

MET's Institute of Engineering, Bhujbal Knowledge City, Nashik
Department of Computer Engineering

Honours Course TE Sem-V Subject: **310701: Virtual Reality**

Following are NPTEL Courses available on NPTEL Repository

<https://nptel.ac.in/courses/106/106/106106138/>

<https://nptel.ac.in/courses/121/106/121106013/>

Unit I Introduction to Virtual Reality	http://lavallo.pl/vr/node1.html
Defining Virtual Reality	https://youtu.be/f-vUixm-YIQ NPTEL
History of VR	https://youtu.be/HZgRmmmrhZk NPTEL
Human Physiology and Perception,	https://youtu.be/vMYXTVc5g-w NPTEL https://youtu.be/F58InohOFbs NPTEL
Key Elements of Virtual Reality Experience, Virtual Reality System, Interface to the Virtual World-Input & output- Visual, Aural & Haptic Displays, Applications of Virtual Reality. #Exemplar/ Case Studies Study the use of Virtual Reality at NASA	https://youtu.be/YJuRQXF2VqI NPTEL https://youtu.be/YJuRQXF2VqI NPTEL http://lavallo.pl/vr/node1.html https://youtu.be/8adip41nrm0 NPTEL http://lavallo.pl/vr/node1.html https://www.nasa.gov/feature/ames/analog-missions-mixed-reality/ https://spacecenter.org/how-nasa-uses-virtual-reality-to-train-astronauts/
Unit II Representing the Virtual World Representation of the Virtual World, Visual Representation in VR, Aural Representation in VR and Haptic Representation in VR #Exemplar/ Case Studies GHOST (General Haptics Open Software Toolkit) software development toolkit.	http://lavallo.pl/vr/node1.html http://lavallo.pl/vr/node1.html https://youtu.be/bNvfbAryoEM , https://youtu.be/2wnZ31sz5cY , NPTEL https://youtu.be/bxeHqvuh_Jc , NPTEL https://www.nap.edu/read/4761/chapter/8#163 https://www.3dsystems.com/haptics-devices/openhaptics https://vizulab.com.au/simulation/haptics/geomagic-openhaptics-toolkit/
Unit III The Geometry of Virtual Worlds & The Physiology of Human Vision Geometric Models, Changing Position and Orientation, Axis-Angle Representations of Rotation, Viewing Transformations, Chaining the Transformations, Human Eye, eye movements & implications for VR. #Exemplar/ Case Studies Sweeping coverage of eye movements	https://youtu.be/tgbXCwjIcaE NPTEL https://youtu.be/8adip41nrm0 NPTEL http://lavallo.pl/vr/node1.html https://youtu.be/tgbXCwjIcaE NPTEL http://lavallo.pl/vr/node1.html https://youtu.be/-TUTqVOGSa8 NPTEL https://youtu.be/A8ldsW7RJhY NPTEL https://youtu.be/bUDpT_cg9Ko NPTEL https://youtu.be/jmRkYDFDlp0 NPTEL https://youtu.be/bUDpT_cg9Ko , https://youtu.be/wFEd_uRxxG8 , NPTEL https://youtu.be/PFVPIGoTwmU , http://msl.cs.uiuc.edu/vr/vrch5.pdf https://youtu.be/O6EhPwsRi5o NPTEL
Unit IV Visual Perception & Rendering Visual Perception - Perception of Depth, Perception of Motion, Perception of Color, Combining Sources of Information Visual Rendering -Ray Tracing and Shading Models, Rasterization, Correcting Optical Distortions, Improving Latency and Frame Rates #Exemplar/ Case Studies Automatic stitching of panoramas in Virtual Reality	https://youtu.be/77s8uQ0ZXiw NPTEL https://youtu.be/oJggtvc0dNY NPTEL https://youtu.be/wb_yp5mQ5Tk NPTEL https://youtu.be/tdT1xI25j38 NPTEL https://youtu.be/dNhO6GozluE NPTEL https://youtu.be/Cfo8bGeBcGA NPTEL https://youtu.be/rKASNgIVnKU , https://youtu.be/ROonPREOfY NPTEL https://youtu.be/OuOUdbKoxA8 NPTEL https://youtu.be/1ISLh6oXsUI NPTEL https://www.gearbrain.com/stitch-together-360-degree-photos-2401647385.html

<p>Unit V Motion & Tracking Motion in Real and Virtual Worlds- Velocities and Accelerations, The Vestibular System, Physics in the Virtual World, Mismatched Motion and Vection Tracking- Tracking 2D & 3D Orientation, Tracking Position and Orientation, Tracking Attached Bodies #Exemplar/ Case Studies A virtual Study Use Case- NICE, An Educational Experience</p>	<p>https://youtu.be/QbHFRjfRsaM NPTEL https://youtu.be/WS7Nn6XE1As NPTEL http://lavallo.pl/vr/node232.html https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6787470/ http://lavallo.pl/vr/node1.html http://lavallo.pl/vr/node264.html https://youtu.be/Z1sCpdxRq9I, NPTEL https://youtu.be/WX9Q7JC78II NPTEL https://youtu.be/QbHFRjfRsaM, NPTEL https://youtu.be/0C13S_EtHNY, NPTEL https://files.eric.ed.gov/fulltext/EJ1059024.pdf</p>
<p>Unit VI Interaction & Audio Interaction - Motor Programs and Remapping, Locomotion, Manipulation, Social Interaction. Audio -The Physics of Sound, The Physiology of Human Hearing, Auditory Perception, Auditory Rendering. #Exemplar/ Case Studies Side effects of using VR systems/ VR sickness.</p>	<p>https://youtu.be/DfK4opEwWIs NPTEL https://youtu.be/8adip41nmr0 NPTEL http://lavallo.pl/vr/node314.html https://youtu.be/HWmq8-S8zPA NPTEL https://youtu.be/46Z40FcRwh8 NPTEL https://youtu.be/uo5i3KMjf-g NPTEL http://lavallo.pl/vr/node1.html https://youtu.be/8adip41nmr0 NPTEL https://youtu.be/DfK4opEwWIs NPTEL https://youtu.be/URsxz-MDWhU NPTEL http://resourcemagonline.com/2018/03/the-negative-side-effects-of-virtual-reality/87052/ https://www.lawtechnologytoday.org/2021/01/what-are-the-harmful-effects-of-virtual-reality/ https://www.vesttech.com/4-health-risks-from-using-virtual-reality-headsets/ http://tiny.cc/zxyiuZ</p>