

## ADVANCED COMPUTER AIDED DESIGN

<b>III Semester: CAD/CAM</b>								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BCCB23	Core	L	T	P	C	CIA	SEE	Total
		3	-	-	3	30	70	100
<b>Contact Classes: 45</b>		<b>Tutorial Classes: Nil</b>		<b>Practical Classes: Nil</b>			<b>Total Classes: 45</b>	
<p><b>OBJECTIVES:</b></p> <p><b>The course should enable the students to:</b></p> <ol style="list-style-type: none"> <li>Understand of basic trends in design and modeling applicable to CAD/CAM.</li> <li>Applying the CAD tools for designing.</li> <li>Create surface and geometric models.</li> </ol> <p><b>COURSE OUTCOMES (COs)</b></p> <ol style="list-style-type: none"> <li>Understand the principles of computer graphics with mathematical simulation</li> <li>Understand the coordinate systems and transformation in graphics</li> <li>Understand representations of surface modelling</li> <li>Development of synthetic surface and its transformations</li> <li>Analyze 3D - Geometric models to solve real time problems</li> </ol> <p><b>COURSE LEARNING OUTCOMES (CLOs):</b></p> <ol style="list-style-type: none"> <li>Understand the basic concepts of Computer graphics</li> <li>Understand the basic primitives algorithms</li> <li>Apply the 2D and 3D transformations</li> <li>Understand the various CAD tools</li> <li>Understand the various graphic standards associated to CAD</li> <li>Understand the representation of curves</li> <li>Understand the mathematical representation of analytical surfaces</li> <li>Understand the parametric representation of analytical surfaces</li> <li>Apply the analytical surfaces in CAD modeling</li> <li>Understand the mathematical representation of synthetic surfaces</li> <li>Understand the parametric representation of synthetic surfaces</li> <li>Apply the synthetic surfaces in CAD modeling</li> <li>Understand boundary representation and Constructive Solid Geometry</li> <li>Apply the data exchange formats for data transfer</li> <li>Design and analyze the engineering problems</li> </ol>								
<b>UNIT-I</b>	<b>PRINCIPLES OF COMPUTER GRAPHICS</b>						<b>Classes:09</b>	
Principles of computer graphics: Introduction, graphic primitives, point plotting, lines, Bresenham's circle algorithm, ellipse, transformation in graphics, coordinate systems, view port, 2D and 3D transformation, hidden surface removal, reflection, shading and generation of character.								
<b>UNIT -II</b>	<b>CAD TOOLS</b>						<b>Classes:09</b>	
Definition of CAD Tools, Types of system, CAD/CAM system evaluation criteria, brief treatment of input and output devices. Graphics standard, functional areas of CAD, Modeling and viewing, software documentation, efficient use of CAD software; Geometric modeling: Types of mathematical representation of curves, wire frame models wire frame entities parametric representation of synthetic curves hermite cubic splines Bezier curves Bezier splines rational curves.								

<b>UNIT -III</b>	<b>SURFACE MODELING</b>	<b>Classes:09</b>
Mathematical representation surfaces, surface model, surface entities surface representation. Parametric representation of surfaces, plane surface, rule surface, surface of revolution, tabulated cylinder.		
<b>UNIT -IV</b>	<b>PARAMETRIC REPRESENTATION OF SYNTHETIC SURFACES</b>	<b>Classes:09</b>
Parametric representation of synthetic surfaces: Hermite Bicubic surface, Bezier surface, Bezier Spline surface, COONs surface, Blending surface Sculptured surface, Surface manipulation; Displaying, Segmentation, Trimming, Intersection, Transformations (both 2D and 3D).		
<b>UNIT -V</b>	<b>GEOMETRICMODELLING-3D</b>	<b>Classes:09</b>
Geometricmodelling-3D: Solid modeling, solid representation, boundary representation (B-rep), Constructive solid geometry (CSG). CAD/CAM exchange: Evaluation of data, exchange format, IGES data representations and structure, STEP Architecture, implementation, ACIS and DXF; Design applications: Mechanical tolerances, mass property calculations, finite element modeling and analysis and mechanical assembly; Collaborative engineering: Collaborative design, principles, approaches, tools, design systems.		
<b>Text Books:</b>		
<ol style="list-style-type: none"> <li>1. Ibrhim Zeid, "Mastering CAD/CAM", Tata McGraw Hill, 2<sup>nd</sup> Edition, 2013.</li> <li>2. P. N. Rao, "CAD/CAM Principles and Applications", Tata McGraw Hill, 3<sup>rd</sup> Edition, 2010.</li> <li>3. M. P. Groover, E. Zimmers, "CAD/ CAM Computer- Aided Design and Manufacturing", Pearson, 1<sup>st</sup> Edition, 2003.</li> <li>4. R. Alavala Chennakesava, "CAD/ CAM Concepts and Applications", PHI, 1<sup>st</sup> Edition, 2013.</li> </ol>		
<b>Reference Books:</b>		
<ol style="list-style-type: none"> <li>1. Farid Amirouche, "Principles of Computer-Aided Design and Manufacturing, Pearson, 2<sup>nd</sup> Edition, 2004.</li> <li>2. P. Radha Krishnan, "CAD/ CAM/ CIM", New Age International, 4<sup>th</sup> Edition, 2016.</li> <li>3. Warren. S. Seames, "Computer Numerical Control Concepts and Programming", Delmar Cengage Learning, 4<sup>th</sup> Edition, 2013</li> </ol>		
<b>Web References:</b>		
<ol style="list-style-type: none"> <li>1. <a href="http://nptel.ac.in/courses/112102101/">http://nptel.ac.in/courses/112102101/</a></li> <li>2. <a href="http://www.journals.elsevier.com/computer-aided-design">http://www.journals.elsevier.com/computer-aided-design</a></li> <li>3. <a href="https://www.elsevier.com/books/surface-modeling-for-cad-cam/choi/978-0-444-88482-41">https://www.elsevier.com/books/surface-modeling-for-cad-cam/choi/978-0-444-88482-41</a></li> </ol>		
<b>E-Text Book:</b>		
<ol style="list-style-type: none"> <li>1. <a href="http://sbmpme.blogspot.in/2011/01/cad-cam-cim-p-radhakrishnan.html">http://sbmpme.blogspot.in/2011/01/cad-cam-cim-p-radhakrishnan.html</a></li> <li>2. <a href="https://www.scribd.com/doc/228624725/cad-cam-text-book-by-P-N-RAO">https://www.scribd.com/doc/228624725/cad-cam-text-book-by-P-N-RAO</a></li> </ol>		