Integrating education with consumer behaviour relevant to energy efficiency and climate change at the universities of Russia, Sri Lanka and Bangladesh (BECK)

MODULE SPECIFICATION

Originating Institution, Department	Module Co-ordinator(s)
Patuakhali Science and Technology University (PSTU), Department of Geo-Information Science and Earth Observation	Mr. Md. Mahmudul Hasan, Assistant Professor, Dept. of Geo-Information Science and Earth Observation, PSTU

TITLE OF THE MODULE

Title of the module	Module code[1]
Spatial Urban Planning and Climate Change	GEO 5211

PROGRAMME(S) IN WHICH TO BE OFFERED:

Geo-Information Science and Earth Observation

LEVEL OF STUDIES[2]

First cycle (BSc/BA) ☐	Second cycle (MSc/MA) ☒	Third cycle (PhD) ☐

CREDITS AND LEARNING HOURS

Credit Value[3]	ECTS Value[4]	Indicative academic learning hours[5]	Length (in Semesters)[6]	Year in which to be offered
2	2	60*	1 (6-months)	2

* In Bangladesh, 2 credit value represent 16*2=32 contact hours. We have added additional 28 notional hours for this course which will be achieved by assignment and homework.

11.10.2021

Professor Dr. Swadesh Chandra Samanta
Vice-Chancellor
Patuakhali Science and Technology University
Dumki, Patuakhali-8602

[1] To be indicated by the Institution
[2] According to the Framework of Qualifications for the European Higher Education Area, Annex 8: http://www.aic.lv/ace/ace_disk/Bologna/Bergen_conf/Reports/EQFreport.pdf
[3] Permissible credit values as set out in Institution's Academic Regulations
[4] European Credit Transfer System, 1 ECTS = 25-30 academic learning hours. Please refer to ECTS Users' Guide: https://ec.europa.eu/education/ects/users-guide/docs/ects-users-guide_en.pdf
[5] 1 academic learning hour is equal to 45 minutes
[6] Indicate 0.5, 1, 1.5 or 2

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This module specification reflects the views only of the authors and the Commission cannot be held responsible for any use which may be made of the information contained therein

Course Details

(As per guideline of University Grants Commission, Bangladesh)

Programme: Department of Geo-Information Science and Earth Observation
Degree: Master of Science

Part A- Introduction

1. Course Code		GEO 5211
2. Course Title	:	Spatial Urban Planning and Climate Change
3. Course Type	:	Electives (Online)
4. Level/Term and Section	:	Level-5, Semester-II
5. Academic Session	:	2015-16 and onward
6. Pre-requisite (If any)	:	Not applicable
7. Credit Value	:	02 (Two)
8. Contact Hours	:	32 (Thirty-Two)
9. Total Marks	:	100
10. Course Objectives	:	The main objective of this online course is to produce skilled graduate for spatial urban planning in the context of climate change using GIS and RS tools and techniques.
11. Course Learning Outcomes (CLO)	:	At the end of the course, the student will be able to: **CLO-1:** Describe the importance of urban planning and climate change module and define the basic terminology including urban, urban planning, climate change, geographic information system, and remote sensing; **CLO-2:** Characterise the urban determinants of climate change and explain the effects of climate changes on cities; **CLO-3:** Explore possible ways to combat with climate change through implementing several spatial urban planning measures; **CLO-4:** Characterized the possible barriers to climate change adaptation in urban planning and explain the ways of overcoming them; **CLO-5:** Analyse the decision support system and assessment tools for urban planning in the context of climate change; **CLO-6:** Develop conceptual modelling of cities in the aspects of urban community and climate change; **CLO-7:** Design and make decisions in the development of spatial urban plan in relation to energy efficiency and climate change, based on participants' city contexts by using modern ICT technologies specially GIS and RS; **CLO-8:** Develop sustainable urban planning in the context of the dynamic world.

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This module specification reflects the views only of the authors and the Commission cannot be held responsible for any use which may be made of the information contained therein

Professor Dr. Swadesh Chandra Samanta
Vice-Chancellor
Patuakhali Science and Technology University
Dumki, Patuakhali-8602

Part B- Content of the Course

Topics	Specific Outcome(s)	Time Frame	Teaching Strategy(s)	Alignment with CLO
Introduction and Fundamental Aspects: Concepts of urban, Urbanization- global scenario, Urban planning: definition and objectives, Brief History and Evolution of Urban Planning, Climate Change, The discovery of changing climates, Responses to climate change, Geographic Information System (GIS), Remote Sensing	• To acquire the general idea about the course • To grasp the content and strategy for the class • To introduce the basic terminology	Week 1	• Audio-visual materials • Online lecturing • Group discussion • Q&A session	Developed interest of the students on SUP & CC, and basic terminology linked with CLO 1.
Urban Climate Change: Driver and Effect: Climate change and cities, drivers of urban climate change, effects of climate change on cities	• To discuss the connection between cliamte change and cities • To characterize different drivers and urban climate change • To explain the effects of clinate chagne on cities	Week 2 Week 3	• Audio-visual materials • Online lecturing • Group discussion • Q&A session • Big data mining	Linked with CLO 2.
Mitigation and Adaptation to Climate Change and Spatial Urban Planning: Urban form and structure, urban greening and green infrastructure practices, blue spaces, green transportation, strategies and frameworks	• To describe the possible mitigation and adaptation measures to climate chagne through spatila urban planning	Week 4 Week 5	• Audio-visual materials • Online lecturing • Group discussion • Q&A session • Big data mining	Linked with CLO 3.
Barriers to Climate Change Adaptation in Cities: Climate Change Adaptation, Barriers to Adaptation, Types of barriers to climate change adaptation in urban areas, how to overcome adaptation barriers?	• To anzlyze the barriers to climate chagne adaptation in cities • To findout possibel ways for overcoming climate chagne adaptation barriers in cities	Week 6 Week 7	• Audio-visual materials • Online lecturing • Group discussion • Q&A session • Big data mining	Linked with CLO 4
Decision Support System and Assessment Tools: decision support systems (DSS), assessment tools for	• To understand dicision support	Week 8 Week 9 Week 10	• Audio-visual	Linked with CLO 5

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This module specification reflects the views only of the authors and the Commission cannot be held responsible for any use which may be made of the information contained therein

Professor Dr. Swadesh Chandra Samanta
Vice-Chancellor
Patuakhali Science and Technology University

Topics	Specific Outcome(s)	Time Frame	Teaching Strategy(s)	Alignment with CLO
urban planning in the context of climate change, Theory, Tools and Techniques of GIS and Remote Sensing, Application of GIS and RS in Urban Planning and Management, GIS, Spatial Decision Support Systems (SDSS), and Planning Support Systems (PSS) in Urban Planning, Trends and Factors Influencing the Use of GIS in Urban Planning.	systems • To familiar with the use of assessment tools for urban planning • To explain theory, tools and techniques of GIS and RS • To learn the application of GIS and RS in urban planning and management		materials • Online lecturing • Group discussion • Q&A session • Big data mining	
Conceptual Modelling of Cities: Urban Community and Climate Change: Concepts of conceptual modelling, urban community.	• Able to develop conceptual modelling of cities in aspects of urban community and climate change	Week 11	• Audio-visual materials • Online lecturing • Group discussion • Q&A session • Big data mining	Linked with CLO 6
Design and Evaluation of Spatial Urban Plan: 3D urban planning and management, urban indicators and monitoring, methods and tools in contemporary planning and management, scenario analysis and modeling, evaluating competence of geo-information technology (GIS) in urban planning.	• To explain 3D urban planning and management and urban indicators as well as monitoring • To apply methods and tools in contemporary planning and management • To analyze the scenario and modeling • To evaluate competence of GIS in urban planning	Week 12 Week 13	• A-V materials • Online lecturing • Group discussion • Q&A session • Big data mining	Linked with CLO 7
Sustainable Urban Planning and Management: Sustainability, data gathering and information supply, sustainable urban planning, policy processes and policy instruments, management approach, strategy needed for sustainable urban development, cconceptual framework for urban climate	• To understand sustainability • To learn sustainable urban planning and management in context of modern	Week 14	• Audio-visual materials • Online lecturing • Group discussion	Linked with CLO 8

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This module specification reflects the views only of the authors and the Commission cannot be held responsible for any use which may be made of the information contained therein

Professor Dr. Swadesh Chandra Samanta
Vice-Chancellor
Pabna Science and Technology University

Topics	Specific Outcome(s)	Time Frame	Teaching Strategy(s)	Alignment with CLO
resilience.	world using spatial data, policy instrument and management approach		• Q&A session • Big data mining	
Review Class	• To make an overview	Week 15	• A-V materials • Online lecturing • Q&A session	Linked with all CLOs
Final Assessment		Week 16		

Part C- Assessment and Evaluation

- Online assessment and evaluation pattern of the University will be followed.

Part D- Learning materials

- Spatial Urban Planning and Climate Change Module.
- Audio-visual materials (www.pstu.ac.bd, http://beck-erasmus.com).

Reference:

Abubakar, Ismaila Rimi, and Umar Lawal Dano. 2019. "Sustainable Urban Planning Strategies for Mitigating Climate Change in Saudi Arabia." *Environment, Development and Sustainability* 22(6):5129–52. doi: 10.1007/s10668-019-00417-1.

Amundsen, H., Berglund, F., & Westskog, H. (2010). Overcoming Barriers to Climate Change Adaptation—A Question of Multilevel Governance? *Environment and Planning C: Government and Policy*, *28*(2), 276–289. https://doi.org/10.1068/c0941

Armstrong, M. P., & Densham, P. J. (1990). Database organization strategies for spatial decision support systems. *International Journal of Geographical Information Systems*, *4*(1), 3-20.

Atta-ur-Rahman, Parvin, G. A., Shaw, R., & Surjan, A. (2016). Cities, Vulnerability, and Climate Change. In *Urban Disasters and Resilience in Asia* (pp. 35–47). Elsevier Inc. https://doi.org/10.1016/B978-0-12-802169-9.00003-3

Barnsley, M. J. (1993). Analytical tools to monitor urban areas. In Geographical information handling: Research and applications, 147-184.

Batty, M. (1992). Urban modeling in computer-graphic and geographic information system environments. Environment and Planning B: Planning and Design, 19(6), 663-688.

Batty, M. (1994). Using GIS for visual simulation modeling. *GIS World*, *7*(10), 46-48.

Batty, M., & Xie, Y. (1994a). Modelling inside GIS: Part 1. Model structures, exploratory spatial data analysis and aggregation. *International Journal of Geographical Information Systems*, *8*(3), 291-307.

Bulkeley, H. (2006). 'A Changing Climate for Spatial Planning' in Planning Theory and Practice, (Vol. 7 (2)).

Carsjens GJ, Ligtenberg A. A GIS-based support tool for sustainable spatial planning in metropolitan areas. Landsc Urban Plan 2007;80:72–83.

CDP. (n.d.). *Cities at risk: dealing with the pressures of climate change*. Retrieved April 18, 2021, from https://www.cdp.net/en/research/global-reports/cities-at-risk

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This module specification reflects the views only of the authors and the Commission cannot be held responsible for any use which may be made of the information contained therein

Professor Dr. Swadesh Chandra Samanta
Vice-Chancellor
Patuakhali Science and Technology University
Dumki, Patuakhali-8602

Despotakis, V. K., Giaoutzi, M., & Nijkamp, P. (1993). Dynamic GIS models for regional sustainable development. In *Geographic Information Systems, Spatial Modelling and Policy Evaluation* (pp. 235-261). Springer, Berlin, Heidelberg.

FCFA. (2018). *Overcoming the barriers to climate change adaptation.* www.futureclimateafrica.org

Feldmeyer, D., Wilden, D., Kind, C., Kaiser, T., Goldschmidt, R., Diller, C., & Birkmann, J. (2019). Indicators for monitoring urban climate change resilience and adaptation. *Sustainability*, *11*(10), 2931.

Foundation, F., & Foundation, R. (2014). Appreciation Programme Participatory Urban Planning: Making Cities Inclusive of Urban Poor Module-I, 1-27.

Gallion Arthur B, and Simon Eisner. The Urban patter, City Planning and Design.

Glasson,J . An Introduction to Regional Planning.

Hall, Peter, Urban and Regional Planning.

Hall, Peter. The Theory and Practice of Regional Planning.

Hudson, L., Wolff, A., Gooch, D., Van Der Linden, J., Kortuem, G., Petre, M., ... & O'Connor-Gotra, S. (2019). Supporting urban change: Using a MOOC to facilitate attitudinal learning and participation in smart cities. *Computers & Education*, *129*, 37-47.

IPCC (2007). *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Geneva: IPCC.

Kaklauskas, A., Zavadskas, E. K., & Šaparauskas, J. (2009). Conceptual modelling of sustainable Vilnius development. *Technological and economic development of economy*, *15*(1), 154-177.

Leighton, H. (2019, September 3). *How climate change is going to affect cities, urban spaces* . The Kinder Institute for Urban Research. https://kinder.rice.edu/urbanedge/2019/09/03/how-climate-change-going-change-cities-urban-spaces

M. Pratap Rao (2001), Urban Planning: Theory & Practice EBS Publisheres & Distributors, New Delhi

Nam, T., & Pardo, T. A. (2011). Conceptualizing smart city with dimensions of technology, people and institutions. In Proceedings of the 12th International Conference on Digital Government Research (pp. 282-291). https://doi.org/10.1145/2037556.2037602.

Papa, R., Galderisi, A., Vigo Majello, M. C., & Saretta, E. (2015). Smart and resilient cities. A systemic approach for developing cross-sectoral strategies in the face of climate change. *TeMA Journal of Land Use, Mobility and Environment*, *8*(1), 19-49.

Van Waart, P., Mulder, I., & de Bont, C. (2016). A participatory approach for envisioning a smart city. Social Science Computer Review, 34(6). https://doi.org/10.1177/0894439315611099.

Yadav C.S., City Planning: Problems and prospects.

Zhoua, G., Tana, Z., Chengb, P., & Chena, W. (2004, July). Modeling and visualizing 3D urban environment via internet for urban planning and monitoring. In *XXth ISPRS Congress Commision* (Vol. 2, p. 341).

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This module specification reflects the views only of the authors and the Commission cannot be held responsible for any use which may be made of the information contained therein

Professor Dr. Swadesh Chandra Samanta
Vice-Chancellor
Patuakhali Science and Technology University
Dumki, Patuakhali-8602