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| Course Title | Introduction to the Energy Power System |
| Registration Code | L100130001 |
| Number of Credits | 2 |
| Years of Eligible Graduate Students | 1-2 |
| Semester | 1st |
| Period | Thu. 1st |
| Room | B4-WK-401 (Nakamozu Campus, OPU) |
| Instructors | Atsushi Ishigame |
| Office hours | Thursday 12:15~12:45 and 16:15~18:30, Room B4-W417, 4th Floor, Bldg.B4 (Nakamozu Campus, OPU) |
| Goals of the course | <ol style="list-style-type: none"> 1. Acquiring knowledge of the history on the electric power industry. 2. Understanding the various methods related to power system analysis. 3. Understanding the Lyapunov function, which is one of the stability-analysis techniques. 4. Understanding meta-heuristics, which is one of the system optimization techniques. 5. Developing an ability to view future power systems. 6. Upgrading the fundamental skills of presentations. |
| Textbooks | Printed materials will be distributed. |
| Books of reference | A. R. Bergen, Power System Analysis, Prentice-Hall, Inc. (1986) R.H. Miller, J. H. Malinowski, Power System Operation, IEEE Published (1998) |
| Allied subject | |
| Homework (Preparing for the classwork) | <ol style="list-style-type: none"> 1. Survey of "the news related to Power System", the theme which you present in the class and creation of the presentation materials by PowerPoint, etc. 2. Review of Q&A test and creation of report assignment 3. Careful reading of the materials as preparation and confirmation of the note written on whiteboard as review |
| Course outline | <p>First, we outline various issues of power systems and explain the methods of systems analysis, considering that the style of energy supply systems is changing. Next, we present the concrete examples on Lyapunov stability theorem and its function configuration, and discuss the stability analysis of power systems by Zubov's theorem and linear matrix inequality.</p> <p>Additionally, we discuss the various problems (genetor start and stop plan, system expansion plan, etc.) related to optimization of power systems and the solving algorithm (mathematical programming and meta-heuristics).</p> |
| Class schedule | <p>1st History of the electric power industry</p> <p>2nd The problems on electric power systems</p> <p>3rd The outline of electric power systems analysis</p> <p>4th Stability analysis I</p> <p>5th Stability analysis II</p> <p>6th Energy function method</p> <p>7th Lyapunov function method</p> <p>8th Linear matrix inequality</p> <p>9th System optimization I</p> <p>10th System optimization II</p> <p>11th Electric power system planning problems</p> <p>12th Electric power system operation problems</p> <p>13th Meta-heuristics outline</p> <p>14th Meta-heuristics application</p> <p>15th Recent topics of electric power systems</p> |
| Evaluation | Evaluation will be based on the reports, presentations and discussions in the class. |