

<b>Course Number and Name</b>	
BME301 – KINEMATICS OF MACHINES	
<b>Credits and Contact Hours</b>	
4&60	
<b>Course Coordinator's Name</b>	
Mr.R.Karthikeyan	
<b>Text Books and References</b>	
<b>TEXT BOOKS:</b>	
1. S.S.Rattan-Theory of Machines- Tata McGraw Hill, 2005.	
2. Rao J.S. & Dukkipatti R.V.Mechanisms and Machine Theory, 2 <sup>nd</sup> Edition-Wiley Estern Ltd-1992.	
<b>REFERENCES:</b>	
1. Bansal- Theory of Machines, 2006.	
2. Shigley.J.E-Theory of Machines and Mechanisms, 2 <sup>nd</sup> Edition- McGraw Hill Inc,1995	
3. V.P.Singh-Theory of Machines ,2001	
4. <a href="http://royalmechanicalbuzz.blogspot.com/.../theory-of-machines-by-rs-khurmi..">royalmechanicalbuzz.blogspot.com/.../theory-of-machines-by-rs-khurmi..</a>	
<b>Course Description</b>	
To understand the concept of machines, mechanisms and related terminologies. To analyse a mechanism for displacement, velocity and acceleration at any point in a moving link.	
<b>Prerequisites</b>	<b>Co-requisites</b>
Engineering Mechanics	Nil
required, elective, or selected elective (as per Table 5-1)	
Required	
<b>Course Outcomes (COs)</b>	
CO1	Upon completion of this course, the students can understand mechanism and its applications in various field of work
CO2	Students will be able to draw velocity and acceleration diagrams graphically and analytically.
CO3	Understand the analysis method for optimum design.
CO4	Understand the importance of friction in machine elements.
CO5	Understand control mechanism
CO6	Study of gears and its applications

Student Outcomes (SOs) from Criterion 3 covered by this Course													
COs/SOs	a	b	c	d	e	f	g	h	i	j	k	l	
CO1	H	H	H			H		L	H		M	M	
CO2						H		L			M		
CO3						H		L			M	M	
CO4						H		L			M	M	
CO5						H		L			M	M	
CO6	H	H	H			H		L	H		M	M	

List of Topics Covered	
<p><b>UNIT I INTRODUCTION TO MECHANISMS</b></p> <p>Introduction-Science of mechanisms-Terms and definitions-Planar, Spherical and spatial mechanisms, Mobility-Classification of mechanisms-Indexing mechanisms, reciprocating mechanism etc. Straight line generators- kinematic inversion- Slider crank chain inversions- Four bar chain inversions- Grashof's law.Determination of velocities and acceleration in mechanisms- Relative motion method (Graphical) for Mechanisms having turning, sliding and rolling pair.</p>	<b>12</b>
<p><b>UNIT II SYNTHESIS OF MECHANISMS</b></p> <p>Classification of kinematics- Synthesis problems- Chebyshev's spacing, Two point synthesis- Freudenstein method- Four bar mechanism and slider crank mechanism.Types of cams and followers- Follower motions- Uniform, parabolic, SHM, Cycloidal and polynomial-Synthesis of cam profiles for different followers. Cams with specified contours</p>	<b>16</b>
<p><b>UNIT III FRICTION</b></p> <p>Friction-Types-Application-Inclined plane, Screw jack, Clutch, Brakes Bearings, Journal bearing, Flat pivot bearing, multi collar bearings, Belt &amp; Rope drives.</p>	<b>10</b>
<p><b>UNIT IV THEORY OF GEARING</b></p> <p>Classification of gears, Law of gearing, nomenclature-Forms of teeth, Cycloidal teeth, Involute teeth-Length of path of contact-Length of arc of contact-Contact ratio-Interference and undercutting- Minimum number of teeth to avoid interference- Internal gears- Extended center distance system- Long and short addendum system- Gear trains-Types-Epicyclic gear trains-Automobile differential unit.</p>	<b>12</b>
<p><b>UNIT V CONTROL MECHANISMS</b></p> <p>Governors- Gravity controlled governors-Spring control governors, Hartnell governor, and Hartung governor-Governor characteristics- Governor effort and power.Gyroscopes-Gyroscopic forces and couple- Forces on bearing due to gyroscopic action- Gyroscopic effects on the movement of aero plans and ships, stability of two wheel drive and four wheel drive.</p>	<b>10</b>