

**Lecture Plan**  
**Department of Planning,**  
**School of Planning and Architecture, Vijayawada**

**Name of Course:** Data Analytics and Programming in Planning (PLN325)

Programme & Sem: Bachelors in Planning (UG), III year, VI semester  
 Course Duration: Jan 02,2023 to April 19,2023  
 Course Coordinator: Dr. Solanki Ghosh  
 Number of Credits: 03  
 Subject Category: TC  
 Total Periods/Week: 03  
 Internal Assessment: 50 (minimum pass marks 40%)  
 End Evaluation: 50 (minimum pass marks 40%) – Written Exam.  
 Total Marks: 100 (to be converted to CGPA credit pattern as per regulations)

**Subject Objective:** To develop key data analytics skillsets necessary to interpret and derive inferences from the relevant datasets available to spatial planners.

Week	Lecture / Session Topic (Teaching-Learning Objective aimed)	Session Mode	References / Suggested Readings
Week 1 (starting Jan 9)	Need for Data Analytics in Spatial Planning, Revision of basic statistical concepts – central tendencies, measure of dispersion, frequency distribution, etc. (For both classical and spatial statistics) Discussion on challenges and pitfall of spatial statistics.	Lecture	<i>Spatial statistics for urban analysis: A review of techniques with examples, September 2005 GeoJournal 61(1):53-67, DOI: 10.1007/s10708-005-0877-5</i>
Week 2 (starting Jan 16)	Written exam on above class. (IA1 part A) Revision on probability distribution functions. Detailed numericals tutorial on normal and standard normal distribution.	Exam (5 marks) and lecture + tutorial	<i>Basic Quantitative Research Methods for Urban Planners, Edited By Reid Ewing, Keunhyun Park White, P. (1988), Public Transport Planning, Management and Operation, Hutchinson, London.</i>
Week 3 (starting Jan 23)	Data, Types of Data, units of measurements, Data coding, data cleaning techniques, biases and errors in data, sample size calculation and sampling techniques	Lecture	<i>Basic Econometrics, Fifth Edition, Damodar N. Gujarati, West Point Dawn C. Porter.</i>
Week 4 (starting Jan 30)	Correlation, autocorrelation and Regression analysis – linear, logit and spatial.	Lecture + tutorial in SPSS, ArcGIS and GeoDA	
Week 5 & 6 (Starting Feb 3, 14)	Field Visits (Planning Studios)		
Week 7 (starting Feb 20)	Clustering spatial and non-spatial data – HCT, K-means, fuzzy K-means, etc. Factor analysis (PCA) Submission of IA1 part B – application of above methods using PCA data of any city using software.	Lecture + tutorial in SPSS, ArcGIS and GeoDA Exam (10 marks)	<i>Applied Data Analysis for Urban Planning and Management Edited by: Alasdair Rae &amp; Cecilia Wong</i>
Week 8 (starting Feb 27)	Mid Semester Examinations for Odd Semester of A.Y.2023-24 (IA2) (20 Marks)		

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Week 8 (starting March 5)	Qualitative methods – data collection methods, narrative analysis, sentiment analysis, social media analysis, mental maps, etc.	Lecture + tutorial in NVIVO	Big Data Support of Urban Planning and Management The Experience in China, Editors: Zhenjiang Shen, Miaoyi Li
Week 9 (starting March 12)	Data mining; Introduction to model building and data validation using programming language. Big data landscape; comparison of big data, survey data and other data commonly used in spatial planning and public policy; Advantages and Disadvantages of data sources for research. Problems and Errors in Big data. Big data sharing policy	Lecture + tutorial	
Week 10 (starting March 19)	Special lecture + workshop on contemporary data analytics techniques in Urban Planning.		
Week 11 (starting March 26)	Introduction to Python, basis on data analysis using python, coding, variables, data structures, logical functions and exercises. Introduction to R /Stata/Matlab, basics on data coding, testing and analysis, model building and queries. Introduction to SQL, Java, DBMS.	Lecture + tutorial	Machine Learning and the City: Applications in Architecture and Urban Design Editor(s):Silvio Carta
Week 12 & 13 (starting April 2, 9)	Introduction to Machine learning; formulation of research questions in machine learning framework; Build, evaluate, compare, select and interpret various models; Introduction to API and tools to interact with network based APIs.	Lecture + tutorial	
Week 14 (starting April 16)	Presentation of IA 3 Case application of above methods	Student presentations (15 marks)	

**Note:**

1. Any other closed holidays as declared by SPAV shall supercede the above lecture plan. Holidays shown above may alter as per Notice from time to time.
2. Assessment Sessions may be re-scheduled, with prior intimation.
3. Reading lists provided is not exhaustive and is subject to addition – students are advised to follow progression of class to keep abreast of the new reading lists, if any.