University of Colorado Boulder

PHYSICS HANDBOOK FOR GRADUATE ADVISORS

AY 2022-2023 Version

September 23, 2022

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This document is intended to assist in establishing productive professional relationships between physics graduate students and their PhD thesis advisors. This document serves both the advisee and the advisor by providing guidelines and a plan for clarifying expectations, lessening conflict, and providing structure. The information contained in this document is intended to provide recommended best practices and guidelines for graduate student mentoring. This information is up to date as of **September 2022.** For the latest information, please consult the Physics Department website.

1 Physics Department Requirements

There are several key requirements of the physics graduate program that PhD advisors should be aware of. The advisee and advisor should have knowledge of Graduate School and program requirements, guidelines, and expectations for graduation.

Here is a summary of rules and requirements as of Sepbember 2022. Refer to the physics department website for the latest information.

1. **Comps 1:** The Comprehensive Exam 1 in the physics department consists of completing several required courses (typically 5). Students are **required to finish their Comps 1 courses by the end of their second year**. More details about the specific course requirements can be found at https://www.colorado.edu/physics/academics/graduate-students/graduate-program-requirements-phd/comps-i, and note that these are different for different tracks within the PhD program.
2. **Comps 2:** Currently the Comprehensive Exam 2 exam has three components. For the first part, the student must prepare a formal paper that summarizes a broad current research topic outside the student's area of research. For the second component, two weeks after giving the paper to the committee, the student then delivers an oral presentation (of ~20 min) about the content of the research paper. The third part, taken right after the presentation, is an oral examination on the research topic as well as their general knowledge of physics through advanced undergraduate courses. More details on the exam can be found at https://www.colorado.edu/physics/academics/graduate-students/graduate-program-requirements-phd/comps-ii. Students must take their Comps 2 exam **by the end of their third year** in the program, and after completion of their Comps 1 courses. Students can pass or fail each part of the exam but must eventually pass all three components. Students are permitted a second attempt to pass each part of the exam. Note that this exam cannot be taken during the summer. Advisors should **expect that it will take a significant amount of effort from the student to prepare for all three parts of this exam** (typically over several months), and that this might impact the student's research productivity. Advisors should be prepared to support their student by reading over their paper before it is sent to the committee, arranging a practice talk for the student, and potentially giving them an opportunity to practice answering general physics questions orally.
3. **Comps 3:** This exam is the student's proposal for their dissertation, demonstrating adequate knowledge in their field, and a plan to complete their PhD dissertation. After a student completes Comprehensive Exam 3 and submits the required paperwork, they will have "Advanced to Candidacy". This exam should typically **be completed by the end of the student's fourth year.** This exam must be completed at least one semester before the thesis defense and cannot be taken in the same semester as the thesis defense. It cannot be taken in the summer. The student must

select a committee of five graduate faculty. At least three of these must be physics faculty members, and they may all be physics faculty (but note the requirements for thesis defense committees are different, see below). More details about the requirements can be found at https://www.colorado.edu/physics/academics/graduate-students/graduate-program-requirements-phd/comps-iii. This presentation should be approximately 45 min with additional time for questions.

4. **Coursework:** A PhD student must complete 30 hours of course work at the graduate level (5000 level or above), with at least a B– in each class. Students typically take 2-3 courses per term during their first 2-3 years. In addition to coursework, a student must also complete 30 hours of dissertation credit. More details about the course requirements can be found at https://www.colorado.edu/physics/academics/graduate-students/phd-requirements.
5. **Thesis defense:** The thesis defense committee typically consists of four of the five members of the student's Comps 3 committee. At least one member must be a University of Colorado Boulder regular faculty member who is outside the Physics Department (and cannot have a courtesy appointment in the Physics Department either). This can take place in the summer, but the student must be enrolled in research credits for the summer if they defend after the conclusion of the Maymester term. The complete written thesis should be provided to the committee at least two weeks prior to the defense date. The defense will be publicly announced to the department and the student must complete the defense poster form at least two weeks prior to the defense date. The public defense, consisting of a presentation from the student and general questions from the audience, will typically last an hour. The committee members can then privately question the student afterwards. There can be some revisions to the defense version of the thesis prior to final submission. The student must submit a final version to the graduate school before the deadline for that term, typically several weeks before the end of courses.

2 Guidelines for Graduate Advisors

The following are useful guidelines for providing adequate support to graduate student advisees.

1. **Establish regular (weekly or biweekly) group meetings with your students.** This is an efficient means of keeping everyone up to speed and establishing cohesion within the group. It also distributes the responsibility of feedback across the entire group. In addition, it gives the students practice sharing their work in front of an audience and allows them to build up material for use in conference presentations and posters over time.
2. **Establish regular (weekly to monthly) one-on-one meetings with your students.** Use these meetings to provide and solicit more specific feedback that may not fit into or be appropriate for group meetings. Establish clear goals for the short term and long term.
3. **Provide clear and realistic research expectations.** Ensure that the overarching research goals are well understood and attainable. Establish milestones and identify potential paths to reach them with the student. Identify and agree upon the student's individual roles and responsibilities within the context of the group.
4. **Define communication boundaries.** Decide with the student what modes of communication are appropriate under different circumstances and at times of day/week, and how quickly a response should be expected.
5. **Establish working hours.** Discuss and agree upon expectations for working hours, and be sure to update/iterate as needed over time. For example, it may not be necessary to keep strict hours most of the year, but during certain periods a rigid schedule may be required to maintain regular experimental shifts. In addition, agree upon holiday/vacation policies as early as possible. Currently there are 10 observed holidays on the University calendar. Each faculty member has final say on what leave they will provide. The baseline recommendation from the graduate school is not to require students to work on these holidays, unless there is a major deadline or data collection need. The baseline recommendation for vacation leave is two weeks of vacation each calendar year, with the understanding that some times of year are not ideal for individual labs based on research-related events.
6. **Establish publication expectations.** Keep and update a long-term plan for publications during the student's Ph.D., and set more detailed schedules for each individual paper as they arise. Ensure that the student knows where to find the appropriate resources, e.g. submission requirements, journal formatting rules, Latex templates, and general scientific writing guidance (provided by the department). Give *constructive* feedback during the editorial process. Establish a clear authorship policy within the group as early as possible.
7. **Establish research travel expectations.** Discuss and agree upon travel expectations for research as early as possible, as this may affect the student's ability or willingness to work in a particular group. For example, will the advisee be expected to spend weeks or months at a time away from home? Specific research travel arrangements should be discussed well in advance of each trip, including important logistical considerations (vaccines for international travel, foreign language barriers, local contacts, etc.). The student should be made aware of university travel requirements and resources (https://www.cu.edu/psc/travel), and should be given clear guidance for expectations regarding trip planning and reimbursement for expenses. A shared document laying out travel logistics for the entire research group can be very useful.

8. **Allow and encourage external educational opportunities.** Many fields have summer schools or institutes for graduate students working in particular areas. Help identify appropriate opportunities of these kinds and work with the student to accommodate their attendance, if possible. Discuss whether the student ought to take the special courses for credit, if applicable.
9. **Provide opportunities to attend conferences.** To the extent possible, allow and encourage the student to give presentations on their research at conferences, workshops, and similar venues. Identify these opportunities and agree upon the format (talk/poster) and topic of the presentation as early as possible. Schedule a practice talk session with the research before each conference. Let the student know if they must apply for special travel grants well in advance. Note that the graduate school offers travel grants for students without access to travel funds (https://www.colorado.edu/graduateschool/funding/awards-grants/graduate-school-student-travel-grant).
10. **Provide career mentoring.** Discuss the student's career goals at various stages throughout their Ph.D., especially as graduation approaches. Provide practical advice and reasonable educational/professional opportunities to help the student attain their goals. Also provide the student with letters of recommendation within the stated deadlines when requested. The student should also be made aware of CU's Career Se**rvices (https://www.colorado.edu/career/)**
11. **Provide coursework guidance.** Faculty are encouraged to consult with their graduate students on the selection of courses that will satisfy the departmental requirements and complement the student's research.

3 Suggested Practices for Graduate Advisors

Organized and effective advising is beneficial to both the advisor and student.

1. **Each Semester Needs a Plan:** You should meet regularly with your advisee. It is also recommended to have a planning meeting each term to establish goals and milestones for that semester and monitor progress towards the completion of their degree. A good starting point might be the example "Individual Development Plan" available from the Office of Postdoctoral Affairs. Another example from the Graduate School appears later in this section.

2. **Mentoring Agreements:** When you first begin to collaborate with a student mentee, it is strongly recommended to prepare a mentoring document to discuss with them, so that you clearly outline what you expect from them and what they can expect from you (including many of the expectations discussed in the previous section). This can include guidelines for lab conduct, communication preferences, meeting schedule, policies on authorship, and expectations on working. Discuss these onboarding items with students. This information can help reduce conflict by aligning lab-specific and advisor-specific expectations early (See *Nature* **561**, 7 (2018) for example). The next section includes several examples of mentoring agreements. These are just examples; **please tailor them to meet your needs and research methods.**

Example of Semester Planning Document

The Student and Advisor should discuss progression and timelines related to graduation at an early point in the student's graduate career and revisit this regularly, ideally every semester. This example timeline, based on one prepared by the Graduate School, can be used to help chart progress each term.

Academic Milestone	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Notes**
Complete Comps 1 Exam							
Completion of coursework							
Complete Comps 2 Exam							
Complete Comps 3 Exam							

Dissertation defense							
Submission of approved dissertation							
Research Milestone	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Notes**
Draft paper on X							
Prepare data sample Y							
Read papers on Z							
Give a conference talk at B							
Finish analysis of C							

Examples of Mentoring Agreements

Note: The text below is meant to serve as an *example*. It is strongly suggested that advisors evaluate the text below and customize it to the specific needs of their individual group. Once created, this information should be reviewed with students annually in case something needs to be changed.

Mentoring Agreement EXAMPLE 1:

Lab Hours are:

Example: Generally, N AM to M PM for me, and ideally our paths would cross during that time. I expect you to come to lab meetings which are on X days at X time. You're an adult, so I expect you to manage that time yourself, and I expect the work will get done. How you want to schedule that time is up to you.

If you want to reach me:
Example: Email is always good, in person is great but I'm not always in the immediate vicinity. Feel free to drop by when we're not having our one on one if my office door is open. My cell is X, and my office is room Y.

When I go out of town:
Example: I will let you know. If it's a personal vacation, I'll be offline. If it's professional (conference, talk, etc.), I'll still be reachable, but my emails will be delayed. I keep a calendar at X, so you'll know where I am and when I'll be back. If there's an issue that needs immediate assistance, please speak to <Lab Manager> until I am back.

If I email you:
Example: I expect a response within 2 business days, if I would like a faster response (during tight

deadline times) we will have a conversation about that. Generally, if I email on weekends, I don't expect an answer until Monday during lab hours, unless we're up against a deadline.

If you email me:
Example: I will respond to all emails from you within 2-3 business days. If I am traveling, this can be delayed. I'll be sure you're aware of when I will be offline. If I don't respond during 'normal times', please email again.

If you want to go on a vacation:

Example: Just give me 3 weeks' notice. Certain times of year are bad for travel, such as <>.We'll coordinate a calendar to make sure the needs of the lab are covered. For family emergencies, obviously no notice is needed (but please let me know you are out so I don't worry). Students in my lab get N weeks' vacation a year, plus major university holidays.

If you are sick:
Example: Please do not come to the lab. Rest and get well, see a doctor if you need to. If you need to communicate anything serious, please let me know (I don't need details, but I do want to know how you are doing).

If you make a mistake:
Example: Please come to me or to a postdoc in the lab. Mistakes happen during grad school, and during the scientific process. THIS IS NORMAL. This is how we learn.

If you feel your research interests have changed OR our working relationship is not the best fit:

Example: It is okay to let me know if your research interests have changed, OR if you feel the working culture in this lab is not the best fit for you. Please feel free to come and discuss this with me. We can sort out issues together and work on your next plan of action or next steps to succeed in the PhD program.

Lab Culture:
Example: I work hard to maintain a respectful lab culture. If at any time there is an issue between lab colleagues, I hope it can be resolved through discussion and mutual respect. If it becomes a problem, please bring it to me. Everyone should feel safe, supported, and empowered.

Graduate School is:
Example: Not easy! It's a marathon, and there will be ups and downs throughout the process. You may feel like a failure, or an imposter. THIS IS NORMAL. Please know you were brought into my lab for a good reason, and I am here to support you – work hard and don't give up. You can do this!

Mentoring Agreement EXAMPLE 2:

This is question-based mentoring agreement is based on one prepared by the University of Alabama Birmingham.

This contract is intended to serve as a guideline to facilitate communications between a trainee (mentee) and the mentor. It is suggested that the document be thoroughly reviewed and completed by the mentee and the mentor individually, and then jointly review and discuss each person's answers in order to reach an agreement. The mentee should re-write the agreed upon answers before the contract is signed and

dated by the mentee and the mentor. The mentee is responsible for keeping the contract and reviewing/updating it as necessary.

1. What type of assistance does the mentee want from the mentor in achieving their career goals over the next 1-3 years? Where does the mentee hope their career will have taken them in five years?

_____
_____

2. What expectations do the mentor(s) have of the mentee?

_____
_____

3. What expectations does the mentee have of the mentors?

_____
_____

4. How often will you meet?

_____

---

5. When and where will you meet?

_____

6. For how long?

_____

7. Who will be responsible for scheduling the meetings?

_____

8. What will meeting topics include?

_____
_____

9. What will be the ground rules for discussions? (E.g., confidentiality, openness, candor, truthfulness, etc.)

_____
_____

10. If problems arise, how will they be resolved?

_____
_____

11. Any concerns the mentee wants discussed and resolved?

_____
_____

12. Any concerns the mentors want discussed and resolved?

_____
_____

13. How will you know when the mentoring relationship has served its purpose and needs to be terminated?

_____
_____

14. We have agreed that our initial meetings will focus on these three topics:

a. _____
b. _____

c. _____

15. Any additional areas/issues you want to discuss and agree to?

_____

_____

_____ _____

Mentee Signature Date

_____ _____

Mentor Signature Date

Additional Mentoring Agreement examples and Resources:

- A very detailed example of the mentoring agreement from the McMahon lab at the University of Wisconsin.
- Another very detailed example from a robotics lab at CU Boulder.
- A very short generic one also from the University of Wisconsin

4 Additional Campus Services and Policies for Graduate Students

Travel Support

The graduate school provides opportunities for travel support to conferences outside of the state of Colorado.

Career Services

The graduate school offers career support services for exploring opportunities in industry and academia. These services include individual advising appointments, job postings, job application support, workshops, and more.

Funds for Medical or Financial Emergencies

There are emergency funds available at the university for students that encounter an unexpected medical emergency.

The existing resources available to students are listed below:

1. **Graduate School Emergency Fund**

The University of Colorado Boulder Graduate School Emergency Fund is intended to help meet the financial needs of Boulder graduate students who encounter an emergency situation resulting in unforeseen expenses during their degree program.

For more details, download the document about this fund located on the Graduate School's website.

2. **Student Relief Fund Emergency Grant**

The CU Boulder Student Relief Fund Emergency Grant is designed to assist enrolled students with a financial emergency in the current term that is impacting their ability to stay on track towards graduation. Students must be either in danger of withdrawing due to an unexpected, temporary financial hardship resulting from an emergency or crisis situation; or struggling with debilitating financial circumstances which may impede their academic progress and ability to complete classes. The emergency grant is only available to students who face a legal barrier to accessing federal or state financial aid. The costs must have been incurred while enrolled at CU Boulder; costs for a future academic year will not be considered.

Emergency funding is provided in the form of one-time per year awards. It is not intended to provide ongoing relief for recurring expenses. These awards are grants and do not need to be repaid.

https://www.colorado.edu/financialaid/types-aid/student-relief-fund-emergency-grant

3. **International Student and Scholars Office Emergency Fund**

Every fall and spring semester, ISSS administers grants for F-1 and J-1 students with financial difficulty or emergencies. Grants vary according to available funds and need. Unfortunately, due to limited resources, not all applicants will receive a grant. If you are in need of emergency financial assistance, you are encouraged to review the application instructions (https://www.colorado.edu/isss/node/268/attachment) and apply before the deadline. For more information, please contact ISSS.

4. **Medical Expense Assistance Fund**

The Student Health Board's Medical Expense Assistance Fund (MEAF) is designed to financially assist students who are unable to pay incurred medical bills or prescription costs. To Apply: Read and complete the MEAF application (https://www.colorado.edu/healthcenter/content/meaf-application), and bring it to the Billing & Coding office at the Wardenburg Health Center on the 3rd floor in Room 336. If you'd like to appeal a Medical Expense Assistance decision, please complete the Application to Appeal for Medical Expense Assistance.

Pregnancy or Parental-Related Leave

It is the policy of the University of Colorado Boulder to support to the greatest extent possible, and in a manner consistent with the effective and efficient operation of the university, graduate students with a need for Academic Adjustment and/or Paid Parental Leave for Students on Appointment due to childbirth or adoption. The new Graduate Student Pregnancy and Parenting-related Policy will be in effect as of 7/1/2020.

Leave of Absence

Graduate students must apply for a leave of absence if they withdraw from or do not enroll in classes for a fall or spring semester. Graduate students who do not apply for a leave of absence will be discontinued and must reapply to the university to return to CU Boulder.

The leave of absence form must be filled out and then signed by your faculty advisor. After obtaining that signature, please submit the form to the Graduate School's Student Services office to obtain the signature of the Dean of the Graduate School. The form can be dropped off or mailed, accompanied by the leave of absence fee.

Doctoral candidates who have passed their comprehensive examinations are not typically eligible, with the exception of parental leave. Students who are conducting required research out of the area, and students with other extenuating situations or additional questions may contact the Graduate School for further guidance, at gradinfo@colorado.edu.

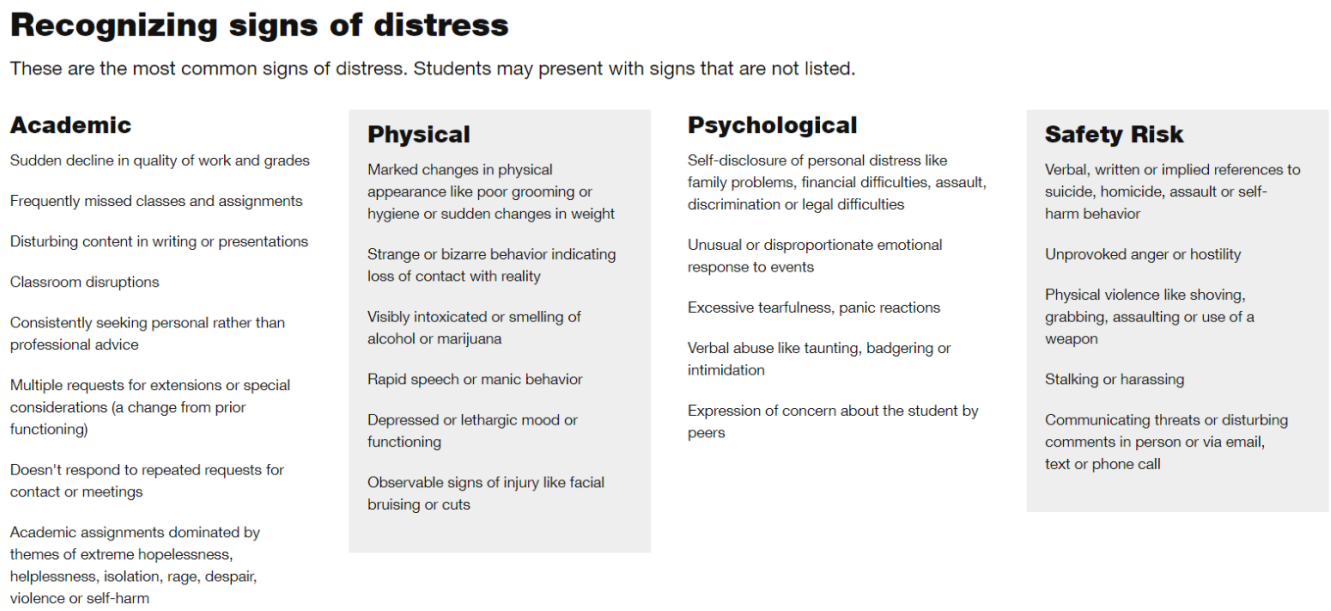
Conflict Resolution

If conflict should arise, the student advisee and faculty advisor should attempt to resolve the issue informally. The Director of Graduate Studies, program director, or Department Chair may also be contacted for context and guidance. The Ombuds office can act as a confidential resource for conflict resolution, along with assisting with mediation in some cases. If resolution cannot be reached informally, students may consider additional avenues for their complaint. The Graduate School grievance process and procedures document includes information about jurisdiction for a variety of issues and explains the process for grievances which fall under the purview of the Graduate School. Resources related to conflict resolution and information on the grievance process can be found on the Graduate School website. Conflicts related to discrimination, harassment, or sexual misconduct should be reported to the Office of Institutional Equity and Compliance. If the student is employed by CU and has an employment grievance, they should consult Faculty Affairs for guidance.

5 Assisting Students in Difficulty

The Student Affairs Health and Wellness Services division provides a variety of resources for assisting students as part of the Red Folder initiative.

The site includes information on how to recognize the common signs of distress:



Recognizing signs of distress

These are the most common signs of distress. Students may present with signs that are not listed.

Academic

Sudden decline in quality of work and grades

Frequently missed classes and assignments

Disturbing content in writing or presentations

Classroom disruptions

Consistently seeking personal rather than professional advice

Multiple requests for extensions or special considerations (a change from prior functioning)

Doesn't respond to repeated requests for contact or meetings

Academic assignments dominated by themes of extreme hopelessness, helplessness, isolation, rage, despair, violence or self-harm

Physical

Marked changes in physical appearance like poor grooming or hygiene or sudden changes in weight

Strange or bizarre behavior indicating loss of contact with reality

Visibly intoxicated or smelling of alcohol or marijuana

Rapid speech or manic behavior

Depressed or lethargic mood or functioning

Observable signs of injury like facial bruising or cuts

Psychological

Self-disclosure of personal distress like family problems, financial difficulties, assault, discrimination or legal difficulties

Unusual or disproportionate emotional response to events

Excessive tearfulness, panic reactions

Verbal abuse like taunting, badgering or intimidation

Expression of concern about the student by peers

Safety Risk

Verbal, written or implied references to suicide, homicide, assault or self-harm behavior

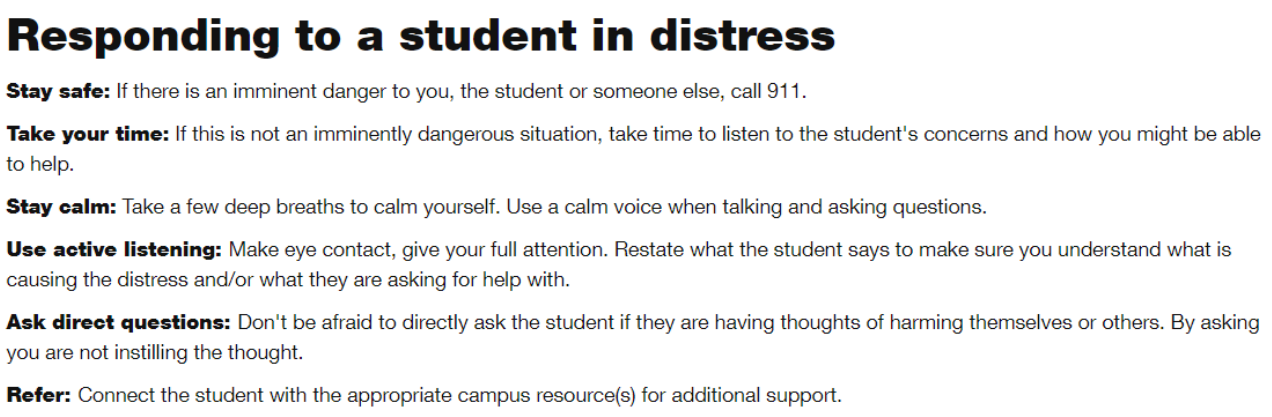
Unprovoked anger or hostility

Physical violence like shoving, grabbing, assaulting or use of a weapon

Stalking or harassing

Communicating threats or disturbing comments in person or via email, text or phone call

How to respond to a student in distress:



Responding to a student in distress

Stay safe: If there is an imminent danger to you, the student or someone else, call 911.

Take your time: If this is not an imminently dangerous situation, take time to listen to the student's concerns and how you might be able to help.

Stay calm: Take a few deep breaths to calm yourself. Use a calm voice when talking and asking questions.

Use active listening: Make eye contact, give your full attention. Restate what the student says to make sure you understand what is causing the distress and/or what they are asking for help with.

Ask direct questions: Don't be afraid to directly ask the student if they are having thoughts of harming themselves or others. By asking you are not instilling the thought.

Refer: Connect the student with the appropriate campus resource(s) for additional support.

And how to refer a student in distress to campus resources:

Referring a student in distress

Does the student need immediate assistance?

Yes

The student's conduct is clearly reckless, disorderly, dangerous or threatening and suggestive of immediate harm to self or others in the community.

What to do:

- If there is an imminent danger to you, the student or someone else, call 911.
- Report the concern to Student Support and Case Management.

I'm Not Sure

Signs of distress are visible but the severity is unclear. The interaction has left you feeling uneasy or concerned about the student and you're not sure how to proceed.

What to do:

- Consult with Counseling and Psychiatric Services (303-492-2277) or Student Support and Case Management (303-492-7348) on how best to support the student.

No

I'm not concerned for the student's immediate safety but they are having significant academic and/or personal issues and could use support.

What to do:

- See our list of campus resources below to connect the student with support on campus.

Mandatory Reporting

In addition to referring a student to resources, any sexual misconduct, intimate partner abuse (including dating and domestic violence), stalking, protected-class discrimination or harassment, or related retaliation must be reported to the Office of Institutional Equity and Compliance (OIEC).

For questions regarding these issues or the obligation to report, please contact OIEC at 303-492-2127.

The links above, and additional resources, can be accessed on the Red Folder resources page. Extensive resources are also available on the Student Affairs Health and Wellness Services site .

The Graduate School website provides a variety of additional resources related to conflict resolution and assisting students in distress. See above or the graduate school website for details.