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Pei Jinling
Business Analyst,
Standard Chartered Bank
Class of 2021, ESD Alumna

ESD Core Subjects

- **Transform Data into Decisions**
  - Be equipped with tools in data manipulation, visualisation and analysis. Gain a competitive edge using advanced optimisation models.
  - Application examples: Recommend locations for new stores. Shortlist companies for mergers and acquisitions.

- **Learn Computational Tools & Modelling Skills**
  - Master the four fundamental methods for modelling dynamical systems: system dynamics, agent-based modelling, discrete-event simulation and Markov Chain Monte Carlo.
  - Application examples: Predict the evolution of financial option prices. Devise scheduling rules to relieve airport ground transportation congestion.

- **Understand & Manage Complex Engineering Systems**
  - Learn to use probability, statistics and optimisation, opening the door to powerful techniques for tackling complex engineering systems.

- **Develop Consultancy Skills**
  - Become familiar with accounting and finance — the language of business — even as you acquire skills in project management and professional communication.
THE SCIENCE BEHIND DECISION-MAKING

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• Data & Business Analytics
• Engineering Systems Architecture
• Manufacturing & Service Operations
• Optimisation
• Probability & Statistics
• Simulation Modelling & Analysis
• The Analytics Edge

TRANSFORM DATA INTO DECISIONS
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Application examples:
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**ESD CURRICULUM**

<table>
<thead>
<tr>
<th>JAN-APR</th>
<th>MAY-AUG</th>
<th>SEP-DEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshmore Subject</td>
<td>Y1</td>
<td>TERM 1</td>
</tr>
<tr>
<td>Core Subject</td>
<td>Y2</td>
<td>Modelling &amp; Analysis</td>
</tr>
<tr>
<td>Humanities, Arts and Social Sciences (HASS) Subject</td>
<td>Y3</td>
<td>Physical World</td>
</tr>
<tr>
<td>Elective</td>
<td>Y4</td>
<td>Computational Thinking for Design</td>
</tr>
<tr>
<td>Capstone</td>
<td></td>
<td>Social Science: Understanding Behaviour, Culture &amp; Society (HASS)</td>
</tr>
</tbody>
</table>

**TERM 2**
- Modelling Space & Systems
- Technological World
- Science for a Sustainable World
- Design Thinking & Innovation

**TERM 3**
- Modelling Uncertainty
- Global Humanities: Literature, Philosophy, and Ethics (HASS)
- Any Two Electives*
- VACATION

**TERM 4**
- Data & Business Analytics
- Probability & Statistics
- Optimisation
- HASS

**TERM 5**
- Manufacturing & Service Operations
- Engineering Systems Architecture
- The Analytics Edge
- VACATION/INTERNSHIP/EXCHANGE

**TERM 6**
- Simulation Modelling & Analysis
- Elective
- Elective
- HASS

**TERM 7**
- Capstone
- Elective
- Elective
- HASS

**TERM 8**
- Capstone
- Elective
- Elective
- HASS

*Term 3 Electives: Science and Technology for Healthcare Data Driven World
Describing Energy Systems
Spatial Design World

- In addition to all subjects in Term 1 being grade-free (Pass/No Record), students can choose up to four more subjects from Terms 2 and 3 to be grade-free.
- Students will declare their choice of major in Term 3.

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**MINOR PROGRAMMES**
Our range of minors offers you more choices and flexibility in pursuing your broader interests.

- Minor in Artificial Intelligence (AI)
- Minor in Computer Science (CS)
- Minor in Design Innovation, Ventures and Entrepreneurship (DIVE)
- Minor in Design, Technology and Society (DTS)
- Minor in Digital Humanities (DH)
- Minor in Engineering Product (EP)
- Minor in Healthcare Informatics (HI)
- Minor in Sustainability by Design (SD)

Students will indicate their choice of minor before the start of Term 4. Information is subject to change. Visit sutd.edu.sg/minors for latest updates.

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**+++**
Chloe Tan
SIA Executive (Ground Experience Development), Singapore Airlines Limited Class of 2021, ESD Alumna

My current role relies heavily on the design-centric approach to produce elegant system features that enhance the multi-faceted user experience. Being able to seamlessly bring together and consolidate different perspectives in producing a holistic and satisfying solution is widely appreciated and embraced in the modern working industry. The design and analytical thinking skills I learned at ESD help to tackle the inevitable complexities embedded in all systems regardless of industry.

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**+++**
Google Cloud

Mirabel has demonstrated her ability to grasp technologies and learn things quickly. She has an impressive record in obtaining four technical certifications within five months after joining the team. Mirabel has applied her data analytics and machine learning skills to create a more adaptive model which better predicts demands and optimises the inventory management during COVID-19 times.

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**+++**
Car Club Pte. Ltd.

We have been working with ESD since 2017. We are always very impressed with the quality work that the students have presented, as well as the creativity that they have demonstrated. The students are proactive, they give us fresh insights or new ways to look at the data which help our business identify potential business opportunities.
FUTURE POSSIBILITIES

ESD graduates are equipped with skills that make them suited for a wide range of engineering and management careers. With skills in analytics, management and design, they have excelled in both the private and public sectors in industries such as consulting, healthcare, banking and finance, manufacturing, supply chain, energy, transportation, telecommunications, retail, entertainment and hospitality.

EXAMPLES OF ESD GRADUATES’ JOB TITLES:
- Aviation analyst
- Corporate planner
- Data scientist/engineer
- Financial analyst
- Hospital planner/data analyst
- Management/Technology consultant
- Operations analyst
- Project manager
- Supply chain analyst
- Systems engineer

EXAMPLES OF ESD GRADUATES’ EMPLOYERS:
- Accenture
- Bloomberg
- Changi Airport Group
- Citibank
- DBS
- DB Schenker
- Huawei
- Infineon Technologies
- Lazada
- P&G
- Singapore Airlines
- Visa

ENTREPRENEURSHIP
Strong engineering and design skills, coupled with practical knowledge in developing solutions for real-world challenges will put you in good stead to initiate your start-up ventures.

START-UPS BY ESD GRADUATES:
- Novocall is the result of a capstone project created by three SUTD graduates. The founders started the company to help businesses increase their sales conversion rate through an efficient callback software platform. Today, more than 2,000 businesses across 42 countries use Novocall.
- SGP Foods, winner of the Singapore SME 500 Award, is a resource efficiency tech company which uses a multi-pronged approach to combat issues of climate change and food security. Through its carbon crediting, vertical farming via IoT and energy efficiency solutions, it aims to build Singapore’s food and climate resilience.

GRADUATE SCHOOL
The rigorous technical training from ESD will prepare you for various post-graduate programmes such as industrial and systems engineering, operations research, business, economics and public policy. Our ESD graduates have enrolled at top universities including:
- Carnegie Mellon University
- Cornell University
- Harvard University
- London School of Economics and Political Science
- Massachusetts Institute of Technology
- University of California, Berkeley
- Yale University

PREPARE TO TAKE ON THE WORLD
AVIATION SYSTEMS

Learn and explore the intricacies of the airport systems from both a ‘landside’ and an ‘airside’ perspective, acquire modelling skills to evaluate alternative operational designs, and consider integration issues with land transportation systems.

Designed for students interested in careers in the aviation industry.

BUSINESS ANALYTICS AND OPERATIONS RESEARCH

Prepares you for a career in the field of data-driven decision-making. You will gain experience in modelling, analysing and solving complex decision-making situations. You will also learn the tools and techniques in both the descriptive domain (statistics and predictive analytics) and the prescriptive domain (optimisation and reinforcement learning).

FINANCIAL SERVICES

Learn about portfolio theory, derivatives valuation and financial risk analysis, complementing the core subjects in stochastic processes, optimisation, simulation and statistics.

Designed for students interested in careers in the securities, banking, financial management and consulting industries; or as quantitative analysts in corporate treasury and finance departments.

SUPPLY CHAIN AND LOGISTICS

Covers the design and management of products, information and financial flow related to supply chains in a wide range of industries.

You will learn quantitative methods (built upon statistics, optimisation, and microeconomics) relevant to a variety of supply chain decisions; read and critique industry cases; and also participate in supply chain simulation games that simulate real-world decision-making scenarios.
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