



"THE SEEDS WE ARE PLANTING TODAY WILL GROW AND BECOME MIGHTY OAKS, AND THEIR BRANCHES WILL RUN ALL OVER THE EARTH." (PRINCIPAL JACOB SPORI)

Catalysts for Digital Transformation:

Mastering Distributed Systems for Global Impact

Welcome to your digital journey, where innovation meets impact!

Are you ready to channel your creativity and technical prowess to design distributed software systems that revolutionize agriculture, biology, industries of all kinds, physical sciences, social sciences, and beyond? Prepare to ignite a personal explosion of digital mastery—where your growth fuels meaningful change around the world.

In this immersive course, you'll dive into the mechanics of large-scale software systems and discover how they can spark innovation across every facet of our modern world. Being hands-on with a product, dynamic collaboration, and state-of-the-art generative AI tools, you'll master the core competencies needed to create scalable, secure, and efficient distributed systems. More than just a coding bootcamp, this experience is a catalyst for personal growth—equipping you to make a lasting impact on communities, industries, and global challenges.

What You'll Conquer

Elevate your skills by mastering:

- **Time Management:** Create, modify, and follow a plan regarding your learning.
- **Data Structures:** Understand how key data structures work that are widely used in industry and featured in job interviews.
- **Design Patterns:** Explore the patterns that guide modern software design—essential for robust and scalable systems.
- **Cloud Systems:** Learn to create highly scalable cloud software and secure cloud systems that power digital innovation across sectors.
- **Linux:** Learn basic Linux skills expected by recruiters around the world.
- **Languages:** Learn a language designed to help you create world-spanning distributed systems.



Catalytic Behaviors

To become a catalyst for change, you need to be catalytic.

- Attend every class, as in-person learning and assessments are integral to your progress.
- Use the provided Learning Assistant, Dipper, and CompetentSee GPTs to accelerate your learning across data structures, patterns, and cloud topics.
- Collaborate in squads to drive major components of your product while also honing your individual competencies.

Your Growth

When you have completed this portion of your growth, you'll be able to:

- Explain, in clear and jargon-free language, the “why, how, and when” behind common design patterns, data structures, cloud system tools, and Linux commands.
- Implement these concepts proficiently in code and in the Linux terminal.
- Architect rational, massively distributed, parallel cloud systems that are secure and scalable.
- Use Linux, firewalls, HTTPS certificates, and SSH to build secure cloud systems.
- Apply generative AI in a manner that is industry-appropriate, transforming ideas into impactful digital solutions that drive positive change.

Ready, Set, Transform!

Your mission is to develop your skills through technological mastery—growing and changing in ways that translate into tangible, positive impacts across agriculture, biology, physical and social sciences, and beyond. With every line of code and every collaborative effort, you're not just learning; you're evolving to make a significant difference in the world.



Prepare to be the change. Embrace growth and

change. And let your work shape a brighter future for all!



Your Commitment Schedule

- Class Time (3 hrs/week): Collaborate with your squad, innovate on your product, and engage in dynamic in-class experiences.
 - Squad Time (3+ hrs/week): Work with your team outside of class to build, iterate, and refine your product.
 - Personal Time (3+ hrs/week): Dedicate time to self-study, enhance your competencies, and seek mentorship to deepen your understanding.

Essential Gear & Resources

- Programming Erlang 2nd Edition (Armstrong): Available for free digitally in the BYU-Idaho MacKay Library
 - OTP Documentation: <https://www.erlang.org/doc/readme.html>
 - Erlang Documentation: <https://www.erlang.org/docs/23/>
 - Patterns and Data Structures Readings: <https://byui-cse.github.io/cse382-course/>

Optional Materials

All available for free digitally in the BYU-Idaho MacKay Library

- Introducing Erlang, 2nd Edition (St. Laurent)
 - Erlang For Concurrent Programming (Larson)
 - Designing for Scalability in Erlang/OTP (Cesarini and Vinoski)

Learning & Competency Tools

Accelerate your transformation with custom GPT tools designed to boost your mastery in key areas:

Erlang Tools

Learn: ErlangSparq

Practice & Claim:

- Erlang Dipper
 - Erlang CompetentSee

Elixir Tools

Learn: [ElixirSparq](#)

Practice & Claim:

- ### - Elixir Dipper



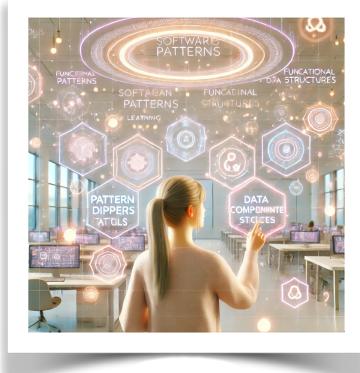
- [Elixir CompetentSee](#)
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OTP Tools

Learn: [OTPSparq](#)

Practice & Claim:

- [OTP Dipper](#)
- [OTP CompetentSee](#)
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Pattern Tools

Learn: [Programming Patterns](#)

Practice & Claim:

- [Pattern Dipper](#)
- [Pattern CompetentSee](#)

Data Structure Tools

Learn: [Functional Data Structures](#)

Practice & Claim:

- [Data Dipper](#)
- [Data CompetentSee](#)

Linux Tools

Learn: [Commander](#)

Practice & Claim:

- [Command Line Dipper](#)
- [Command Line CompetentSee](#)



Cloud Tools

Learn: [Cloudy With Droplets](#)

Practice & Claim:

- [Cloudy With Droplets Dipper](#)
- [Cloudy With Droplets CompetentSee](#)

Project & Coding Assistants

Enhance your development with our coding allies:

- [Structural Beam](#) – Product Architecture and Design Generation Agent
- [Elixir Unit Test Creator](#)
- [ElixirDoc Builder](#) – Documentation Creator for Elixir
- [Erlang Unit Test Creator](#)

- [ErlangDoc Builder](#) – Documentation Creator for Erlang

Required Hardware & Software

Hardware: Any device that can SSH into remote Linux machines and interact via a terminal.

Software Requirements:

- A ChatGPT account (free version available, though occasional computation limits may apply).
- A free student account with DigitalOcean to create Linux instances, set up firewalls, manage databases, and access terminal-based SSH.

Course Pre-Requisites

Successful learning and retention of the CSE 381 materials is required if you want to be successful on this path of transformation.

Assessing Your Transformation

Assessment results are determined by your product contributions, squad interactions, utilization of the Learning Model, and competency progress:



Still Working on It

-An indication that further effort is needed in mastering the competencies and producing meaningful contributions to the squad's product. Remediation or retaking the course will be required to fully prepare for future courses and jobs. This maps to a D grade.

Considerable

-A strong grasp and effective application of all the course material demonstrated by meaningful contributions to the squad's product and all competencies being completed. Your efforts set the stage for your further growth and productivity . This maps to a B grade.

Outstanding

-Masterful understanding, application, and integration of course material; significant original thinking; contributions that not only advance your squad's product but also reflect a profound personal transformation. Your efforts set the stage for positive global impact. This maps to an A grade.

Note: *Your assessment reflects your evolution*—from daily contributions and interactions to your final competency assessments. The last competency consultation with your CSE 382 instructor is entered as the grade for CSE 382. At the end of CSE 481 you will have a another competency consultation meeting with your instructor. This is exactly the same as the last one done with your 382 instructor. If your CSE 481 grade is higher than your CSE 382 grade, your CSE 382 grade will be replaced by the same grade as that from this last competency consultation for CSE 481.

Claiming Competencies & Goal Discussions

Your journey to mastery extends beyond the classroom—competencies are forged through proactive learning and collaborative mentorship. By consulting with your instructor and claiming competencies during class sessions, you drive your personal transformation. Achieving overall competency means reaching the “Considerable” level by successfully mastering every topic outlined in the iLearn grade book and contributing significantly to your squad’s product.

Competency and Goal Discussions

- Weeks 5 & 9:
Meet with your instructor to review your progress, identify where you stand, and set ambitious targets for the semester.
- Week 13:
Finalize your grade for CSE 382 (and subsequently CSE 481) based on the competencies you’ve demonstrated.

Prepare for each meeting by reflecting on your progress, reviewing grade descriptions, and engaging in thoughtful self-assessment—this is your opportunity for personalized feedback that steers your transformation toward excellence.

Embrace Open, Collaborative Learning

Cultivate a spirit of mutual support and shared growth within your squad. Contribute innovative design and architecture ideas, write code that makes an impact, and attend every squad meeting to harness the collective energy. Dive deep into the language Sparq, Dipper, and CompetentSee GPTs until you confidently master the languages’ applications. Similarly, immerse yourself in OTPSparq, OTP Dipper, and OTP CompetentSee GPTs to conquer OTP competencies, and continue this practice with every individual skill set your find in iLearn.