Johnson School of Engineering and Computer Science

EPICS I and II – UTDesign at Dallas

Course Descriptions for Course Catalog Spring 2022

EPICS Syllabus

EPICS 1: Interdisciplinary Design and Development

EPCS 2200 Engineering Projects in Community Service (2 semester credit hours) This is a human-centered design course in which multidisciplinary teams solve engineering/computing-based problems sourced from real-world sponsors in the local community. Students will learn the complete design process, customer validation in engineering design, active sponsor/client engagement and interaction, active use of rapid prototyping tools, leadership, communication skills, and more. (1-2) S

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| **EPICS 1**  **Team Components** | |
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| 15% | Semester Project Plan (+ Charter) |
| 15% | Mid-semester Design Review (Team Presentation) |
| 10% | EPICS Exhibit |
| 15% | Final Written Report |
| 10% | Project Webpage |
| **Team/Personal Components** | |
| 25% | Project Results (agreed by advisors and/or sponsors, weighted by peer review)   * Graded weekly based on PM/Manager progress report meeting |
| **Personal Components** | |
| 10% | Time, Attendance, Workshops, Performance |
| 100% |  |

EPICS 2: Interdisciplinary Project Management

EPCS 3200 Engineering Projects in Community Service II (2 semester credit hours) This is an engineering case review and project management course in which students return from EPCS I to learn the role of project management in real-world sponsored engineering projects from the local community. Students will implement their learned skills in their respective EPICS teams throughout the semester. Lecture is taught through Socratic case evaluation from Harvard Business Review using examples from Google to Theranos. This course will include lectures and instruction in the UTDesign Studio. May be repeated for credit (6 semester credit hours maximum). Prerequisite: EPCS 2100 or EPCS 2200. (1-2) S

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| **EPICS 2**  **Team Components** | |
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| 15% | Semester Project Plan (+ Charter) |
| 15% | Mid-semester Design Review (Team Preparation) |
| 10% | EPICS Exhibit |
| 15% | Final Written Report |
| **Team/Personal Components** | |
| 25% | Project Results (agreed by advisors and/or sponsors, weighted by peer review)  Graded weekly based on PM/Manager progress report meeting |
| **Personal Components** | |
| 20% | Time, Attendance, Workshops, Performance   * Class engagement * Participation * Case Brief |
| 100% |  |

EPICS Syllabus

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| Week# | Week of | 2200 Lecture | 3200 Lecture | Assignment(s) Due |
| 1 | Jan 17 | General Introduction   * Instructor introduction * Class introduction * Project introduction * Wallet Exercise Assign * Team activity assign – due the following week | Same | Wallet Exercise |
| 2 | Jan 24 | Introduction to Design Process & Specification Development   * Overview * Project identification * Specification development | Human Centered Design  IDEO: Human-Centered Service Design  HBR | DUE: Team Activity |
| 3 | Jan 31 | Conceptual Design Phase   * Functional decomposition * Brainstorming * Decision matrix * Initial prototyping | Customer Validation  Structo: A Start-Up in 3D Printing for the Dental Industry  HBR | DUE: Teamwork and Team Charter Form (Due on lecture day)  Smallwood presentation (Lab day) |
| 4 | Feb 7 | Detailed Design Phase   * Detailed design * Freezing interfaces * DFMEA * Universal design | Forecasting Adoption  Drug-Eluting Stents  HBR | EPICS Website Workshop – only for webmasters |
| 5 | Feb 14 | Program Management  (PM) Overview (1)   * Planning and scheduling * Cost and schedule control * Progress reporting * Project controls | Government Influence  Shaping Health Care  23andMe  HBR | Due:  Project Plan (inc charter)  Hazard Assignment |
| 6 | Feb 21 | Program Management  (PM) Overview (2)   * Planning and scheduling * Cost and schedule control * EVA   Progress reporting | Struggle  Pressing on  ORA - The Power of the Pivot  HBR |  |
| 7 | Feb 28 | Concept Review   * Use flow * System evaluation * Concept comparison * Testing variables * Testing plan | Funding Disaster  Stop or Retool  EndoNav  HBR | EPICS Design Review   * Meeting with technical mentor and EPIC faculty for validation of plan and design |
| 8 | Mar 7 | Mid-Semester Review and Preparation –  In LAB | Mid-Semester Review and Preparation –  In LAB | DUE: Mid-Semester Design Presentation  Project plan evaluation |
| 9 | Mar 14 | Spring Break | Spring Break |  |
| 10 | Mar 21 | Ethics in Engineering | Decision Making  Zimmer: The Gender-Specific Knee  HBR |  |
| 11 | Mar 28 | Project Delivery   * Presentation * Examples * Handoff and maintenance instructions * Other ?? | Gender Considerations  Gender and Free Speech at Google ABC  HBR |  |
| 12 | Apr 4 | Intellectual property, confidentiality, licensing, and contracts   * various IP components * trademarks to patents, NDAs and CDAs, * licensing components and strategies, * contract components * negotiations | Collapse and Fraud  Theranos: Who Has Blood on Their Hands?  HBR |  |
| 13 | Apr 11 | Entrepreneurship –   * lessons learned in launching, operating, and selling a biotech startup | Ethics  Martin Shkreli - The Most Hated CEO in America  HBR |  |
| 14 | Apr 18 | Work Day | Work Day |  |
| 15 | Apr 25 | Sustainability – | Operations and Management  Too Much Alcohol at a Remote Construction Site  HBR |  |
| 16 | May 2 | Last Week of Class  Project Day  Final semester project review | Last Week of Class | Due: Final written report |
| 17 | May 9 | EPICS Exhibit | EPICS Exhibit | During Final Exam Period |

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| 3200 Lecture |  |
| General Introduction   * Instructor introduction * Class introduction * Project introduction * Team activity assign – due the following week | NA |
| Human Centered Design  IDEO: Human-Centered Service Design  HBR | The case describes IDEO, one of the world's leading design firms, and its human-centered innovation culture and processes. It is an example of what managers can do to make their own organizations more innovative. In reaction to a rapidly changing competitive landscape, a team of IDEO designers have been hired by Cineplanet, the leading movie cinema chain in Peru, to reinvent the movie-going experience for Peruvians. Cineplanet wishes to better align their operating model with the needs and behaviors of its customers. |
| Customer Validation  Structo: A Start-Up in 3D Printing for the Dental Industry  HBR | This case looks into the sources of innovation in entrepreneurship and exemplifies how incongruity in an existing market can create avenues for new ventures to be successful. The case also helps students gain an understanding of the importance of customer validation process for technology entrepreneurship. Lastly, the case also helps students understand how customer validation and multiple pivots can be utilised to formulate a viable business model for growing a start-up enterprise. |
| Forecasting Adoption  Drug-Eluting Stents  HBR | Marketers are often tasked with exploring the factors that impact the long-run adoption of a new product or technology. The new product under consideration here is the drug-eluting stent: a device which props open a clogged artery to the heart and then releases medication that reduces the risk of artery re-blockage. In light of recent medical and competitive trends in the market, the case prompts students to examine the future adoption of drug-eluting stents as well as to consider the potential marketing actions to be taken by Medtronic for ENDEAVOR - a newly approved stent that will hit the market in 2008. |
| Government Influence  Shaping Health Care  23andMe  HBR | On November 22, 2013, the direct-to-consumer genetic testing provider, 23andMe, received a letter from the U.S. Food and Drug Administration (FDA) ordering the company to halt the sale and promotion of its genetic testing kit. The FDA stated that the product was marketed as a diagnostic and preventative tool and that it was subject to the agency's regulations for medical devices. Company co-founder Anne Wojcicki and chairman Andy Page carefully considered the potential impact of the FDA's letter on 23andMe's position in the industry and the sustainability of its operations. |
| Struggle  Pressing on  ORA - The Power of the Pivot  HBR | Instructors are able to apply different methods of teaching the case by exploring internal resources and using external environmental analysis, or by integrating both perspectives in strategic decision-making. After working through the case and assignment questions, students will be able to identify and analyze business risk and opportunities in the medical alert device industry; identify and describe a company's resources and capabilities; understand a company's product-market fit and strategic positioning; understand the concept of a strategic pivot; and understand how to integrate both environmental and enterprise analyses when making strategic decisions. |
| Funding Disaster  Stop or Retool  EndoNav  HBR | EndoNav developed an innovative medical device to make colonoscopy procedures easier and faster to perform and less painful to receive. Despite of excellent technology, IP protection, a reasonably large market, and relatively low regulatory risk, the founder (Jaime Vargas) and his business partner (Kenneth Kelley, GSB MBA, 1987) are unable to secure venture funding. The company eventually decides that it must adapt its product and business plan so that it can be funded on a smaller scale by angel investors. |
| Mid-Semester Review and Preparation –  In LAB | NA |
| Spring Break |  |
| Decision Making  Zimmer: The Gender-Specific Knee  HBR | Focuses on a simple question: should Zimmer develop a gender-specific artificial knee? The decision is complicated because while the idea seems to make sense, there is little clinical evidence that a gender-specific knee produces superior patient outcomes, and orthopedic surgeons are likely to be skeptical of the innovation. |
| Gender Considerations  Gender and Free Speech at Google ABC  HBR | The main learning objectives of this case are to help students: Survey explanations that have been given for the lower number of women in tech; evaluate strategies to increase representation of women and racial and ethnic minorities in tech; review legal protections for free speech in the workplace as well as arguments for free speech in general; appreciate the challenges of managing freedom of expression while trying to promote specific values and an organizational culture that may run counter to some people's views; develop a framework for how to draw lines regarding acceptable and unacceptable speech in the workplace. |
| Collapse and Fraud  Theranos: Who Has Blood on Their Hands?  HBR | This case covers the rise and fall of Theranos, the company founded by Elizabeth Holmes in 2004 to revolutionize the blood testing industry by creating a device that could provide from a small finger prick the same results and accuracy as intravenous blood draws. As founder and CEO, Holmes was hailed as the most successful female tech entrepreneur ever. In October 2015, however, a Wall Street Journal article exposed internal struggles and questioned the startup's trajectory. Subsequent investigations revealed that Theranos, despite commercial operations in 40 retail locations, lacked a functioning product. Set in 2017, the (A) Case opens with Theranos' motion to dismiss the class action lawsuit filed by two investors who claimed that Theranos and its officers had violated California's securities law and engaged in fraud. |
| Ethics  Martin Shkreli - The Most Hated CEO in America  HBR | In the fall of 2015, Turing Pharmaceuticals increased the price of its recently acquired drug, Daraprim, by several thousand percent. While the short-term effect on profits would be substantial, the long-term effects were less clear. The CEO, Martin Shkreli, was constantly in the media flaunting his pricing strategy as a way to maximize Turing's profits. The subsequent attention from media and government officials was forcing the CEO to defend his positions. After announcing to the media on September 23, 2015, that the price of Daraprim would be lowered, Martin Shkreli needed to decide if he would follow through on lowering the price of Daraprim.  The case study discusses issues of price discrimination, consumer demand, government regulation, and corporate social responsibility. After studying and discussing the case, students should be able to: assess how market demand will affect corporate revenue, identify different market structures, analyze the short-run and long-run costs and benefits for government intervention, and discuss the role of corporate social responsibility in pricing decisions. |
| Work Day | NA |
| Operations and Management  Too Much Alcohol at a Remote Construction Site  HBR | This case can be used in courses on operations management, business law, organizational behaviour, and international business. It can be used to illustrate and discuss: Issues of managing employees at a remote project site; The challenge of allowing alcohol consumption during non-working hours; Risks to a project due to certain employee behaviours; and Legal issues related to such situations. |
| Fundamentals of Financial Analysis  The Case of the Unidentified Healthcare Companies  HBR | This case presents financial statements and selected ratios for 14 unidentified healthcare organizations and asks that each set of financial information be matched with one of the following healthcare companies: a biotechnology firm, a community nursing company, a distributor (medical), a DME licensee and seller, a DME developer and seller, a home care provider, a hospital (diversified), an insurer, a lab/diagnostic firm, a medical device manufacturer, a nursing home operator, a pharmaceuticals company (branded), a pharmaceuticals company (generics), and a private practice.  To learn the fundamentals of financial analysis (and financial health) of healthcare organizations by predicting the 14 healthcare firms that are represented by 14 sets of financial statements. |