encouraging and welcoming projects in smart technologies in its incubator space. The Graduate School will contribute by imparting education, related to smart cities development. The Graduate School will also be involved in the research, consultancy and capacity building activities to support the governments at all levels.

The Graduate School seeks to involve industries and the society to ensure that its studies and research have a relevance to the needs of the society and the industries. Therefore, there the graduate school has invited KNOWLEDGE PARTNERS from industry and from cities to avail of their real life experience. Currently there are five KNOWLEDGE PARTNERS.

The Graduate School also promotes institutes for research partnership to carry out the research for the components at grass root level of smart city development. Therefore, the Graduate School Invited educational and research institutes of GTU and others to become Research Partner with the graduate school and created the only one of its kind of network of expert from various domain of expertise for contribution to smart cities development. Currently there are 19 institutes in Gujarat and one institute in New Zealand as Research Partners of the Graduate School.

Vision of GTU-GGSSCD

To become a national resource centre in smart cites development by developing as a point of confluence for Industry, Academia and Government and help developing policies and plans at various Governmental levels.

Objectives of GTU-GGSSCD

Academic

- One year full time post graduate diploma (PGD) course on smart cities development from next year.
- Conducting short certificate courses on related topics for developing skilled workforce.
- E-courses on various aspects of organization, technologies and life in smart cities.
- To become a National Resource Centre in smart cities development by developing as a point of confluence for Industry, Academia and Government and help developing policies and plans at various Governmental levels

Research

- To work with universities and research institutions across the globe to develop new technologies
- To conduct research on the requirements of the Indian cities & citizens and help determine the best of technologies being used across the world in Indian context in collaboration with GSSCD Research Partners.
- To develop strategies for development, which enhances cultural strength of our diverse society in the area, where the smart city is located.

Consulting & Advisory

- Organizing Seminars / workshops /symposium in India.
- Capacity building and training by training municipal engineers and managers, government officers and industrial workers, required for smart cities.
- Advisory functions to government and industry.
- Techno management consultancy

GTU-GSSCD Knowledge/Research Partners

Gujarat International Finance-Tech City

Gujarat Infrastructure Development Board

Gujarat Energy Research & Management Institute

CMAI Association of India, New Delhi

Christchurch Polytechnic Institute of Technology (CPIT), New Zealand (Research Partner)

GTU-GSSCD Activities

Lighting of lamp by Hon'ble Union Minister Shri M. Venkaiah Naidu on Inauguration of Graduate School on April 18, 2015

Vote of thanks by Shri Rajnikant Patel, Honorary Director, GSSCD. on Inauguration of Graduate School on April 18, 2015

Lighting of lamp by Hon'ble Minister Shri Bhupendrasingh Chudasama, GoG & Shri Dhanksukh Bhanderi, Chairman, GMFB, on 3 day smart city training workshop July 10-12, 2015

Mr. Pratap Padode, Director- Founder, Smart Cities Council India giving presentation, on 3 day smart city training workshop July 10-12, 2015

Key Note Speech by Mr. Neelesh Kelkar, Head Smart city Development, IBM, India during Research Partners' smart city workshop on August 22, 2015

Visit to Heritage city Ahmedabad: Group picture of participants, during the three days smart city training workshop July 10-12, 2015

Lecture by Mr. Ravi Kumar Kanduri, Director, AECOM USA on Dholera Smart City Development during Research Partners' smart city workshop on August 22, 2015

Corporate Presentation by Mr. Nilesh Purey, Vice President, ICT, Gujarat International Finance Tec-City Co. Ltd., during the Visit to GIFT city, Gandhinagar on August 22, 2015

E-Course Name: **Smart Cities Planning and Development**
Course Code: **GSSCDE501**

Course Summary

Urbanization is not only associated with economic development but over the time it started aspiring people to better quality of life. Cities are seen as solutions for boosting economy, generating employment, creating skills, providing better health services and many more things. Expression of change from being habitat to providing such breadth of services was not brought in a day; cities have eventually developed into these dimensions. However, the state of urban service delivery in India's cities and towns is far poorer than is desirable for India's current income levels. Considering that the Indian economy has been one of the fastest growing economies in the world for some time, and aspirations and standards are raising, the current state of service delivery is simply unacceptable. Moreover, a successful city cannot operate efficiently in isolation from its environment. It must balance social, economic and environmental needs. Smart Cities focus on their most pressing needs and on the greatest opportunities to improve lives. They tap a range of approaches – digital and information technologies, urban planning best practices, public private partnerships, and policy change – to make a difference. They always put people first. During this course on Smart Cities Planning and Development, Let's understand the dynamics of an Indian city and learn smart ways to plan, management and maintain our cities.

Course Objective

- Understanding the concepts, discourses and practices of "Smart Cities" across Globe: US, EU, UK, Middle East and South East-East Asia experiences
- Critical reflections on juxtaposition and relevance for smart cities of developing economies considering issues as Inclusiveness, Feasibility, Sustainability
- Understanding of road map for Planning Smart Cities and benchmarking their performance for Indian context

Course Modules

Module 1
- Introduction to "'City Planning"

Module 2
- Understanding Smart Cities

Module 3
- Dimensions of Smart Cities

Module 4
- Global Experience of Smart Cities

Module 5
- Smart Cities –Global Standards and Performance Benchmarks, Practice Codes

Module 6
- India "100 Smart Cities" Policy and Mission

Module 7
- Smart City Planning and Development

Module 8
- Financing Smart Cities Development

Module 9
- Governance of Smart Cities

Perspective Participants

The course shall offer a good academic and career enhancement prospects to the aspirants like Entrepreneurs, Employees of Private/Government sectors, Members of NGOs, Consultants or Students.

The aspirant having the academic or professional backgrounds from Architecture, Civil Engineering, Information and Communication Technology, Business Management and Commerce, Science, Sociology and other relevant area are likely to get maximum advantage from this course.

E-Course Name: Project Management in Smart Cities
Course Code: GSSCDE502

Course Summary

Project Management would be an integral facet for smart infrastructure and cities. Smart City projects involve great technical complexity, and require a wide diversity of skills to control and monitor them. Like other complex mega infrastructure projects Smart City projects are subjected to risk and uncertainties throughout all the phases leading to huge time and cost overrun. Managers are faced with the problem of putting together and directing large temporary organizations while being subjected to constrained resources, limited time, and environmental uncertainty. To cope with complexity and uncertainty, new forms of project organization and management have evolved. Project management plays an important role in developing the Smart Cities. Project management has grown in response to the need for a managerial approach that deals with the problems and opportunities of modern society. It provides the diversified technical and managerial competency and decentralized communication and decision making necessary to meet the challenges of complex, unfamiliar, high-stakes activities. Application of modern project management tools would ensure more collaboration, more communication flow and much flawless implementation of Smart City projects. Modern project management concepts of application of Integrated Project Delivery (IPD) and Building Information Modeling (BIM) would reduce the co-ordination problems and would ensure much higher probability of successful completion of the projects within stipulated time and cost frame.

Course Objective

This course is designed to give exposure to project management tools and techniques applicable for planning, controlling & monitoring of Smart Infrastructure and Cities. This course would also enable to develop insight for managing project risks, uncertainties and complexities of smart cities project.

Course Modules

Module 1
- Introduction to Smart Cities
- Philosophy & Concepts of Project Management

Module 2
- Phases, Stages of Project & their Approval Status
- Work Breakdown Structure

Module 3
- Project Organization Structure
- Planning, Scheduling & CPM

Module 4
- The PERT Model

Module 5
- Project Cost Analysis
- Updating a Project

Module 6
- Resource Allocation & Levelling
- Line of Balance Technique

Module 7
- Project Monitoring & Control
- Project Risk Management

Module 8
- Case Studies on PM of Smart Cities

Perspective Participants

- B.E / B. Tech (Any Branch),
- B. Arc. (Bachelor of Architecture)
- B.Sc., B.Com. B.A.
- MBA (Any Stream)

E-Course Name: Application of Solar Energy for Smart Cities
Course Code: GSSCDE503

Course Summary

It is estimated that by the year 2050, the number of people living in Indian cities will touch 843 million. To accommodate this massive urbanization, India needs to find smarter ways to manage complexities, reduce expenses, increase efficiency and improve the quality of life. Hence the Govt. of India planned to introduce 100 smart cities in the country. A smart city, by definition, will have smart communication network for efficient utilization as well as ultrafast response to the demand and supply management. Out of many important aspects, the smart city is projected to have green energy for smarter solution of environmental issues. India needs to add at least 250-400 GW of new power generation capacity by 2030. In order to keep a balance of the environment, the Ministry of New and Renewable Energy has plans to add capacity of 30,000 MW in the 12th Five Year Plan (2012-17). Two major contributors to the renewable energy are solar energy and Wind energy. The majority of solar energy generation is meeting today by the solar photovoltaic and solar thermal technologies. In the projected course, the incumbent will be trained on the solar photovoltaic and solar thermal technologies applicable for smart city development. The e-course will focus on the technology, policies and their impact on the ambitious 100 smart city program.

Perspective Participants

Active professionals like engineers working in govt. sectors who are dealing with energy issues directly or indirectly, aspirant students who wants to make carrier in the green energy generation, utilization and related development of infrastructure can be highly benefited from the e-course **'Application of Solar Energy for Smart City Development'**

Course Modules

Module 1

- Conventional vs. Smart, City components, Energy demand, Green approach to meet Energy demand, Index of Indian cities towards smartness – a statistical analysis.

Module 2

- Energy scenarios of conventional cities, Consequences, Alternative resources, Reliability on predictability scale, Solar options, PV and thermal; Singular or hybrid.

Module 3

- Meeting energy demand through direct and indirect solar resources, Efficiency of indirect solar resources and its utility, Capacity limit for the indirect solar resources, Effectiveness in responsive environment in smart city; Smart communication using green resources.

Module 4

- Process heating and cooling; Solar cooler and its capacity limit, Various solar concentration methods and their utility on smart perspective, Process heating and cooling for BOS of smart city.

Module 5

- Introduction to PV technology, PV of various scale for smart city applications, Energy efficiency, Policies of Solar PV in smart domains (RPO, REC, Carbon credit, etc.)

Module 6

- Definition, Structure of Smart Grid, Indian Perspective, Advantage & limitation, Volume of Capital flow, Evaluation/integration of large volume Renewable in Smart grid

Module 7

- Structural concept, Specific applications, Perspective in Smart Cities, Conceptual Application in process control and stabilization

Module 8

- Drive green in Smart city, FEV, HEV, Application of Solar in mobility, Matching demand and supply of energy in typical Smart city through Green mobility

E-Course Name: **Green Buildings in Smart Cities**
E-Course ID: **GSSCDE504**

Course Summary

Smart Mardsan city has gone "Always clean, always green" The city has been remodelled, improved and made sustainable. Let's learn how we can make India Clean and Green!

Smart cities should have green and energy efficient buildings which have potentials of bringing economic changes and raising the efficiency both ecological and economic efficiency while ensuring that the cost of natural resources exploitation is within the acceptable range.

The basic philosophy for the proposed Course on "Green Buildings" is to meet the challenge of ensuring excellence in the most critical part of Smart Cities – green buildings and energy conservation system in buildings. The major emphasis is designing the course on the principle of outcome based education. The students will at the end of the programme be able to:

- Understand basic principles and concept of green as well as energy efficient buildings as a part of Smart, sustainable development
- Learning energy conservation building code (ECBC) 2007
- Optimizing/designing the green building system and use of sustainable materials
- & M and Energy audit of green building
- Rating the green building systems

Perspective Participants

This course is useful for those who are interested to provide green solutions, who wish to learn how to make sustainable/good practices and who aspires to be green building raters to evaluate the green building systems.

The ideal participants could be Environmental Engineers, Civil Engineers & Architects, Town planners, Mechanical and Electrical Engineers having attitude to learn and aptitude to be a nation builder by contributing in smart Cities Development

Course Modules

Module 1
- **Sustainability**

Module 2
- **Green Buildings**

Module 3
- **Rating System of Green Building**

Module 4
- **Energy Efficient Building - I**

Module 5
- **Energy Efficient Building - II**

Module 6
- **Energy Saving System in Buildings - I**

Module 7
- **Energy Saving System in Buildings - I**

Module 8
- **Wrap Up of All Modules**

- Introduction, concept and philosophy
- Concepts, elements, benefits, important aspects of resource conservation and efficient utilization of resources, pervious concrete for parking lots
- GRIHA, LEED and IGBC rating system
- Energy conservation concept in building, heating in cold regions and cooling in hot climatic conditions, use of solar energy for heating, internal sources of heat and heat storage system, cooling concept – orientation of building, shading and ventilation
- Energy in building construction, energy saving potential in India, parameters, ECBC requirements and compliances
- Thermal insulation and energy savings, building insulation practices, windows and energy savings, building form and lighting systems, energy audit in buildings

Course Methodology

The online certificate E-courses on Smart Cities Development are conducted exclusively through electronic mode by **Gujarat Technological University**. The course consists of **3 credits** and is an online distance learning programme where the participants study, and complete their assessment through quizzes and assignment from their preferable location. The course will last for **16 weeks**. The course has been designed to recreate a classroom learning environment via online learning where reading materials and tools are provided for each modules.

Course Assessment

The Students will be able to engage fully with the programme content and with their peers, via lectures, discussion boards, group work, online chat, question and answer sessions and through the provision of peer to peer feedback and assessment. The course will however require strong commitment from the participant and they are expected to devote approximately 8–10 hours per week for online and self-study work. The Assessment shall be done through the regular quizzes and assignment submission for the modules.

Course Delivery

- E-lecture sessions on dedicated GTU E-Learning Portal
- Review of Case studies
- Videos: Short talks and Case videos
- Participatory exploration
- Online group discussions and debates.

Successful Completion

There will be minimum one Individual Assignment for the assessment of the participants.
Completion Criteria: 50% will be the passing marks for all Quizzes and Assignment/s, separately and as well as for the entire course.

Practical Information on How to Apply

Entry Requirements

Applicants should have a Bachelor Degree from a recognized university with minimum 50% in Graduation.

English language and IT Requirement

The medium of instruction is English. Applicants must have adequate knowledge of English to undertake the course. This includes reading of academic texts books, journal papers and white papers, discussing complex concepts with other course participants and writing essays, etc.

Access to computer with a reliable internet connection is required.

E-Course Fees

- Individual from Academic Institutions, Research Institute, Government Agencies, Industries/Non-Academics, Non-Government Agencies & Public Sector Units, etc: Rs.12,000/- per student (Indian Rupees twelve thousand only).
- GTU wants to create strong and knowledgeable organizational units. Hence Discounted fees for a group of minimum 5 students: Rs.10,000/- per student (Indian Rupees ten thousand only).
- Fees from overseas participants: USD 400/- (United States Doller four hundred only) per participant to be paid by Bank Demand Draft in favour of **Gujarat Technological University** payable at **Ahmedabad** to be sent to our address.

How to apply

Step 1: Fees Payment Details: Please refer fees payment instructions on following link before making the payment.
https://goo.gl/NAFjv9
Course fee payment can be done online on SBI collect by clicking on the following link.
https://www.onlinesbi.com/prelogin/institutiontypedisplay.htm

Step 2: After paying the fees amount in step 1, applications must be submitted online via following link
http://smartcities.gtu.ac.in/login/index.php
Register yourself at the GTU-GSSCD website on the above link. Click on the "C**reating New Account"** and follow the instructions. Additional inquiries can be addressed by email on **smartcities.graduateschool@gtu.edu.in**

Step 3: Send soft copy/scanned copy of following to **smartcities.graduateschool@gtu.edu.in** with the subject as "Registration for E-Course: (Your Username same as entered in the step 1 during application)"

1. Fees Payment Receipt
2. Highest Qualification Certificate
3. Recent Photograph
4. Photo ID Card

Certification

On Successfully completion of the course/s, the participant/s will be entitled for Certificate of Accomplishment for the completed course from Gujarat Technological University, Ahmedabad, India

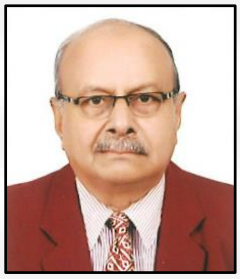
GTU E-Course Team

VICE CHANCELLOR

Dr. Akshai Aggarwal,
Hon'ble Vice Chancellor,
Gujarat Technological University.

REGISTRAR

Shri J. C. Lilani,
Registrar,
Gujarat Technological University.



Hon. DIRECTOR

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Some more Faculty Members may also be invited to join the team in various capacities, depending upon the number of participants, who register for the course.

CO-ORDINATORS

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