



**ZEAL EDUCATION SOCIETY'S
ZEAL COLLEGE OF ENGINEERING AND RESEARCH
NARHE | PUNE -41 | INDIA**



E-Content Development

Subject: Power System Operation and Control

Developed by: Chinmay Deshpande

Unit 1: Power System Stability (Angle Control)

Playlist: <https://youtube.com/playlist?list=PLcyXyzEYiL1Bv9Q5dY6Zpe3beBrIdkM8N>

| Sr. No. | Topic | Link |
|---------|---|---|
| 1. | Lec_01_Power System Stability: Introduction to Stability and its types | https://youtu.be/VqLiGwFpIJU |
| 2. | Lec_02_Power System Stability: Dynamics of synchronous machine | https://youtu.be/yW2F-YB9Kzg |
| 3. | Lec_03_Power System Stability: Swing Equation | https://youtu.be/832vxHzZuRs |
| 4. | Lec_05_Power System Stability: Swing equation of machines swinging coherently and non-coherently | https://youtu.be/HmlYSFSfQhM |
| 5. | Lec_06_Power System Stability: Equal area criterion | https://youtu.be/WxX49svG83s |
| 6. | Lec_07_Power System Stability: Applications of equal area criterion: Sudden change in mechanical input | https://youtu.be/Llh3iXAzWlK |
| 7. | Lec_08_Power System Stability: Effect of clearing time on stability and critical clearing angle | https://youtu.be/ZR61vmr2fSs |
| 8. | Lec_09_Power System Stability: Short circuit at one end of line | https://youtu.be/TiLa5Aqsi_U |
| 9. | Lec_10_Power System Stability: Short circuit away from line ends | https://youtu.be/n3I6uaPCD7w |
| 10. | Lec_12_Power System Stability: Methods to improve steady state and transient stability | https://youtu.be/C5NiO5e6zDQ |
| 11. | Lec_13_Power System Stability: Numerical based on equal area criteria (Fault at midpoint): Part 1 | https://youtu.be/KLgN8BjT-QE |
| 12. | Lec_13a_Power System Stability: Numerical based on equal area criteria (Fault at midpoint): Part 2 | https://youtu.be/fHYDm90VunY |
| 13. | Lec_14_Power System Stability: Numerical based on Swing Equation | https://youtu.be/2VUNgq27GwA |
| 13a) | Lec_15_Power System Stability: Numerical based on equal area criteria (Sudden increase in mechanical input) | https://youtu.be/x5Oq1Q5oAsM |

Unit 2: Reactive Power Angle

Playlist: <https://youtube.com/playlist?list=PLcyXyzEYiL1DNx6qCYJi2uVMr0QOn0xMi>

| Sr. No. | Topic | Link |
|---------|--|---|
| 1. | Lec_01_Reactive Power Control: Necessity of reactive power control | https://youtu.be/-AdejM6w1c0 |
| 2. | Lec_02_Reactive Power Control: Production and absorption of reactive power | https://youtu.be/L240XhpYrZA |
| 3. | Lec_05_Reactive Power Control: Loading capability curve of a synchronous generator | https://youtu.be/0Gqog-y0_wM |
| 4. | Lec_06_Reactive Power Control: FACTS Controller: Basics and its types | https://youtu.be/I_Ov9Rt1c7w |
| 5. | Lec_07_Reactive Power Control: Relation between receiving end voltage and the reactive power | https://youtu.be/VnC_7abwNB8 |
| 6. | Lec_08_Reactive Power Control: Series compensation: reactor and capacitor | https://youtu.be/7KzBJK0lhs8 |
| 7. | Lec_09_Reactive Power Control: Shunt compensation: reactor and capacitor | https://youtu.be/RT7XnhaB98Y |
| 8. | Lec_10_Reactive Power Control: working principle, circuit diagram, VI characteristics, applications of STATCOM | https://youtu.be/ZX3gDvASxWY |

Unit 3: Automatic Generation Control

Playlist: https://youtube.com/playlist?list=PLcyXyzEYiL1A09F_LQA6Wj5ISLA5Gagr5

| Sr. No. | Topic | Link |
|---------|--|---|
| 1. | Lec_01_Automatic Generation Control: Introduction to the concept of AGC | https://youtu.be/CxytDVWjuB4 |
| 2. | Lec_02_Automatic Generation Control: Block diagram representation of load frequency and excitation control | https://youtu.be/fH3vZxfQ-cs |
| 3. | Lec_04_Automatic Generation Control: Turbine speed-governor system | https://youtu.be/IhkW_UbgxS8 |
| 4. | Lec_05_Automatic Generation Control: Turbine speed-governor system with its modeling | https://youtu.be/v_tWkwydQFM |
| 5. | Lec_06_Automatic Generation Control: | https://youtu.be/ijJh8Ijmx1E |



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|-----|--|---|
| | Turbine Model | |
| 6. | Lec_07_ Automatic Generation Control: Generator Load Model | https://youtu.be/ZAdICUMT57U |
| 7. | Lec_08_ Automatic Generation Control: Complete block diagram representation of LFC | https://youtu.be/Uqz6sdPj-A4 |
| 8. | Lec_09_ Automatic Generation Control: Steady state analysis of single are LFC | https://youtu.be/zK7Uc-LSDv4 |
| 9. | Lec_11_ Automatic Generation Control: Concept of Control Area | https://youtu.be/DiYWZu-iazc |
| 10. | Lec_14_ Automatic Generation Control: Concept of area control error (ACE) | https://youtu.be/ejnkeNJgXFk |

Unit 4: Economic Load Dispatch and Unit Commitment

Part A]: Economic Load Dispatch

Playlist:

<https://youtube.com/playlist?list=PLcyXyzEYiL1CpGeUKCengjSJUL8RiUzTY>

| Sr. No. | Topic | Link |
|---------|---|---|
| 1. | Lec_01_Economic Load Dispatch: Introduction, objective and its necessity | https://youtu.be/J4WGO3VzPCo |
| 2. | Lec_02_Economic Load Dispatch: revision of cost curve, incremental cost curve of thermal | https://youtu.be/T0FK6bqMMIE |
| 3. | Lec_03_Economic Load Dispatch: Method of Lagrange's multiplier | https://youtu.be/Ca7YiKPiydU |
| 4. | Lec_04_Economic Load Dispatch: Economic dispatch including generator limits (neglecting losses) | https://youtu.be/KD5mAFaeUPo |
| 5. | Lec_05_Economic Load Dispatch: Economic load scheduling with transmission loss | https://youtu.be/mzEXh0tm6Lo |
| 6. | Lec_06_Economic Load Dispatch: Economic scheduling of thermal plant considering the effect of transmission line | https://youtu.be/15ufBIFYpN0 |
| 7. | Lec_07_Economic Load Dispatch: Penalty factor | https://youtu.be/PXItXjDY6sw |
| 8. | Lec_08_ Economic Load Dispatch: Trick to solve the numerical | https://youtu.be/vkftUzzIwcA |

Part B]: Unit Commitment



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| Sr. No. | Topic | Link |
|---------|---|---|
| 1. | Lec_01_Unit Commitment: Introduction and its need | https://youtu.be/enaFuzxGgmg |
| 2. | Lec_02_Unit Commitment: Constraints in UC | https://youtu.be/jHBiB8VRDSA |
| 3. | Lec_03_Unit Commitment: Methods of unit commitment – priority list method | https://youtu.be/RVLb2l3zGxo |
| 4. | Lec_04_Unit Commitment: Methods of unit commitment – Dynamic Programming method | https://youtu.be/v4vIGRhllvw |
| 5. | Lec_05_Unit Commitment: Numerical on Priority list method | https://youtu.be/QoOJndOrePA |
| 6. | Lec_06_Unit Commitment: Numerical on Dynamic Programming method. | https://youtu.be/oXfJ5KbVSUo |

Unit 5: Energy Control

Playlist: https://youtube.com/playlist?list=PLcyXyzEYiL1DG3phQ_YqKEHhFndMcaHDF

| Sr. No. | Topic | Link |
|---------|--|---|
| 1. | Lec_01_Energy Control: Interchange of power between interconnected utilities | https://youtu.be/w94pweLhWpQ |
| 2. | Lec_02_Energy Control: economic interchange evaluation | https://youtu.be/50amyzEHqqs |
| 3. | Lec_03_Energy Control: interchange evaluation with unit commitment | https://youtu.be/eL01dVwr3V4 |
| 4. | Lec_04_Energy Control: Capacity interchange | https://youtu.be/wixAYfS40B8 |
| 5. | Lec_05_Energy Control: Diversity interchange | https://youtu.be/jVPN6YxNDLU |
| 6. | Lec_06_Energy Control: Energy Banking | https://youtu.be/omObKV53thY |
| 7. | Lec_07_Energy Control: Emergency Power Interchange | https://youtu.be/QIARKAg3gOI |
| 8. | Lec_08_Energy Control: inadvertent power exchange | https://youtu.be/rHb7sJyZV7w |
| 9. | Lec_09_Energy Control: Power Pool | https://youtu.be/cmtv3EuqSKU |