# **B.C.A. SEMESTER - 6**

### **Course 601-1 : Computer Graphics**

Course Code	601-1	
Course Title	Computer Graphics	
Credit	4	
Teaching / Week	4 Hours / Week (Suggested) ( Total Minimum 48 Hours )	
Minimum Weeks/Semester	15 Weeks (Including Class work, preparation, Examinations etc.)	
Review/Revision	2021-2022	
Implementation Year	2022-2023 A.Y.	
<b>Purpose of Course (POC)</b>	Make students aware and understand Computer Graphics.	
Course Objective	To make students understand and learn the geometrical processes on	
	various shapes, objects and text.	
Pre-requisite	Basic concepts of computer-based animation, various objects and	
-	basic school geometry.	
Course Outcome	Students will be able to understand and write algorithms for	
	construction of various shapes like line, circle & ellipse, and various	
	processes on them.	
Course Content	Unit 1. Introduction	
	1.1 Application areas of Graphics Systems	
	1.1.1. Presentation Graphics	
	1.1.2. Entertainment	
	1.1.3. Education and Training	
	1.1.4. Image Processing	
	1.2 Computer Graphics Files	
	1.3 Introduction to graphic standards	
	Unit 2. Graphics Systems	
	2.1. Video Display Devices	
	2.1.1. Refresh CRT	
	2.1.2. Color CRT	
	2.1.3. LCD	
	2.1.4. Direct View Storage Tube	
	2.2. Raster scan and Random Scan Display	
	2.3. Raster Graphics and Vector Graphics	
	2.4. Concepts of various objects: Point, Line, Circle, Ellipse and	
	Polygons	
	Unit 3. Line generation	
	3.1. Geometry of line	
	3.2. Frame Buffer	
	3.3. Line Drawing Algorithms	
	3.3.1. DDA Algorithm	
	3.3.2. VECGEN	
	3.3.3. Bresenham	
	3.4. Line Styles	
	3.4.1. Thick line	
	3.4.2. Line caps and joint	
	3.5. Anti-aliasing of line	
	Unit 4. Polygons	
	4.1 Polygon Representation	

	4.2 Polygon Inside Tests	
	4.2.1 Even-odd method	
	4.2.2 Winding number method	
	4.3 Polygon Area Filling Algorithm	
	4.3.1 Flood Fill	
	4.3.2 Scan Line	
	4.3.3 Boundary Fill	
	4.4 Filling polygon with a pattern	
	Unit 5. Geometric Transformations	
	5.1 Basic Transformations	
	5.1.1 Scaling	
	5.1.2 Translation	
	5.1.3 Rotation	
	5.1.3.1 Rotation about origin	
	5.1.3.2 Rotation about Homogeneous Coordinates	
	5.2 Other transformations	
	5.2.1 Reflection	
	5.2.2 Shearing	
	[All Units carry Equal Weightage]	
<b>Reference Books</b>	1. Computer Graphics - second edition, Donald Hearn & M. Pauline	
	Baker – Tata McGraw Hill Pub.	
	2. Computer Graphics, Harrington STata McGraw Hill.	
	3. Computer Graphics, Desai A. A. –PHI.	
	4. Computer Graphics: Algorithms & Implementations, Mukherjee &	
	Jana – PHI.	
	5. Interactive Computer Graphics, Giloi W. K. –Prentice Hall India.	
	6. Principles of Interactive Computer Graphics, New Man W. &	
	Sproul P. F. –McGraw Hill	
	7. Procedural Elements for Computer Graphics, Rogers D. F. –	
	McGraw Hill.	
Teaching Methodology	Class Work, Discussion, Self-Study, Seminars and/or Assignments	
Evaluation Method	30% Internal assessment.	
	70% External assessment.	

## **Course 601-2: Fundamentals of Cloud Computing**

Course Code	601-2	
Course Title	Cloud Computing	
Credit	4	
Teaching / Week	4 Hours / Week (Suggested) ( Total Minimum 48 Hours )	
Minimum Weeks/Semester	15 Weeks (Including Class work, preparation, Examinations etc.)	
Review/Revision	2021-2022	
Implementation Year	2022-2023 A.Y.	
<b>Purpose of Course (POC)</b>	To provide fundamental knowledge and management of cloud computing	
_	system along with Big Data.	
Course Objective	To provide comprehensive knowledge of cloud computing, its architecture,	
_	Management and security. This course will also provide the introductory	
	knowledge of Big Data.	
Pre-requisite	Basic concepts and understanding of operating system and computer	
	network technologies.	
Course Outcome	After learning the course, the student will be able:	
	• To understand the cloud models such as software as a service and the other	
	models Iaas and Paas as well as managing in a multi-cloud world,	
	developing your cloud strategy such as integrating data in the cloud,	
	promoting cloud security, and more.	
	• To learn about Big data sets that are too large to be handled by traditional	
	data-processing application software and about Data Lake.	
Course Content	Unit-1: Introduction to Cloud Computing	
	1.1 Fundamentals of Cloud Computing	
	1.1.1 Concepts of cloud and cloud computing	
	1.1.2 Types of cloud based on deployment (Public, Private and Hybrid)	
	1.2 Cloud service models:	
	1.2.1 IaaS (Infrastructure as a Service), PaaS (Platform as a Service)	
	1.2.2 SaaS (Software as a Service)	
	1.2.3 Network as a Service, Database as a Service	
	1.3 Advantages and dis-advantages of Cloud computing	
	Unit-2: Architecture of Cloud Computing	
	2.1 Basics of Planning and deployment of Cloud	
	2.1.1 Cloud Planning phases	
	2.1.1.1 Business Architecture Development	
	2.1.1.2 IT Architecture Development	
	2.1.1.3 Transformation Plan Development	
	2.1.2 Technologies behind the Cloud	
	2.1.2.1 Virtualization	
	2.1.2.2 Service oriented Architecture (SOA)	
	2.1.2.3 Utility Computing	
	2.2 Cloud Computing Architecture	
	2.3 Infrastructure components of Cloud	
	Unit-3. Cloud Management.	
	3.1 Tasks of Cloud management	
	3.2 Cloud Storage Devices: (Rlock storage File Storage)	
	3 3 Cloud Storage Classes: (Managed and Unmanaged)	
	3 3 1 Cloud Virtualization.	
	3.3.1 Cloud Virtualization:	

	3.3.1.1 Hypervisor	
	3.3.1.2 Types of Hardware Virtualization: (Full, Emulation, Para)	
<b>Unit-4: Cloud Securing, Operations and Applications:</b>		
	4.1 Security Boundaries	
	4.1.1 Cloud security Alliance (CSA)	
	4.1.2 Cloud operations and its management concepts	
	4.2 Cloud applications:	
	4.2.1 Business Applications	
	4.2.2 Data storage and backup applications	
	Unit-5: Concepts of Big Data and Data Lake:	
	5.1 Concepts of Bigdata	
	5.1.1 Sources of Bigdata	
	5.1.2 Bigdata benefits over Traditional Database	
	5.1.3 Concepts of Data Warehouse	
	5.1.3.1 Concepts of data processing techniques:	
	5.1.3.1.1 OLTP (Online Transaction Processing)	
	5.1.3.1.2 OLAP (Online Analytical Processing)	
	5.2 Concepts of Data Lake:	
	5.2.1 Data lake concepts and its architecture	
	5.2.2 Significance of data lake	
	5.2.3 Comparison of Data Lake and Data Warehousing	
	[All Units carry Equal Weightage]	
Reference Books	1. Cloud Computing For Dummies 2nd Edition, by Judith S. Hurwitz, Daniel	
	Kirsch, John Wiley & Sons Inc., ISBN: 978-1119546658	
	2. Cloud Computing: Concepts, Technology & Architecture, Ricardo Puttini,	
	Thomas Erl, and Zaigham Mahmood, PHI, ISBN: 978-0133387520,	
	3. Cloud Computing: Principles and Paradigms - R. Buyya et al, Wiley 2010	
	4. Cloud Computing : Principles Systems and Application - L Gillam et al -	
	Springer 2010	
	5. Cloud Computing Bible - Sosinsky - Wiley - India, 2011	
	6.Cloud Computing Second Edition Dr. Kumar Saurabh, Wiley - India, 2012	
	7.Service Oriented Architeture: Concepts, Technology and Design, Thomas	
	Erl, Prentice Hall publication, 2005	
	8. Understanding Enterprise SOA - Enterprise Service Oriented Architecture,	
	Eric Pulier, Hugh Taylor, Dreamtech Press 2008	
	9.Cloud Computing - Insight into New Era Infrastructure, Dr Kumar	
	Saurabh, Wiley India 2012	
	10.Understanding SOA with Web Services - Sanjiva Weerawarana,	
	Franscisco Cubera, Frank Leymann, Tony Storey, Donald F Ferguson, Eric	
	Newcomer, Greg Lomow - Addision Wesely Publication, 2004	
	11.Enterprise Service Bus - Dave Chappelll - O'Reilly Publications 2004	
	12. Amazon Web Services For Dummies, Bernard Golden, ISBN:978-	
	1118571835	
	13. Principles of Interactive Computer Graphics, New Man W. &	
	Sproul P. F. –McGraw Hill	
	14. Procedural Elements for Computer Graphics, Rogers D. F. –	
	McGraw Hill.	
Teaching Methodology	Class Work, Discussion, Self-Study, Seminars and/or Assignments	
Evaluation Method	30% Internal assessment	
	70% External assessment	
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#### **Course: 602 – E-Commerce and Cyber Security**

Course Code	602	
Course Code	002	
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Teaching / Week	4 Hours / Week (Suggested) (1 otal Minimum 48 Hours)	
Minimum Weeks/Semester	15 Weeks (Including Class work, preparation, Examinations etc.)	
Review/Revision	2021-2022	
Implementation Year	2022-2023 A.Y.	
<b>Purpose of Course (POC)</b>	To make students aware of e-Commerce, Cyber Security, Cyber Crime	
	and Cyber Laws To impart hasic knowledge of e-Commerce, Cyber Security, Cyber	
Course Objective	To impart basic knowledge of e-Commerce, Cyber Security, Cyber Crime & Cyber Law	
Pre-requisite	Fundamental Knowledge of Networking Web Applications &	
The requisite	Database	
Course Outcome	The students will get the basic knowledge of e-Commerce. Cyber	
Course Outcome	Security Cyber Crime & Cyber I aw and hence will help them in	
	developing secured applications and will make them aware of various	
	Cyber Laws	
Content	Unit 1: Introduction to Electronic Commerce	
Content	1 1 Concepts of e-Commerce	
	1.2 Aims of e-Commerce	
	1.3 e-Commerce Framework	
	1.4 e-Commerce Consumer Applications	
	1.5 e-Commerce Organizational Applications	
	1.6 Introduction to m-Commerce	
	Unit 2: Network Infrastructure of e-Com . Payment and Security:	
	2.1. Concepts of Information Way	
	2.2. Components of I-Way	
	2.2.1. Network Access Equipment	
	2.2.2. Local on-ramps	
	2.2.3. Global Information Distribution Network	
	2.3. Transaction Models	
	2.4 e-Commerce Payments and Security Issues	
	2.4.1. e-Commerce Payment Systems	
	2.4.2. Debit Card Based, Credit Card Based, Risks & EPS	
	2.4.3. e-Cash, e-Cheque, e-wallet	
	2.5. Security on Web, SSL	
	Unit-3: Introduction to Cyber Crimes:	
	3.1 Category of Cyber Crimes	
	3.2 Technical Aspects of Cyber Crimes	
	3.2.1 Unauthorized access & Hacking	
	3.2.2 Trojan, Virus and Worm Attacks	
	3.2.3 E-Mail related Crimes: Spoofing, Spamming, Bombing	
	3.2.4 Denial of Service Attacks	
	3.2.5 Distributed Denial of Service Attack	
	3.5 Various crimes :	
	3.3.1 IPR Violations (Software piracy, Copyright Infringement,	
	Trademarks Violations, Thett of Computer source code, Patent	
	violations)	
	5.5.2 Cyber Squatting, Cyber Smearing, Cyber Stacking	
	5.5.5 Financial Crimes: (Banking, credit card, Debit card related)	
	Unit 4.	
	Unit-4:	
	4.1 Concepts of Cyber Security:	

	4.1.1 Types of Threats	
	4.1.2 Advantages of Cyber Security	
	4.2 Basic Terminologies:	
	4.2.1 IP Address, MAC Address	
	4.2.2 Domain name Server(DNS)	
	4.2.3 DHCP. Router. Bots	
	4.3 Common Types of Attacks:	
	4 3 1 Distributed Denial of Service	
	4.3.2 Man in the Middle Email Attack	
	4 3 3 Password Attack Malware	
	4.5.5 Password Attack, Malware	
	4.4 Hackers:	
	4.4.1 Various vulnerabilities:	
	4.4.1.1 Injection attacks, Changes in security settings	
	4.4.1.2 Expouser of Sensitive Data	
	4.4.1.3 Breach in authentication protocol	
	4.4.2 Types of Hackers: White hat and Black hat	
	Unit-5:	
	5.1 Ethical Hacker	
	5.1.1 Roles and Responsibilities	
	5.1.2 Benefit of Ethical Hacking	
	5.1.3 Skills require to become Ethical hacker	
	5.2 Penetration testing concepts	
	5.2.1 Phases of Ethical hacking	
	5.2.2 Areas of penetration testing	
	5.3. SOL Injection:	
	5.3.1 Concepts of SOL Injection	
	5.3.2 Types of SQL Injection	
	5.3.2 Types of SQL injection	
	5.4 Firewall	
	5.4 1 Concents of Eirsensl	
	5.4.1 Concepts of Firewall	
	5.4.2 Types of Firewall	
	5.4.3 Working, Advantages and Importance of Firewall	
	[All Units carry Equal Weightage]	
Reference Book	1. Frontiers of Electronic Commerce, Ravi Kalakota and Andrew	
	Whinston, Addition Wesley	
	2. Electronic Commerce: A Managerial Perspective, Efraim turban, Jae	
	Lee, David King, H. Michel Chung, Addition Wesley	
	3. E-Commerce: An Indian Perspective, Joseph, PHI	
	4. E-Mail Hacking, Ankit Fadia, Vikas Publishing House Pyt. Ltd.	
	5 e-Commerce Concept Models Strategies GVS Murthy Himalaya	
	Publisher	
	6 Cyber Crime in India Dr M Dasgunta Centax Publications Pyt I to	
	7 Cyber Laws and Crimes Barkha II Rama Mohan Universal Law	
	Publishing Co. Dut I td	
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	7. Cyber Security Understanding Cyber Unine, Computer Forensic and Logal Darapaotives. Nine Codholo Sunit Delanur, Willey Later	
	Legal reispectives, Milla Goudole, Sunit Belapur, Willey India	
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reaching Methodology	Class work, Discussion, Self-Study, Seminars and/or Assignments	
Evaluation Method	30% Internal assessment.	
	70% External assessment.	

#### Course: 603: Project

Course Code	603	
Course Title	Project	
Credit	12	
Teaching / Week	2 Hrs. / Week / 5 students (Reporting & Contact hours)	
Minimum Weeks/Semester	15 (Including class work, examination, preparation etc.) 28 hours/week	
Review/Revision	2021-2022	
Implementation Year	2022-2023 A.Y.	
<b>Purpose of Course (POC)</b>	To make students get hands on experience of software development life	
-	cycle.	
Course Objective	The main objective is to make students acquire knowledge of analyzing	
	and solving real world problems and hands on experience of software	
	development life cycle.	
Pre-requisite	Knowledge of Operating System, Computer Networking, Software	
	Engineering, Database, Application Development Tools, Web	
	Designing Related Tools, Computer Languages.	
Course Outcome	Students will understand the complete process of software development	
	life cycle and will be able to produce good applications of real world	
	problems.	
<b>Guidelines for Project</b>	The project will be in-house. Duration of the Project Work should be	
	minimum eight weeks. The project work will start with the beginning	
	of the semester. All the students will have to submit following reports	
	to their respective examination centers. 1. The Joining Report (Once).	
	2. Project Title Report (Once). 3. Progress Reports (Fortnightly) signed	
	by the guide (internal faculty) & submitted to the Head/Project	
	Coordinator in person. 4. Project Completion Certificate issued from the	
	College. The student shall not be allowed to appear for the Final	
	Examination if the student fails to submit the above-mentioned documents. Project Viva-voce will be conducted at the end of the	
	documents. Project Viva-voce will be conducted at the end of the	
	semester. The project report in form of soft-copy can be accepted along	
	with the required documents/reports in form of hardcopy.	
Evaluation Method	30% Internal assessment.	
	70% External assessment.	
	Internal Evaluation: Minimum two faculties (preferably senior most)	
	should be nominated by the Head of the Department or the senior most	
	faculty in absence of the Head to evaluate the performance of the	
	students' presentation.	
	External Evaluation: The evaluation should be as per the following	
	break up:	
	1. Analysis:25% weightage	
	2. Design: 25% weightage	
	3. Implementation: 25% weightage	
	4. Presentation: 15% weightage	
	5. Project Report: 10% weightage	

#### **Course: 604: Seminar on Information Technology Innovations & Trends**

Course Code	604	
Course Title	Seminar on Information Technology Innovations & Trends	
Credit	3	
Teaching / Week	3 hours / Week	
Minimum Weeks/Semester	15 (Including class work, examination	n, preparation etc.)
<b>Review/Revision</b>	2021-2022	
Implementation Year	2022-2023	
<b>Purpose of Course (POC)</b>	1. To improve the communication and presentation skills.	
	2. To let students, update knowledge on latest & forthcoming	
	technologies.	
	3. Let students keep pace with new tre	ends of Information Technology.
Course Outcome	Students will be able to develop their	presentation skills and will keep
	themselves updated with latest trends	in Information Technology.
Course Objective	Information Technology is a constant	ntly changing field. The idea of
	introducing this subject is to let stude	ents keep pace with the changing
	scenario of I. T. During the lectures, f	aculty will help students to select
	the topic. The students will collect re	elevant information from various
	sources and prepare a presentation. Du	iring the class hours, students will
	present their presentation on the given	topic. The faculty will access and
Deve are available	neip them to improve their presentation	on skills.
Pre-requisite		
Guidelines for Seminar	Students will prepare a presentation to	asing IC1 Tools and submit hard
Evaluation Mathed	200/ Internal accessment	nu External evaluation.
Evaluation Method	70% External assessment.	
	Fully for:	
	Evaluation.	ha university will evaluate the
	Seminar Presentation The external	seminar exam will be scheduled
	simultaneously along with the project	exams
	For internal evaluation. Minimum	two faculties (Preferably senior
	most) nominated by the Department F	lead or the Senior most faculty, in
	absence of the Department Head, wil	l evaluate the performance of the
	student's presentation and will be tre	eated as Internal Evaluation. The
	students will submit and produce the	e softcopy of the seminar report
	along with the hardcopy of the required certificates at the time of	
	internal and external exams.	
	The evaluation should be as per the following break up:	
	1. Selection of the Topic & Relevance: 20% weightage	
	2. Understanding of the topic:	35% weightage
	3. Source of the topic:	10% weightage

#### **Course: Foundation Elective (FND – 06)**

Course Code	FND-05	
Course Title	Foundation Elective	
Credit	2	
Teaching / Week	-	
Minimum Weeks/Semester	-	
<b>Review/Revision</b>	2021-2022	
Implementation Year	2022-2023 A.Y.	
<b>Purpose of Course (POC)</b>	To enhance the student's capabilities in terms of extra curriculum	
	activity or by gaining additional knowledge in any field including their	
	core subjects.	
Course Objective	Make students to participate and learn new technology or any multi-	
	disciplinary subject by joining university approved 2 credit certificate	
	course. Students are encouraged to participate in sports/NSS/NCC and	
	contribute at University level or state level or National level.	
Pre-requisite	No specific requirement.	
Course Outcome	Students will be able to obtain additional 2 credits by active	
	participation in field of NSS/NCC/Sports/Saptdhara/Certificate course.	
Structure of the Course:	Students are required to select any one from the following and produce	
	the evidence. Additional 2 credits will be granted to the students on	
	recommendation by the principal on fulfilment of any of the following	
	criteria during the semester.	
	1) Active participation in NSS/ NCC at University level / State	
	level / National level and produce the certificate.	
	2) Active Participation in any one saptdhara/Sports activity and	
	represent/participate at University level / State level / National	
	level and produce the certificate.	
	3) Successful completion of any minimum two credit course	
	recognized by the University from any university affiliated	
	institution. The credits will be granted on producing the	
	completion certificate. (Certification course fees will be paid	
	separately by the student for which the student enrolled. It is an	
	Optional activity in field of INSS/INCC/Sports/Saptdhara.)	
Evaluation Method:	On producing the supporting document as per the need described in	
	Structure of the Course" section.	