**Singapore IEMBA July/August 2020 -- Analytical Techniques (if in person)**

| Date | Day | Projected Start Time | Projected End Time | Class Activity | Material | Preparation/Homework |
|---|---|---|---|---|---|---|
| 7/25/2020 | Saturday | 9:00 AM | 10:45 AM | Introduction, basic concepts, overview of course, administrative issues | Lecture | **Read** Ragsdale chapter 1 |
| | | | | Introducing optimization models and linear programming: Blue Ridge Hot Tubs | Ragsdale 2.5-2.7 | Optional: Read Ragsdale chapters 2, 3-3.13 |
| | | | | Visualizing optimization models and solutions | Ragsdale 2.10 (partial) | |
| | | | | Special conditions: nonuniqueness, redundancy, infeasibility, unboundedness | Ragsdale 2.11 | |
| 7/25/2020 | Saturday | 11:15 AM | 1:45 PM | *Kinds of optimization models: linear/nonlinear, continuous/integer* | Lecture | |
| | | | | Spreadsheet modeling | Ragsdale 3-3.4 | |
| | | | | "What if" versus spreadsheet optimization via Solver, design guidelines | Lecture, Ragsdale 3.5-3.8 | |
| | | | | A slightly more complicated problem: Make or buy; substituting out variables | Ragsdale 3.9 and alternate solution in coursepack | |
| | | | | *In-class group work / problem solving* | *Ragsdale problems 3.13/weed wackers and 3.21/Valu-Com (time permitting)* | |
| | | | | | *Optional/advanced: Ragsdale problem 3.16/Beef-Up Ranch* | |
| 7/25/2020 | Saturday | 2:45 PM | 3:45 PM | Transportation modeling and variable grids | Ragsdale 3.11 | |
| | | | | Multiple time periods and inventory | Ragsdale 3.13 | |
| 7/25/2020 | Saturday | 4:15 PM | 6:00 PM | *In-class group work / problem solving* | *Ragsdale problem 3.36/paper recycling* | |
| | | | | | *Ragsdale problem 3.45/gas trading -- time permitting or as ungraded homework* | |
| | | | | | *Optional/advanced: Ragsdale case 3.1/Putting the Link in the Supply Chain* | |
| 7/26/2020 | Sunday | 9:00 AM | 10:30 AM | Go over solution of gas trading problem | | |
| | | | | Introducing integer programming: employee scheduling | Ragsdale 6.9 | Optional: read Ragsdale chapters 6-6.12, 8-8.4 |
| | | | | Binary variables: capital budgeting | Ragsdale 6.10-6.11 | |
| | | | | If necessary, review Net Present Value | Lecture | |
| 7/26/2020 | Sunday | 11:00 AM | 11:30 AM | Binary variables and logical conditions/constraints | Ragsdale 6.12 | |
| | | | | "Carryover" version of capital budgeting with discounting | CAPITAL-BUDGETING-CARRYOVER (coursepack) | |
| 7/26/2020 | Sunday | 11:30 AM | 1:00 PM | *In-class group work / problem solving* | *Ragsdale problem 6.19/video game development* | |
| | | | | | *Ragsdale problems 6.21/apartment building layout (with data change)* | |
| | | | | | *Optional/advanced: Ragsdale Problem 3.22/Bellows Lumber Yard* | |
| | | | | Go over solutions to in-class work | | |
| 7/26/2020 | Sunday | 2:00 PM | 3:30 PM | Assignment: grids of binary variables | MACHINCO (coursepack) | |
| | | | | More grids of binary variables | MILKEM (coursepack) | |
| | | | | *In-class group work / problem solving* | *REACTORS (coursepack)* | |
| | | | | | *Optional/Advanced: Machine Assignment with Setup Costs and Overtime (coursepack)* | |
| | | | | Go over solution to REACTORS problem | | |
| 7/26/2020 | Sunday | 4:00 PM | 6:00 PM | Remington fixed-charge problem | Ragsdale 6.14 | |
| | | | | Time permitting: brief lecture on constraint logic programming | Lecture | |
| | | | | Time permitting: the dangers of allocated costs 1 | ALLOCATED (coursepack) | |
| | | | | Introduction to nonlinear models | Lecture, Ragsdale 8-8.3 | |
| | | | | EOQ inventory replenishment model (without calculus) | Ragsdale 8.4 | |
| | | | | One-product pricing model | PRICING (coursepack) | |
| | | | | The dangers of allocated costs 2 | Lecture | |
| | | | | Go over setup for homework assignment | | |
| 7/28/2020 | Tuesday | 7:00 PM | 8:15 PM | Review assignment case solution | Electronically distributed files (BlackBoard) | **Assignment:** Ragsdale Case 6.4 (subject to change) |
| | | | | Decision support systems | Lecture, Repaired for Takeoff (coursepack) | Optional: read Ragsdale 14-14.7 |
| | | | | Time permitting: Pricing with multiple products and resources | MULTIPRICING (coursepack) | Optional: read Repaired for Takeoff (coursepack) |
| 7/28/2020 | Tuesday | 8:25 PM | 10:00 PM | Optimization with multiple objectives: Blackstone Mining | Ragsdale 7.5 and modified spreadsheet in coursepack | |
| | | | | Weighting multiple objectives, Pareto optimality | Lecture | |
| | | | | Begin decision making under uncertainty: hotel site example, EMV criterion | Ragsdale 14-14.7 | |
| | | | | *Discuss upcoming exam* | | |
| 7/30/2020 | Thursday | 7:00 PM | 8:30 PM | *Exam 1 -- deterministic models (first 90 minutes)* | | Study for exam |
| 7/30/2020 | Thursday | 8:40 PM | 10:00 PM | Decision trees | Ragsdale 14.11 | Optional: read Ragsdale 14.9, 14.11, 14.13 |
| | | | | Multi-stage decisions, conditional probabilities, sample information: Colonial Motors, EVSI | Ragsdale 14.13 | |
| | | | | Caveats about EMV: risk aversion | Lecture | |
| 8/1/2020 | Saturday | 9:00 AM | 10:30 AM | Review first exam | Exam handout | **Assignment:** Freemark Abbey case (coursepack) |
| | | | | Bayes' theorem | Ragsdale 14.14, Problem 14.26 (Eagle Credit Union), Bayes' theorem notes (coursepack) | |
| | | | | EVSI and EVPI | | |
| 8/1/2020 | Saturday | 11:00 AM | 1:15 PM | *Help people install YASAI* | YASAI User Guide | |
| | | | | Introduction to simulation | Lecture | |
| | | | | Classic newsvendor problem (via simulation) | NEWSPAPER (coursepack) | |
| | | | | Binomial distributions: Piedmont Commuter Airlines | Ragsdale 12.14, Binomial and Poisson distributions (coursepack) | |
| | | | | Statistics and simulation | Ragsdale 12.10 | |
| | | | | *In-class group work / problem solving* | *TRANSLATORS (coursepack)* | |
| | | | | | *Optional: Staffing mobile phone repair techicians (coursepack)* | |
| 8/1/2020 | Saturday | 2:15 PM | 3:45 PM | Go over solution to TRANSLATORS problem | | |
| | | | | Poisson distributions | Poisson slides, Binomial and Poisson distributions (coursepack) | |
| | | | | Poisson, binomial, and multiple decisions: OVERBOOK | OVERBOOK (coursepack) | |
| 8/1/2020 | Saturday | 4:15 PM | 6:00 PM | Lecture on continuous random variables | Coursepack p. 82 | |
| | | | | Applying continuous random variables: POWERSUPPLY | POWERSUPPLY (coursepack) | |
| | | | | YASAI charting | | |
| | | | | *In-class group work / problem solving* | *CHEMSIM (coursepack), DIESEL (coursepack)* | |
| 8/2/2020 | Sunday | 9:00 AM | 10:45 AM | INSURANCE | INSURANCE (coursepack) | **Read:** North Star Concert case (coursepack) |
| | | | | North Star solution by both decision tree and simulation | NORTHSTAR (BlackBoard only) | |
| 8/2/2020 | Sunday | 11:00 AM | 1:00 PM | Go over homework solution | Solutions on BlackBoard | |
| | | | | Inventory control simulation: Millenium Computer | Ragsdale 12.15 (minor changes in coursepack) | |
| | | | | Waiting in line (via simple simulation) | REPAIRSHOP (coursepack) | |
| 8/2/2020 | Sunday | 2:00 PM | 2:45 PM | Time permitting: discrete-event simulation demonstration | Computer animation with Arena and/or JaamSim | |
| | | | | Exam review problem (product 2 x 3 gas drilling) | Exam review material (BlackBoard) | |
| 8/2/2020 | Sunday | 3:00 PM | 6:00 PM | *Exam 2 -- stochastic models* | | |

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| | | | | Weighting multiple objectives, Pareto optimality | Lecture | |
| | | | | Begin decision making under uncertainty: hotel site example, EMV criterion | Ragsdale 14-14.7 | |
| | | | | *Discuss upcoming exam* | | |
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| | | | | EVSI and EVPI | | |
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| | | | | Discuss assignment for Tuesday | | |
| 8/4/2020 | Tuesday | 7:00 PM | 8:15 PM | Review first exam | Exam handout | **Assignment:** Freemark Abbey case (coursepack) |
| | | | | Bayes' theorem | Ragsdale 14.14, Problem 14.26 (Eagle Credit Union), Bayes' theorem notes (coursepack) | |
| 8/4/2020 | Tuesday | 8:45 PM | 10:00 PM | *Help people install YASAI* | YASAI User Guide | |
| | | | | Introduction to simulation | Lecture | |
| | | | | Classic newsvendor problem (via simulation) | NEWSPAPER (coursepack) | |
| 8/6/2020 | Thursday | 7:00 PM | 8:30 PM | Go over homework solution | Solutions on BlackBoard | |
| | | | | Binomial distributions: Piedmont Commuter Airlines | Ragsdale 12.14, Binomial and Poisson distributions (coursepack) | |
| | | | | Statistics and simulation | Ragsdale 12.10 | |
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| | | | | | *Optional: Staffing mobile phone repair techicians (coursepack)* | |
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| 8/9/2020 | Sunday | 11:15 AM | 12:00 PM | Exam review problem (product 2 x 3 gas drilling) | Exam review material (BlackBoard) | |
| 8/9/2020 | Sunday | 2:00 PM | 5:00 PM | *Exam 2 --stochastic models* | | |