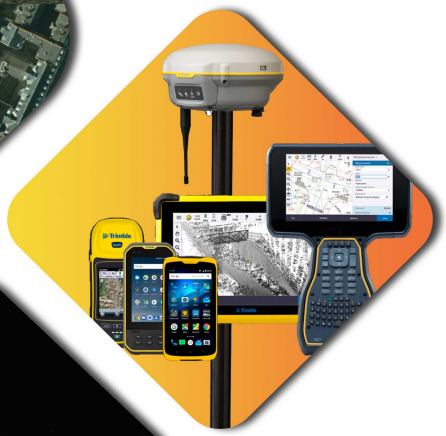
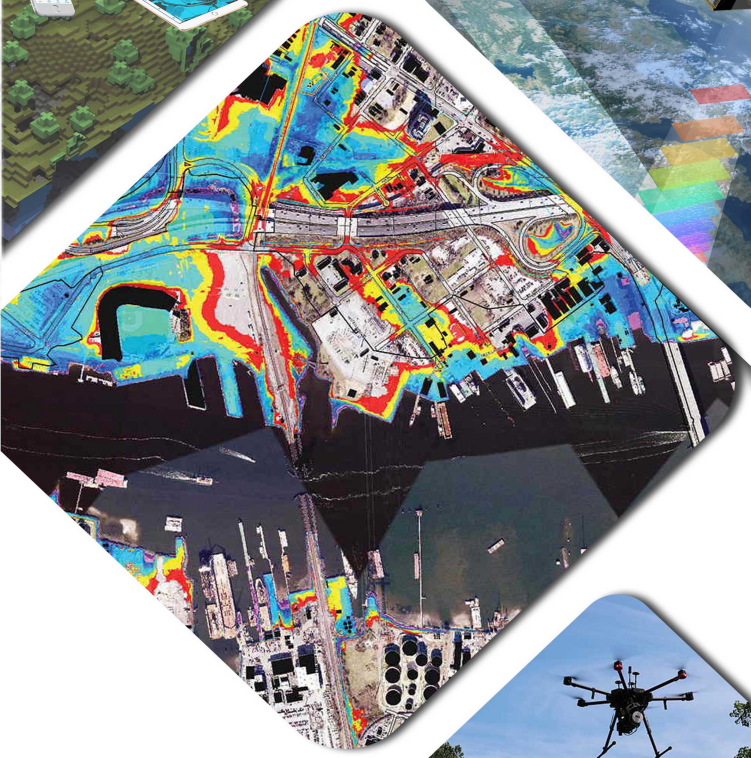




Computer Aided Design Centre
JADAVPUR UNIVERSITY

Prospectus

P.G. Diploma in Applied Geoinformatics

The CAD Centre

The Computer Aided Design (CAD) Centre, Jadavpur University was established in the year 1985 by the Electronics Commission and the Department of Electronics, Government of India. The primary objective of the Centre was to promote CAD activities in the eastern part of India. The first supermini computer (Norsk Data ND-560CX) of the Eastern India was installed in this Centre for performing CAD activities. However, later the Centre has diversified its activities in other emerging fields like Multimedia and Geoinformatics. A certificate course on Geoinformatics was offered by the Centre in the year 2002; and that was the first formal education in Geoinformatics in the Eastern India. Two years later, in the year 2004, the Centre introduced a Post Graduate Diploma course in Geoinformatics. That was also the first of its kind in Eastern India. Since the time of inception, more than 10000 students, researchers and working persons have been trained at the Centre in different fields; among which more than 2000 students have been trained in the field of Geoinformatics. A number of projects from the industry have also been successfully completed by the Centre. During last 38 years, the CAD Centre of Jadavpur University has remained the most prestigious and important centre in Eastern India for promoting CAD/Geoinformatics activities.

Infrastructure

At present, 60 numbers of Core i7 based PCs and a server are connected in a LAN environment and distributed in three air-conditioned laboratories. Three well-furnished and air-conditioned classrooms provide an excellent ambience for theoretical classes. The classrooms are equipped with multimedia projectors for demonstration. Laboratory computers are installed with latest and popular software packages on CAD, Geoinformatics, Digital Image Processing, Multimedia, DBMS and Programming Languages. The Centre has industry grade instruments like professional cameras, geodetic survey grade RTK GNSS receivers, drone for remote sensing/photogrammetry/videography, digital photogrammetry workstation with active shutter (quad buffer) and colour anaglyph stereo. The Centre has a library with latest books on CAD, CAM, GIS, Remote Sensing, DIP, Multimedia, RDBMS & other related fields and used by the students on regular basis inside the Centre.

The Course

Title of the Course : **Post Graduate Diploma in Applied Geoinformatics**

Geoinformatics is a blend of art, science and technology, which develops and uses information science infrastructure to address the problems of Geosciences or Earth sciences and related branches of engineering. It is actually the collection, integration, management, analysis, and presentation of geospatial data, models and knowledge that support disciplinary, multidisciplinary, interdisciplinary and transdisciplinary research and education. The four main tasks of Geoinformatics are: (1) collection and processing of geospatial data, (2) development and management of databases of geospatial data, (3) analysis and modeling of geospatial data, and (4) development and integration of logic and computer tools and software for the first three tasks. Geoinformatics uses GeoComputation and it is the development and use of Remote Sensing, Geographic Information System (GIS), and Global Navigation Satellite System (GNSS). GeoComputation is not just using computational techniques to solve geospatial problems, but rather a completely new way of dealing science in a geospatial context.

Geoinformatics is not only for the people from geography but recently more and more people from other disciplines like Information Technology, Civil Engineering, Architecture, Geological Science, Social Science, Environmental Science, Life Sciences, and several others want to study Geoinformatics as their minor or even as their major subject. For that reason it has been most important to develop the contents of Geoinformatics curriculum towards more scientific subjects and the curriculum of the course has been designed accordingly. Education on Geoinformatics within India is although not a new thing but limited to very few universities or institutions. Furthermore, in majority of the instances these departments are run by the Geographers. We believe that it is beyond the capacity of the Geographers to teach Geoinformatics properly; rather Engineers, Geoinformatics professionals and Computer Application Professionals must be engaged to teach Geoinformatics. The CAD Centre of Jadavpur University is the pioneer in Eastern India in the field of Geoinformatics. The Centre has achieved an immense amount of reputation and goodwill in this discipline.

Career Opportunities in Geoinformatics

The discipline of Geoinformatics is in its nascent stage and expanding at a rapid pace as more and more organizations are employing spatial data to manage their activities. Almost no developmental project is complete without geospatial information. Most of the countries in the world have started specialized education in geospatial technology after understanding its future impact. The need for Geoinformatics services is on the rise by 10—15% per annum. Therefore, there is tremendous scope with accelerated growth and development prospects. The only limit of Geoinformatics is the acute shortage of skilled professionals. Actually, teaching and learning of Geoinformatics demands additional level of DEDICATION. Shortfall of this dedication remained the primary hurdle to build a good career in this field.

Geoinformatics professionals can be hired at various levels in positions like GIS Mapping Technician, GIS Data Specialist, GIS Application Specialist, GIS Business Analyst, GIS Engineer, GIS Operator, GIS Consultant, GIS Executive, GIS Programmer, GIS Developer, Geospatial Software Engineer, GIS Surveyor, GIS Technical Assistant, Photogrammetrist, Image Analyst, and many more. In research and development, a Geoinformatics professional can be engaged as Scientific Officer, Coordinator, Research Associate, Scientist/Engineer (Natural Resource management, Petroleum and Mining, Agriculture, Forestry, Health, Disaster Management, Climate Change, Urban Planning and Management, etc.).

Major users of Geoinformatics applications and therefore employers are the Central and State governments. Nowadays, the government wants to make cities smart that can be best implemented by Geospatial technology. With the private sector discovering the benefits of Geoinformatics, there is growing demand in many different companies. Then there are environmental agencies, national survey and mapping organizations, mineral exploration organizations, utility companies, emergency services, public health related organizations, international monitoring organizations, United Nations, transportation and infrastructure related organizations, tourist industry, police, military, market analysis and e-commerce companies and so on.

Course Structure

Duration : 1 year (2 semesters)

Course Fees : Rs. 55,000/- + 18% GST per semester (the first semester fees to be paid at the time of admission; and second semester fees to be paid before the commencement of the second semester as notified by the Centre)

Class Timing : Regular classes will be conducted from Monday to Friday (except University holidays); special classes and additional practice sessions will be offered on Saturdays. Timing is 11:30 AM to 4:30 PM including 30 min recess.

Faculty Members

The Centre has engaged highly experienced faculty members from academic sector as well as industry. Some of our faculty members are well known figures in the field of Geoinformatics and have published huge number of books, monographs, and research articles internationally. The Centre has four internal faculties for this course.

Dr. Basudeb Bhatta
MSc (Geoinformatics), PhD (Engineering)

Mr. Biswajit Giri
MCA

Ms. Dipannita Bose (Mukherjee)
MSc (Environmental Science), PG Diploma (Geoinformatics), PG Diploma (Environmental Management)

Dr. Aditi Sarkar
MSc (Geography), MTech (Geoinformatics), PhD (Engineering)

Other than our internal faculties we also invite academicians from different Universities as well as industry professionals to provide special exposures. Eminent persons from geospatial industry are associated with this course.

Course Curriculum

SEMESTER-I

	Paper Particulars	Teaching Hours	Credits	Full Marks
	THEORITICAL PAPERS			
GIT11	Information System	40	4	100
GIT12	Introduction to Remote Sensing and Image Interpretation	40	4	100
GIT13	Geographic Information System	40	4	100
	PRACTICAL PAPERS			
GIP11	Information System	50	5	100
GIP12	Introduction to Remote Sensing and Image Interpretation	50	5	100
GIP13	Geographic Information System	50	5	100

SEMESTER-II

	Paper Particulars	Teaching Hours	Credits	Full Marks
	THEORITICAL PAPERS			
GIT21	Advanced GIS and GNSS Technology	50	6	100
GIT22	Digital Image Analysis and Photogrammetry	50	6	100
	PRACTICAL PAPERS			
GIP21	Advanced GIS and GNSS Technology	60	6	100
GIP22	Digital Image Analysis and Photogrammetry	80	10	200
GIP23	Project + seminar + viva-voce	60	10	400

Placement Opportunity

Our students are working in many reputed private as well as government organizations in India and even abroad. We generally provide placement assistance to regular, sincere and well performed students according to merit list. At least 90% attendance is mandatory to achieve the goal.

Course Syllabus

SEMESTER-I

THEORITICAL PAPERS

GIT11 Information System

Computer Basics: Exploring computers and their uses: computers for individual users, computers for organizations, parts of a computer system, data and information, how computers process data, factors affecting processing speed, Data and number representation—number systems, bit and byte, text codes, conversion of numbers from binary to decimal.

Database: Introduction to database and DBMS, advantages, administration roles, data dictionary, DBMS users, Traditional models, three-level architecture, ER model concepts, Functional Dependency (Armstrong's Axioms), Normal forms (1NF, 2NF, 3NF, BCNF), Relational model – definitions and properties, keys, integrity rules, relational algebra, joins, set operations, SQL constructs.

Programming Basics: Computer Programming concept, code, machine code, compilers and interpreters, program control flow, algorithms, structured and object oriented programming, evolution of Programming languages, planning a computer Program.

GIT12 Introduction to Remote Sensing and Image Interpretation

Optical remote sensing: Concept of energy, conversion of energy, electromagnetic energy (web model, particle model), radiant flux, electromagnetic spectrum, properties of electromagnetic energy (for optical, thermal, microwave), energy-matter interactions, absorption, scattering, reflection, refraction, transmission, types of reflectors, colour theory (RGB, IHS, CMYK), light filters, types of remote sensing, orbital characteristics of remote sensing satellite, advantages and limitations of remote sensing, ideal remote sensing system, sensor resolutions (spatial, spectral, radiometric, temporal), image referencing system. Process and principle of optical remote sensing, Aerial photography, types of camera, functional concept of aerial cameras, types of filters, types of films, film size, film resolution, digitization of film, geometry of aerial photography, scale, vantage point, concept of digital imaging, types of sensors, imaging sensors, framing and scanning sensors, across track scanning, along track scanning, hyperspectral imaging, digital framing system, sensor specifications, UAV (drone) based remote sensing.

Thermal remote sensing: radiant and kinetic temperature, blackbody radiation, thermal imaging, thermal capacity, thermal conductivity, thermal inertia, thermal image and temperature mapping, thermal remote sensing sensors, interpretation principles of thermal images.

Concepts on co-ordinate system: Map, scale, coordinate systems, sphere/spheroid, datums, projection, projection parameters, different types of projections, maps, Survey of India maps.

Visual image interpretation: Border/marginal information of photographic product, image reading, image measurement, image analysis, elements of optical image interpretation (location, size, shape, shadow, tone, colour, texture, pattern, height/depth, site, situation, association), interpretation keys, interpretation of thermal image (diurnal heating effect, thermal properties of water and land, multispectral thermal image analysis), interpretation of radar image (tone, colour, shape, structure, size, speckle, antenna pattern, texture).

Digital image processing: Preprocessing (destriping, missing scan line removal, random noise removal, vignetting removal, sun angle and topography correction, atmospheric correction, geometric correction, resampling and interpolation, mosaicking, subsetting), enhancement (magnification, reduction, colour-composite, transact, contrast stretch, min-max stretch, average and standard deviation stretch, piecewise stretch, histogram equalization, histogram normalization, reference stretch, density slicing, thresholding, filtering, convolution filter, statistical filter, frequency domain filter, crisp filter).

GIT13 Geographic Information System

Introduction to GIS, history of GIS, definitions, concept about geographical data, Understand the difference between GIS and information system in general, GIS components, function and advantages of GIS, interdisciplinary relations, differences from CAD and AM/FM technology, three views of GIS, dimensions of geographic data, scope and Application Areas, limitations.

GIS data model: spatial and non-spatial (attribute), Discrete and continuous GIS data, Concept of Spatial data model: raster and vector, data formats, storage stucture; workflow model of GIS process, GIS data sources, raster and vector data capturing and encoding techniques, encoding attribute data, quality issues, preprocessing and cleaning of spatial data, linking of spatial and attribute data.

Concept of GIS analysis, type of analysis, selection by attribute, selection by spatial relationship, vector overlay, geoprocessing, point neighbourhood, interpolation, raster overlay, density analysis, geovisulization techniques: classification, generalization, map preparation.

History and Development of Cartography; Sources of cartographic data; Scale: types & importance; General maps: types and applications; Thematic maps: types and applications; Digital cartography, map, map scale, accuracy and resolution of map, classification map, topographical map referencing system, interpretation of topographical map, Coordinate system, types of coordinate system, geogeaphic coodinate system, datum, shape and size of earth, projected coodinate system, projection, selection of projection, projection transformation, type of projections; compilation of map (frame, title, legend, scale, charts, north arrow, label, grids, supplementary information, map symbols and colours, etc.), representation of statistical data (choropleths, isopleths, dots, unimodal, 2D and 3D diagrams).

PRACTICAL PAPERS

GIP11 Information System

Windows: Getting familiar with windows OS, booting, desktop, folder & file, Notepad/WordPad, MS-Paint.

MS-Word: Introduction, page setup, font, font style, color, header & footer, footnote, inserting picture, wrapping textbox, hyperlink, table, equation editor, etc.

MS-Excel: Page setup, inserting rows/columns, worksheet, chart, function, text to column, formatting cell, color, calculation using function, statistical analysis and presentation etc.

MS Access: Database designing (table, form, and report creation), Sort and Filter Records, SQL query, relationship between tables and joins, Import & export table data.

Python: Introduction, structure of python program, built in data types, iterating and making decisions, reserve words, operators, functions, saving time and memory, advanced concepts– OOP, decorators, and iterators, testing, profiling, and dealing with exceptions, graphical user interface and scripts, files- handling, built-in-class attributes, garbage collection, debugging and troubleshooting.

Software exposure: Windows; Notepad/WordPad, MS-Paint, MS-Word, MS-Excel, MS-Access, Python

GIP12 Introduction to Remote Sensing and Image Interpretation

Visual interpretation of optical images, mapping of geographic features, opening an image, zoom, pan, band combination, image info, pixel inquiry, multilayer arrangement, image co-ordinates, header file, save as, etc. Image profile (choosing appropriate band/s), contrast enhancement, georeferencing (image to image, image to ground, image to map), mosaicking, AOI tools, subsetting (spatial and spectral), filtering. Downloading the open data and processing, layer stacking.

Visual interpretation of thermal image, temperature mapping, urban heat island detection, integrating thermal image and optical image.

Drone mapping (mission planning, flight control, preparation of point cloud, mesh, tiled model, DEM, contour, orthomosaic, texture etc., classification of point cloud, measurements, volumetric analysis).

Software exposure: ERDAS Imagine, Agisoft Metashape

GIP13 Geographic Information System

QGIS: Interface & Plugins concepts, Raster handling/processing, Georeferencing (image to image), Georeferencing (image to ground), Working with vector layer (R2V conversion), vector editing etc. Vector styling, labeling, Import CSV file, Coordinate extraction, Join external file with vector layer, Projection transformation, Field Calculation, vector data capturing from Google map, Google earth and OpenStreetmap, Bing maps, OpenStreetMap etc, vector layer conversion (KML, GML, geojson etc.), spatial database creation, export spatial data, spatial data manipulation and analysis.

AutoCAD MAP 3D: Draw geometries using Cartesian and Polar coordinate system, save drawing, Layer preparation, create block, modify geometries, add georeferenced image, practice heads-up digitization, set projection for drawing, vector cleaning, topology creation, internal and external attribute attachment with topology, query topology, export drawing layer into other vector layer, import other vector layer into drawing layer.

ArcGIS: Introduction to ArcGIS Desktop, image Georeferencing (image to image, inage to ground), metadata editing, coordinate and projection; geodatabase design, vector (generation/editing); add XY data, external data attachment, create relationship, query; thematic map, annotation, layout, automated R2V conversion; overlay operations, geocoding, network analysis, geoprocessing and workflow model.

Software exposure: QGIS, AutoCAD Map, ArcGIS

SEMESTER-II

THEORITICAL PAPERS

GIT21 Advanced GIS and GNSS Technology

Concept of spatial database/geodatabase, spatial indexing, feature subtype and domain, topology rules, supported geometry types, spatial operators and functions, spatial query and aggregation.

Geospatial data analysis methods, database query (query by attribute data, query by spatial data, proximity analysis), geospatial measurement (measurement of density, measurement of distance, measurement of neighbourhood), vector overlay (point in polygon, line on polygon, polygon on polygon), representation and process model, rater overlay, multi-criteria analysis, raster calculation, network analysis (network tracing, network routing, network allocation), zonal statistics, surface analysis (deriving contour, slope/aspect analysis, hillshade, viewshed, watershed, surface intersection), hydrological analysis, geovisualization, classification and reclassification, map comparison, chart, report, layout, 3D visualization, concept of mobile GIS and web GIS, time dimension (4D GIS/real-time GIS), planning, implementation and management of GIS.

Fundamentals of geodesy, Geodetic reference systems, Geoid and geoidal heights and undulations. Geodetic datum and datum transformation, Coordinate systems, shape of the earth, earth's gravity field and geoid, WGS 1984 datum, indian geodetic datum, coordinate transformation.

Navigation and positioning, points of reference, history of navigation systems, global navigation satellite system (GNSS), GPS, GLONASS, Galileo, Beidou, space segment, control segment, user segment, working principle of GNSS, triangulation and trilateration, almanac and ephemeris, timing and ranging, GNSS signals and range determination, radio wave, transmitter and receiver, GNSS signals—carriers and codes, navigation message, GNSS time, ranging codes, modulated carrier wave and phase shift, observables—pseudorange and carrier phase, pseudorange measurement, carrier phase measurement, GNSS errors and solutions, positioning methods, point positioning, relative/differential positioning, single difference, double difference, triple difference, kinematic positioning, GNSS augmentation (EGNOS, WAAS, MSAS, CDGPS, GAGAN, DGPS) and other navigation satellite systems (Quasi-Zenith Satellite System, Indian Regional Navigational Satellite System), GNSS receivers, receiver architecture, classification of GNSS receivers, applications of GNSS, surveying and mapping with GNSS.

GIT22 Digital Image Analysis and Photogrammetry

Introduction to digital image processing, advantages of digital image processing, Image transformation (addition, subtraction, multiplication, indices, principal component transformation, tasseled cap transformation, colour space transformation, Fourier transformation, image fusion), classification (unsupervised, supervised, information class and spectral class, minimum distance, maximum likelihood, parallelepiped, feature space, sequential clustering, statistical clustering, K-means clustering, ISODATA clustering), accuracy assessment, post classification processing.

Different types of change detection techniques.

Types of photogrammetry, image acquisition from aerial platform (metric camera, stereo metric camera, digital metric camera, aerial imaging scanners), image acquisition from satellite platform (off nadir stereo image, fore-aft camera concept, scene-specific imaging concept) geometric distortion in imagery (relief displacement, radial distortion, tangential scale distortion, scan skew, earth-rotation skew, platform attitude skew), orientation and triangulation, stereo model, principles of stereoscopic vision, stereoscopic 3D viewing, lens stereoscope, mirror stereoscope, quad buffered stereo, line interleaved stereo, anaglyph stereo, stereoscopic measurement, parallax, orthorectification, outputs of digital photogrammetry, UAV photogrammetry.

Microwave remote sensing: Passive microwave remote sensing, active microwave remote sensing, radar imaging, radar bands, polarization, viewing geometry, spatial resolution of radar, real aperture radar, synthetic aperture radar, speckle, layover, foreshortening, radar shadow, surface roughness, dielectric properties of terrain, airborne and space-borne radar systems, visual interpretation of SAR image.

LiDAR remote sensing: Introduction, How LiDAR works, types of LiDAR platforms, components of LiDAR system, characteristics of LiDAR data, LiDAR applications.

PRACTICAL PAPERS

GIP21 Advanced GIS and GNSS Technology

Geoprocessing on vector layer and model building, Proximity analysis, Points in Polygon Analysis, raster overlay analysis, interpolation analysis, density analysis, network analysis, Heatmaps analysis, Distance matrix analysis, surface interpolation, DEM surface analysis, hydrological analysis, raster reclassification, raster calculation, zonal and local statistics, distance analysis like Euclidean (straight-line) and Cost-weighted distance, suitable site finding using multi-criteria analysis, 3D analysis on map and Globe, animation, report and graph preparation, Geosimulation and Geostatistics.

GNSS: Planning the survey, general factors for GNSS surveying, accuracy considerations, obstructions, occupation time, recording rate, measurement redundancy, satellite geometry, point or line offset, survey of control points, survey of geographic features with attribute information, designing of attribute database, differential GNSS survey, post-processing of DGNSS data, mapping with surveyed data, stakeout, RTK/PPK survey.

ArcGIS Python programming: Python language for ArcGIS, manage map documents and layers, execute geoprocessing tools from scripts, create custom geoprocessing tools, querying and selecting data, customize ArcGIS interface with add-ins.

Software exposure: QGIS, Python, ArcGIS, ArcGIS Pro, GNSS survey planning software, TerraSync, Pathfinder Office, Trimble Access, Trimble Business Centre.

GIP22 Digital Image Analysis and Photogrammetry

Optical Image Processing: Change detection, index (iron oxide, clay, NDVI, SAVI, NDBI), colour space transformation, TCT, FFT, fusion, unsupervised classification, supervised classification, accuracy assessment, unsupervised classification of NDVI and other index image, post-classification vectorisation, accuracy assessment, supervised classification using optical bands in addition to principal component images and indexed image, sub-pixel classification, object based classification, post-classification filtering, classification of change image, pseudo color image preparation, map composition, import/export.

SAR Image Processing: Visual interpretation of radar image (tone, colour, shape, structure, size, speckle, antenna pattern, texture). Calibrating the SAR data, multilook processing, speckle reduction, terrain correction, polarimatric analysis of SAR image, SAR interferometry, SAR image classification, oceanographic applications, urban application, forestry applications.

LiDAR Data Processing: creating and examining LAS data, point cloud generation, point cloud classification, point cloud editing, DEM, DHM and DSM creation, intensity image creation, building footprint extraction, 3D building creation.

Digital Photogrammetry: Non-oriented and oriented digital stereo model (DSM), checking the accuracy of DSM, measuring 3D information, collecting and editing 3D GIS data, automated DTM extraction, point cloud and TIN generation, point cloud classification, orthorectification, irregular terrain observation and interpolation to create a DEM, DEM editing.

Advanced UAV Image Processing: Planning and mobilizing a UAV (drone), use of tilt camera, working with GCPs, working with multiple flights, RTK/PPK drone image processing, multispectral image processing.

Software exposure: ERDAS Imagine, SNAP, Imagine Photogrammetry, eCognition, ArcGIS/ArcGIS Pro.

GIP23 Project

Research / industrial work on any selected topic on Geoinformatics. One hard copy and one soft copy in PDF format of the project report is necessary to be submitted. Students shall present and defend their work in front of other students, PhD scholars, and subject experts in a seminar.

Admission Rules

1. Eligibility : (1) BE/BTech in Engineering or equivalent
   (2) BSc Honours in any discipline or BCA/MCA with minimum 50% marks
   (3) BA Honours in Geography/Environmental Studies with minimum 50% marks

   Candidates who have appeared the final examination of Graduation and result of which are yet to be published are not eligible to apply.
2. Total intake: 30
3. Admission will be on first-come-first-serve basis.
4. There will be no scope of any kind of reservation.
5. The Centre reserves the right of not selecting any candidate who is considered to be physically/mentally challenged or otherwise unsuitable.
6. The application/semester/course fees and supplementary examination/special supplementary examination fees cannot be refunded/transferred in any circumstance.
7. The 'course fees' includes admission fees, tuition fees, session fees, examination fees, fees for grade card, library fees, course material, study material, books etc. The 50% of the course fee is the tution fee for which a separate IT certificate may be provided on request. The course does not attract any other additional fees. However, supplementary/special supplementary examination fees will be collected separately from individuals.
8. Application form can be submitted through our online admission portal. Application fee is Rs.100/-. We shall approve the applications after verification. Once a student gets the approval (s)he have to pay the semester fees within the stipulated time through our online payment gateway.
9. Candidate should bring the following at the time of commencement of the course for the verification:
   (a) Original marks sheet of the Graduation (and Post Graduation if applicable).
   (b) Original document for proof of date of birth.
   (c) One photograph (35 mm x 45 mm) for Identity Card.
10. The candidates have to sign a declaration that he/she will pay the determined fees of Semester-II before the commencement of the respective semester as notified by the Centre. If the candidate fails to submit the semester/course fees within the specified time the candidature will be discontinued without further reference.

11. Ragging is totally banned in the Jadavpur University Campus, and anyone found guilty of ragging and/or abetting ragging is liable to be punished appropriately. If any incident of ragging comes to the notice of the authority, the concerned student shall be given liberty to explain and if his/her explanation is not found satisfactory, the authority would expel him from the institution.

    In case of an event of ragging, the victim will inform the Director, CAD Centre in written and in detail.
12. Sexual harassment, criminal offence, or any other kind of misconduct will not be allowed in any circumstance. University has a zero tolerance in this regard.
13. The student should have at least 80% attendance of total classes, failing of which the the registration will be cancelled without further reference. While pursuing this course the student should not have any attachment to any other course/assignment during the class hours.
14. This course is non-residential. Hostel facility will not be available.
15. This course is fully self-financed. Railway concession, concession for backward classes or any other type of concession are not available to the students of this course.
16. **Age limit: not more than 25 years** as on the date of announcement of the course.
17. Classes will be commenced as notified by the Centre.

Examination Rules

1. The Examination shall be held at the end of each semester. Students must qualify (a minimum of 40%) separately in every paper of all the semester examinations and those who qualified in a paper shall not be permitted to sit for the examination in that paper again. Non-appearance in a paper/examination will be counted as failure in that paper/examination. Satisfactory completion of the internal assessments is essential for the appearance at the semester examinations.
2. Any kind of misconduct in the examination(s) will be treated as failure in that paper of examination.
3. Library books, journals, instruments or any other property of University/Centre held by the student must be returned undamaged before the commencement of the semester/supplementary/special supplementary examination. Otherwise, he/she will not be allowed to appear the respective examination.
4. Each student will have to pass every paper separately in each semester of the course. If a student fails to pass or appear in one or more paper(s) in the semester examinations, a supplementary examination will be held normally after 30 days and within 60 days from the publication of semester results. Students, who do not have any back papers in first semester examination, shall be only eligible to appear at the regular second semester examinations. Dissertation/project, seminars and viva-voce will also come under the purview of the supplementary examination.
5. If a student fails to pass or appear in one or more paper(s) in the supplementary examination(s), a special supplementary examination will be held normally after 30 days and within 60 days from the publication of supplementary examination results. This will be treated as the last opportunity to qualify the examination; failing of which the candidature will be discontinued without further reference.
6. A student will appear in all the papers meant for/taken at the regular semester examinations (first semester and second semester) to be held after the conclusion of the respective semester of studies and as per the date announced by the Centre.
7. Failure/non-appearance in regular semester examinations will be counted as demerits for getting placement assistance.
8. A student will carry on with the second semester program of studies irrespective of the result of the first semester examination. He/she will not be entertained to attain classes in the first semester. Repetition of a semester will attract further payment of semester fees in full.

9. Student must complete the seminar, and submit project/dissertation before commencement of the second semester examination as notified by the Centre. The viva-voce will be held after the completion of second semester examination on theoretical and practical papers. Students who fail to submit their project/dissertation and seminar will not be allowed in the viva-voce.
10. A minimum of 80% attendance in each semester will be essential for appearing the semester examinations. If a student fails to meet this criteria will be counted as failure for which the candidate will have to repeat the same semester again and appear supplementary examination of respective semester along with the regular students in the next academic session. Attendance requirement may be relaxed only in case of severe medical ground. Repetition of a semester will attract further payment of semester fees in full.
11. Pass mark will be 40% in each paper both in theoretical and in practical examination, and viva/seminar/dissertation/project.
12. Question paper for each paper will be set by internal paper setter(s). However, the Centre may appoint external paper setter(s) if internal paper setter(s) is/are not available for specific paper(s).
13. All the theoretical papers will be evaluated by the internal examiners. Practical papers/seminar/project/viva etc. will also be evaluated by internal examiners.
14. For each theoretical and practical paper, 30% and 10% marks will be reserved for internal assessment and attendance respectively.
15. Internal assessment shall be on the basis of tutorials, term papers, reports, seminar presentations, class tests or any combination of these. The modalities of such assessments will be notified by the Centre. Two such assessments will be conducted in a semester for each paper and the best one of these two will be added with the semester examination results of the respective paper(s).
16. Total marks of project work is 400 and is divided as follows

    Attendance during the project work: 100
    Seminar presentation: 100
    Project Report: 100
    Viva-voce/Performance: 100

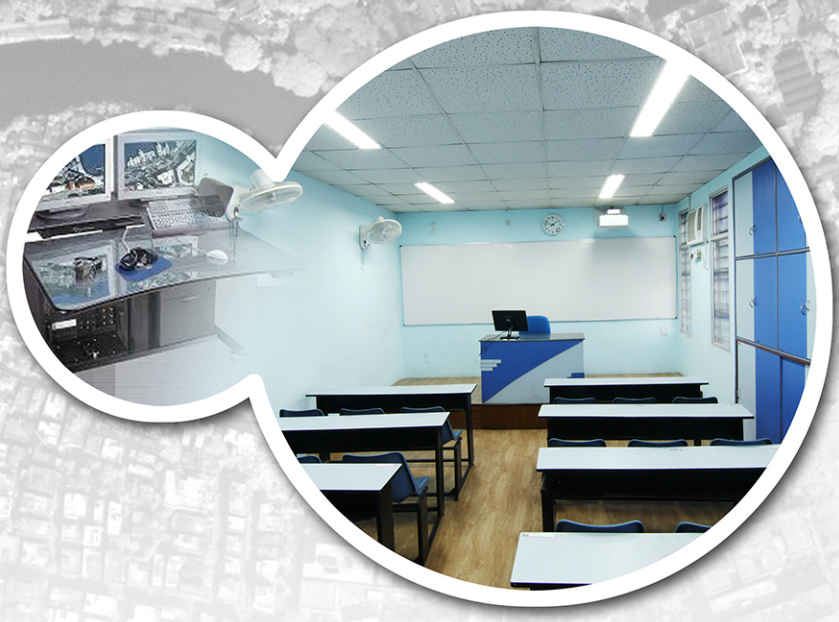
The marks obtained for attendance by a student will not be increased by relaxation in any circumstance including medical ground. The viva-voce covers the entire syllabus of the course from both of the semesters.

17. Duration of the semester end examination will be 1 hour 30 min for 60 marks or on pro-rata basis.
18. The result will be declared in grade system for each semester. In the final semester grade card, there will be a provision for indicating both total marks (theoretical and practical) and grade obtained.

CLASSIFICATION OF GRADES

GRADE	MARKS
A+	90% and above
A	80% to below 90%
B+	70% to below 80%
B	60% to below 70%
C+	50% to below 60%
C	40% to below 50%
X	Below 40% (Failed)

19. The office of the Director, CAD Centre will tabulate and publish the result of internal assessments and semester examinations.
20. Supplementary/special supplementary examination fees will be charged @ Rs.500/- for each paper; and to be paid by cash at the office of the Centre.
21. Fees for transcripts and duplicate grade sheet/certificate etc. will be collected by the office of the CAD Centre. Charges for issuing Transcripts (5 copies): Rs. 300/-; Duplicate Certificate (one copy): Rs. 100/-; Duplicate Mark Sheet (one copy): Rs. 50/-; Duplicate Identity Card: Rs. 50/-. All these charges are payable by cash.
22. A Student may apply for post-publication review/re-examination of his/her answer script for any end-semester examinations within 10 days from the date of publication of results. The results of supplementary/special supplementary examinations will not be eligible for review. No review/re-examination of marks will be entertained for practical papers/internal assessment/seminar/dissertation/project/viva-voce. The marks awarded by the reviewer will be considered as FINAL. The fees for review is Rs. 200/- per paper to be paid in cash at the office of the Centre.
23. No student shall be permitted to transfer his/her candidature to the next instance of the course.



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T : +91 33 2414 6844 / +91 33 2457 2960 E : cadcentr@cadcentreju.org

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