Field Operations Safety Manual

University of California, Office of the President

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Contents

UC Field Operations Manual

This manual provides guidelines and resources to lead safe, successful field courses and research trips. The content focuses on risk management issues that are relevant for California-based field courses and research, international trips, research expeditions, and other outdoor excursions. Field sites may include field stations, natural reserves, public lands or parks, wilderness areas, coastline or waterways, or more controlled sites such as construction areas, excavations, or mines. The Field Operations Manual was developed to serve as a reference document and teaching tool as well as to highlight applicable UC policies and State/Federal laws. The manual is organized into key sections on **planning, training, incident response, best practices for trip leaders,** and appendices on **common field hazards** and **local campus resources.**

Integration of field safety planning into routine instruction and training will meet key objectives and regulatory requirements of your Campus or Department's Injury and Illness Prevention Plan (IIPP). The IIPP is a written safety program to protect employees from illnesses and injuries per the California Code of Regulations Title 8, Section 3203, by establishing a safety management framework for identifying and correcting workplace hazards, ensuring employee training and compliance, and communicating information related to safety and health issues. Faculty, staff and students, including student employees and volunteers, are accountable for health and safety rules and following safe work practices, including:

- obtaining appropriate training for designated activities
- using personal protective equipment (PPE) and safety equipment as required and directed,
- reporting unsafe conditions, malfunctioning equipment, and other safety concerns,
- reporting all injuries and incidents, and
- understanding what to do in the event of an emergency.

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Introduction

Risk, and recognizing the possibility of loss or injury, is integral to experiential learning and is inherent in field environments where we teach and conduct research. A field instructor or researcher must also be an effective risk manager who understands and anticipates risks and acts appropriately to reduce the likelihood of negative consequences. Accidents often result from a combination of challenging conditions, inadequate preparation and poor communication. For this reason, an effective trip leader must incorporate many attributes of leadership including preparation, competency, effective communication, appropriate judgment, self and group awareness, and tolerance for adversity and uncertainty (adapted from the National Outdoor Leadership School Educator Notebook).

Chapter 1

Planning

1.1 Assess Potential Field Hazards

Hazard assessment for field activities may be triggered by various entities, such as via animal protocol review, as part of the research/lab safety program at your campus, or through department procedures. The field hazard assessment tool below provides an overview of resources and hazard mitigation steps for common UC field activities.

All fieldwork warrants a pre-trip discussion regarding foreseen hazards, appropriate precautions, communication options, and emergency procedures. Additional actions are listed below.

Destination	
Will you be traveling more than 100 miles from your home campus/office?	• Register with UC Away for travel insurance documentation, 24/7 assistance, and a custom "Trip Brief"
Will you be traveling internationally?	• Be familiar with the UC International Activities Policy, your campus International Activities office (listed on p.13 of the Policy); the resources at ucgo.org
Does your "Trip Brief", the CDC, or State Department recommend vaccinations or prophylaxis for your destination?	• Schedule a medical visit at least 6-8 weeks prior to your trip; Occupational Health, Travel Clinic or Student Health Clinics available, depending on your campus.

Destination	
Will you be visiting sites with hazardous terrain, climate, wildfire, zoonotic risks, poor sanitation, other environmental hazards, or remote sites with limited services (e.g more than 30 minutes from emergency medical services)?	• Complete a Field Safety Plan and review with all participants. • At least one participant should have current first aid training and carry a first aid kid.
Does your worksite lack reliable phone service?	• Include check-in procedures in your • Avoid working alone, when possible • Carry field radios or satellite communication device
Will you be visiting controlled sites such as construction sites or mines?	• Request PPE and site access requirements in advance • Carry UC identification • Avoid working alone, when possible • Check-in with site manager/ superintendent to understand what other hazards are currently present on the job-site
Will you be driving to your destination via UC, rental or personal vehicles?	• Review UC auto insurance policies for students, faculty and staff; complete relevant driver safety training as required by your campus; consider off road/4x4 training if applicable
Will anyone be chartering boats, planes or using other non-commercial means of transportation?	• Consult with Risk Services regarding appropriate insurance precautions

Participation	
Are you responsible for students registered in a field course?	• Review UC Field Ops Manual Ch.4: “Best Practices for Trip Leaders” and “Campus Resources”

Participation	
Will participants be camping or sleeping in shared dorms, housing, etc.?	• Consider establishing a "Student Behavior Agreement" or reviewing a "Code of Conduct" • Consider establishing a "Student Behavior Agreement" or reviewing a "Code of Conduct" • Set the tone for a safe trip by discussing expectations and rules before the trip • Carry a participant roster with emergency contact information at all times
Will volunteers be helping on your project?	• Registered volunteers formally; consult with Risk
Will family members, partners, or other companions be travelling with participants?	• Companions should be registered via UC Away and may be eligible for UC travel benefits

FIELD ACTIVITIES-Specifics to integrate into your Field Safety Plan|	
Working outdoors with temperatures over 80 degrees F?	• Complete Heat Illness Prevention training • Carry sufficient water, take breaks in shade • Carry shades or tarps if natural is unavailable • Maintain means of communication, awareness of worksite location, and ability to obtain EMS

FIELD ACTIVITIES-Specifics to integrate into your Field Safety Plan|	
Working in dry vegetation/areas with high fire danger?	• Complete fire extinguisher training • Carry a fire extinguisher, shovel, and bucket of sand in your vehicle • Consult with your Campus Fire Marshal or Fire Prevention Office
Working in cold, possibly wet conditions?	• Provide all participants a recommended gear list including waterproof clothing, boots; layers for insulation, extra dry socks, tarp etc. • Carry extra blankets or sleeping bag in your vehicle for emergencies
Does work involve: Excavating soil more than 4 feet deep? Working at heights over 6 feet? Entering caves, vaults, mines, or other potential confined spaces? Handling or transporting hazardous materials or samples? Use of powered tools or equipment? Working in loud noise? ATVS? Snowmobiles?	• Contact EH&S for appropriate hazard assessment, training, and PPE selection • Include training requirements and precautions in your Field Safety Plan or refer to specific procedures, JHAs, etc. • If medical clearance or vaccinations are required, schedule your appointment with Occupational Health at least 6-8 weeks prior to travel (e.g for use of respirators, working in loud noise, handling bats or other hazardous wildlife).

1.2 Captioned figures and tables

Figures and tables *with captions* can also be cross-referenced from elsewhere in your book using `\@ref(fig:chunk-label)` and `\@ref(tab:chunk-label)`, respectively.

Table 1.4: Here is a nice table!

temperature	pressure
0	0.0002
20	0.0012
40	0.0060
60	0.0300
80	0.0900
100	0.2700
120	0.7500
140	1.8500
160	4.2000
180	8.8000

Don't miss Table 1.4.

```
knitr::kable(
  head(pressure, 10), caption = 'Here is a nice table!',
  booktabs = TRUE
)
```

Chapter 2

Parts

You can add parts to organize one or more book chapters together. Parts can be inserted at the top of an .Rmd file, before the first-level chapter heading in that same file.

Add a numbered part: `# (PART) Act one {-}` (followed by `# A chapter`)

Add an unnumbered part: `# (PART\*) Act one {-}` (followed by `# A chapter`)

Add an appendix as a special kind of un-numbered part: `# (APPENDIX) Other stuff {-}` (followed by `# A chapter`). Chapters in an appendix are prepended with letters instead of numbers.

Chapter 3

Footnotes and citations

3.1 Footnotes

Footnotes are put inside the square brackets after a caret `^[]`. Like this one [1].

3.2 Citations

Reference items in your bibliography file(s) using `@key`.

For example, we are using the **bookdown** package [Xie, 2021] (check out the last code chunk in index.Rmd to see how this citation key was added) in this sample book, which was built on top of R Markdown and **knitr** [Xie, 2015] (this citation was added manually in an external file book.bib). Note that the `.bib` files need to be listed in the index.Rmd with the YAML `bibliography` key.

The RStudio Visual Markdown Editor can also make it easier to insert citations: https://rstudio.github.io/visual-markdown-editing/#/citations

[1] This is a footnote.

Chapter 4

Blocks

4.1 Equations

Here is an equation.

$$f(k) = \binom{n}{k} p^k (1-p)^{n-k} \tag{4.1}$$

You may refer to using `\@ref(eq:binom)`, like see Equation (4.1).

4.2 Theorems and proofs

4.3 Callout blocks

The R Markdown Cookbook provides more help on how to use custom blocks to design your own callouts: https://bookdown.org/yihui/rmarkdown-cookbook/custom-blocks.html

Chapter 5

Sharing your book

5.1 Publishing

HTML books can be published online, see: https://bookdown.org/yihui/bookdown/publishing.html

5.2 404 pages

By default, users will be directed to a 404 page if they try to access a webpage that cannot be found. If you'd like to customize your 404 page instead of using the default, you may add either a `_404.Rmd` or `_404.md` file to your project root and use code and/or Markdown syntax.

5.3 Metadata for sharing

Bookdown HTML books will provide HTML metadata for social sharing on platforms like Twitter, Facebook, and LinkedIn, using information you provide in the `index.Rmd` YAML. To setup, set the `url` for your book and the path to your `cover-image` file. Your book's `title` and `description` are also used.

This `gitbook` uses the same social sharing data across all chapters in your book- all links shared will look the same.

Specify your book's source repository on GitHub using the `edit` key under the configuration options in the `_output.yml` file, which allows users to suggest an edit by linking to a chapter's source file.

Read more about the features of this output format here:

https://pkgs.rstudio.com/bookdown/reference/gitbook.html

Or use:

```
?bookdown::gitbook
```

Bibliography

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Yihui Xie. *bookdown: Authoring Books and Technical Documents with R Markdown*, 2021. URL https://CRAN.R-project.org/package=bookdown. R package version 0.24.