

BS 4 Years Program

Computational Social Science (CSS)



An Initiative of:

Pakistan Study Centre
Bahauddin Zakariya Multan

Introduction

Computational social science (CSS) is an interdisciplinary field that studies human behavior and social systems using scientific methods and modern research practices. This contains developing and testing theoretical assumptions with the systematic description of the behavior of people, organizations, institutions and complex socio systems. A significant distinction of CSS is the close interdisciplinary cooperation between social sciences, computer science, and mathematics. In different research areas accompaniment, the investigation of social phenomena and processes through their different perspectives and core competencies. The aim of CSS is to comprehend new social phenomena activated by digitization and to develop new perspectives on traditional research interests in social science. These events are significantly shaped using new data and analytical methods made available through digital technology.

The modern world is shaped by digital technology, and massive data. To understand human society through computational methods is a need of time, necessity and an opportunity as well. CSS will prepare students with the aptitude to gather, analyze, and understand complex social data using coding, algorithms, simulations, and network models — transforming traditional research into climbable, data-driven understandings. While it is studying political polarization, populism, modeling urban migration, or predicting the spread of misinformation, computational social scientists play a crucial role in shaping evidence-based solutions to societal problems.

The program would focus on fostering critical thinking, data-driven decision-making, and innovative problem-solving to tackle societal challenges, through the lens of big data, machine learning, and social theory. The curriculum is designed to meet the increasing demand for professionals able to bridge traditional social sciences and the technology sector, particularly in fields like data analytics, public policy, non-profits, and private industry.

CSS at Bahauddin Zakariya University, Multan, is a forerunner undergraduate program that trains students with the theoretical knowledge of social sciences and technical skills data analytics. The program is designed to train a new generation of researchers, analysts, and decision-makers who can work at the intersection of society and technology. Students will learn techniques such as:

- Data mining and machine learning
- Social network and geospatial analysis
- Natural language processing and big data analytics

Aim and Objectives

The essential aim is to fuse social science perspectives with computational and data-driven techniques. This expresses the graduates of CSS to address complex social problems with both domain and technical expertise. Graduates will be trained to investigate, understand, and examine social phenomena using large datasets, which can lead the public policy, private sector decisions making, and societal intrusions in the country. The program's objective is to produce graduates who can develop new computational methods and relate them to persistent social challenges, contributing to both theoretical and applied research. The curriculum is designed to meet the increasing demand for professionals able to bridge traditional social sciences and the technology sector, particularly in fields like data analytics, public policy, non-profits, and private industry.

BS in CSS will enable students to develop computational tools, algorithms, and models personalized to Pakistan's socio-political culture, and economic context, fostering innovation in areas like e-governance, and analytical modeling for societal inclinations. It will help the professionals who can address country-specific challenges (e.g., poverty, gender disparities, and political polarization) while contributing to global research in computational social science. Produce graduates able to make their careers in academia, industry, government, and NGOs, with skills in data analysis, social research, and computational modeling.

The rationale to start BS program in Computational Social Science in Pakistan is need of time for the growing importance of data-driven approaches to solving complex social problems around the globe. The rise of big data and digital platforms has designed the social phenomena in Pakistan. The country engenders enormous amounts of digital data which can be helpful to understand societal trends. Computational tools like machine learning, natural language processing, and network analysis permit for deeper insights to comprehend social norms, public opinion, and policy impacts to make compatible policies for the masses. We are facing exceptional challenges, including poverty, unemployment, gender inequality, political instability, and public health crises. CSS can provide data-driven insights into these issues, enabling targeted interventions.

The other aspect of CSS is that the traditional social science programs in Pakistan have deficiencies of computational training, while sciences programs have lack of social understanding. BS CSS program bridging this gap by combining programming, data analysis,

and social science theories. This interdisciplinary approach ensures graduates are equipped to understand the real-world problems with both technical and contextual expertise.

Pakistan's promising tech industry, rise of the startups, and private sectors require professionals who can investigate large datasets to advise the business strategies, social campaigns, and policy recommendations. The graduates of CSS surely comply with the abovementioned needs. Areas like e-commerce and e-governance in Pakistan can benefit from CSS graduates who understand both social dynamics and computational methods. It associates with global trends in data science, artificial intelligence, and digital transformation, ensuring Pakistani students are not left behind.

Policymaking in Pakistan usually have deficiencies of data-driven acumens. CSS graduates can back the evidence-based policies by investigating demographic, economic, and social data to address issues like education reform, healthcare access, politics stability, climate change, and urban development. Computational understandings of social phenomena can help to enhance resource allocation for institutional improvements infrastructural developments. CSS program will alter to Pakistani cultural taboos, ethical, and social contexts, ensuring that computational models are important for the country's diverse population and values. The program can foster entrepreneurship by encouraging students to develop data-driven solutions for local problems.

Possible Job Opportunities for CSS Graduates

Computational Social Science is uniquely placed to bridge the gap between data and society. In Pakistan, CSS graduates will be pioneers in using technology to address social challenges, fitting into roles that require not just technical skills but also deep understanding of human behavior and social systems. With some traditional fields unique aspects for the graduates of CSS will be in smart city development, lection analytics and political strategy making, crime mapping and policing, disaster response and crisis mapping and surveillance in case of pandemic.

On the other hand, traditional fields still have vast capacity to grasp the CSS graduate in the fields of, freelancing, journalism and media, tech industry, international organizations and NGOs, academia, government and public sectors.

Scheme of Studies for BS 4-Year Computational Social Science (2025)

STRUCTURE

➤ Total numbers of Credit hours	139
➤ Duration	4 years
➤ Semester duration	16-18 weeks
➤ Semesters	8
➤ Course Load per Semester	18-21 Credit Hours
➤ Number of courses per semester	4-7 courses
➤ General Education Courses	15 (34 Credit Hours)
➤ Allied Courses	04 (12 Credit Hours)
➤ Major Courses	29 (87 Credit Hours)
➤ Field Experience	03 Credit Hours
➤ Capstone Project	03 Credit Hours

Semester –I

Code	Description	Course	Credit Hours
CSS-GED-501	G. Ed	Functional English	3
CSS-GED-503	G. Ed	Islamic Studies	2
CSS-GED-505	G. Ed	General Science	3 (2+1)
CSS-GED-507	G. Ed	Pakistan Study	2
CSS-GED-509	G. Ed	Social Sciences i. Introduction to Political Science ii. Introduction to International Relations iii. Introduction to Journalism iv. Introduction to Gender Studies v. Introduction to Public Administration vi. Introduction to Sociology vii. Introduction to Psychology viii. Introduction to Geography	2
PKS-511	Major	Analytic Geometry and Calculus I	3
PKS-513	Major	Introduction to Computational Social Science I	3
Total Credit Hours			18

Semester-II

Code	Description	Course	Credit Hours
CSS-GED-502	G. Ed	Expository Writing	3
CSS-GED-504	G. Ed	Ideology and Constitution of Pakistan	2
CSS-506	Major	Comparative Politics	3

CSS-GED-508	G.Ed	Tafheem-e-Quran I	1
CSS-510	Major	International Relations Since 1945	3
CSS-512	Major	American History	3
CSS-514	Major	Methods of Research in Social Science	3
Total Credit Hours			18

Semester – III

Code	Description	Course	Credit Hours
CSS-GED-515	G. Ed	Civic and Community Engagement	2
CSS-GED-517	G. Ed	Quantitative Reasoning-I	3
CSS-GED-519	G. Ed	Information Communication Technology	3 (2+1)
CSS-521	Major	Intermediate Programming with Python	3
CSS-523	Major	Introduction to Data Analysis	3
CSS-GED-525	G.Ed	Tafheem-e-Quran II	1
Total Credit Hours			15

Semester – IV

Code	Description	Course	Credit Hours
CSS-GED-516	G. Ed	QR/Tools for Quantitative Reasoning-II	3
CSS-GED-518	G. Ed	Entrepreneurship	2
CSS-520	G. Ed	Arts and Humanities I. The Folk of Pakistan II. Fables, Wisdom Literature, and Epic III. Space, Place, and Experiences IV. Introduction to Literary Theory: Major Critics and Movements V. Introduction To Public History	2

		VI. Introduction to Women's Studies	
CSS-522	Major	South Asian History and Politics	3
CSS-524	Major	European History	3
CSS-526	Major	Human Centered System	3
Total Credit Hours			16

Semester – V

Code	Description	Course	Credit Hours
CSS-601	Major	Networks and Information	3
CSS-603	ALD	Social Change and Development in Pakistan	3
CSS-605	Major	Analytic Geometry and Calculus II	3
CSS-607	Major	Database Management Concepts and Applications	3
CSS-609	Major	Political Strategies and International Relations	3
CSS-611	Major	Cyber Politics and Information Warfare	3
Total Credit Hours			18

Semester – VI

Code	Description	Course	Credit Hours
CSS-602	Major	Administrative and Legal System of the World	3
CSS-604	ALD	Political Economy in the Digital Age	3
CSS-606	Major	Modern Warfare and National Security: External and Internal Dimensions	3
CSS-608	Major	Ethics and Computational Social Science	3
CSS-610	Major	Digital Activism and Civil Society	3
Total Credit Hours			18

Semester – VII

Code	Description	Course	Credit Hours
CSS-INT-613	INT	Internship/ Field Experience	3
CSS-615	Major	Comparative Digital Privacies	3
CSS-617	ALD	Social Theories and Implications	3
CSS-619	Major	Social Implications of Computing Technology	3
CSS-621	Major	Advanced Social Science Research Methods	3
CSS-623	Major	Data, Algorithms, and Political Behavior	3
Total Credit Hours			18

Semester – VIII

Code	Description	Course	Credit Hours
CSS-CP-612	CP	Capstone Project	3
CSS-614	Major	Political Theory and Future Analysis	3
CSS-616	Major	Politics of Human Rights	3
CSS-618	ALD	Western Political Thought	3
CSS-620	Major	Data Mining	3
CSS-622	Major	Geospatial Information System	3
Total credit hours			18

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