ARRL Teachers Institute
2019 Web Application for TI-2:
Remote Sensing & Data Analysis
July 8-12, 2019
ARRL Headquarters - Newington, CT

Application Deadline is May 1, 2019

ARRL membership required!

Current ARRL membership is required to attend ARRL's TI-2. You can join or renew your membership online at www.arrl.org/join. Support the future of ham radio!

Section 1 - Personal Information

Be sure to include contact information that we can use to communicate with you during school and summer months (phone number, address, and email). Make sure the email address(es) you provide will accept emails from @arrl.org.

Name _____   Ham Radio Call Sign (required) _____

Home Mailing Address _____

City, State, Zip Code _____

Home Phone _____   Cell Phone _____

Home email address _____

School email address _____

Emergency Contact _____

Relationship _____   Phone _____

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Section 2 - School or Institution Information

School District _____

Name of School _____

School Mailing Address 1 _____

School Mailing Address 2 _____

City, State, Zip _____

School Phone _____ School Federal Tax ID# _____

Total Number of Students in School (all grades) _____

Grade Level(s) in School

K   1   2   3   4   5   6   7   8   9   10   11   12   C

Grade Level(s) You Teach

K   1   2   3   4   5   6   7   8   9   10   11   12   C

Subject(s) Taught _____

Extracurricular Activities (Clubs, etc.) _____

Estimated Number of students involved in your STEM-related clubs and classes _____

School Demographic Information

School classification (choose one from each row)

Urban   Suburban   Rural   Other   _____

Public   Parochial   Private   Other   _____

Percentage of overall student population that is

Eligible for free or reduced price lunches _____%

Eligible for Title 1 Services _____%

Receive Special Education services _____%

Section 3 - Essay / Video Questions

Reply to the following questions in written form or by addressing the questions in a video. Please limit the total length of the video to no more than six minutes.You'll find instructions for submitting the video at the end of this application form.

1. When and where did you attend ARRL's Introduction to Wireless Technology (TI-1)? Instructor's name?

2. Beyond the experience you have had with microcontrollers in TI-1, what level of experience have you had with microcontrollers (i.e. Arduino, Basic Stamp, Boe-Bots, etc.)?

3. Describe the ways you have used the content presented in the TI-1 to enhance your instruction. Feel free to include video of classroom activities or other documentation of instruction with students that resulted from your participation in the TI-1.

4. What do you hope to learn from TI-2? How do you plan to use the content and training provided in the Remote Sensing Teachers Institute?

5. Where do you see yourself professionally in 3 years? in 5 years?

Section 4 - Pre-Institute Survey

The purpose of this survey is to assess participants' familiarity with the material to be covered at the Teachers Institute so that we can adjust the curriculum and presentation of the content during the Teachers Institute to better meet your needs. Your honest and considered responses on this survey will help us provide the best possible learning experience for everyone.

On the line before each question, please use the following scale to help us plan for a productive session.

1 I totally get this, in fact, I could teach it tomorrow if asked.

2 I could teach this to students, but I will need to review.

3 This one took quite a bit of work, but I am pretty sure I got the correct answer.

4 I really didn't know where to start, so I had to Google it, research it, or call a friend.

Please make your answers concise and reflect how you would present the concepts in your classroom. Feel free to make use of open sources to answer the questions, but restate the information in your own words.

_____ 1. Describe what you would expect the temperature profile (temperature over time) to be if you were to measure air and water temperature at a local pond of water? Use a simple hand drawn graph to illustrate your point.

_____ 2. What part of the Earth most influences global climate? Please explain.

_____ 3. Relate the concepts of hysteresis and specific heat to your local climate.

_____ 4. Explain how a heavy object, like a boat with a concrete hull, is able to float in water.

_____ 5. You have a rectangular solid object that has dimensions 5cm x 5cm x 10cm an a mass of 245 grams. Will this object float or sink when you place it in water? Why?

_____ 6. The formula required to convert the voltage, as an ADC reading, to measured temperature in degrees K is:

$$T = \frac{3950}{\ln\left(\frac{47000\frac{1}{1-\frac{ADC}{1023}}-1}{0.0176322698}\right)}$$

If ADC = 455, calculate the temperature in degrees C.

_____ 7. Using the information from question 6 above and the following ADC temperature readings, create a spreadsheet that converts the ADC readings into degrees C. Plot the data in a graph:

260, 272, 262, 265, 288, 298, 298, 281, 282, 271, 270, 267, 268, 277, 280, 276, 274, 271, 269, 269, 265, 257, 234, 218

Send an electronic copy of your spreadsheet to ariedel@arrl.org.
Reference "TI-2 application, Q7", and your name in the subject line.

_____ 8. What is the voltage at point A in this circuit?

+5V

47K

A

13.3K
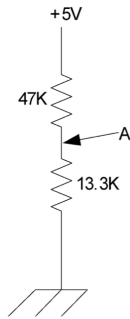
_____ 9. Map coordinates are used in three basic formats. These formats are as follows, with d=degrees, m=minutes, and s=seconds:

ddd.ddddd (decimal degrees)

ddd mm.mmm (decimal degrees and minutes)

ddd mm ss.s (decimal degrees, minutes, and seconds)

Convert the following coordinates in decimal degrees into the other two formats:

N41.4059   W72.0805

_____ 10. Using an online source or mapping program, identify the town near these coordinates. Identify the source you used to find this location.

The following Basic Stamp subroutine is used to turn the robot left a specified number of degrees of turn (number of degrees passed in the variable cmd). The amount of turn the robot makes is dependent on the surface upon which the robot is operating, i.e., surface/tail wheel friction is significant.

```
left:
degrees =((cmd(count
er1+1)-48)*100) + ((cmd(counter1+2)-48)*10)+(cmd(counter1+3)-48)
degrees=degrees/5
FOR counter= 1 TO degrees
   PULSOUT 13, 650
   PULSOUT 12, 650
   PAUSE 20
NEXT
PAUSE 200
RETURN 'left
```

_____ 11. What variable will need to be adjusted by testing to compensate for the unique surface friction?

_____ 12. What variables or numbers in the above subroutine would need to be changed to make the routine usable for making a right turn?

_____ 13. The following Basic Stamp command statement is useful for receiving unique information from an outside source via a data link receiver. Explain each part of this command. [Hint: look in the Help section of the Basic Stamp Editor program.]

```
SERIN 15, 813,[WAIT ("MAREA") ]
```

_____ 14. You want to send a decimal value of 153 to a spreadsheet. Spreadsheets will only accept data into a cell that is in ASCII format. Convert the decimal 153 numbers into the ASCII equivalents for transmission to the computer. Develop a simple formula (algorithm) to make the conversion.

_____ 15. What kind of sensors are you interested in learning about or would like to use in your classroom?

Section 5 - Teachers Institute requirements and acknowledgment

Check the boxes to acknowledge your understanding and acceptance of the following Teachers Institute requirements.

❒ Each participant must bring a laptop computer that meets the following specifications:

Windows
Windows 7 or later operating system
At least two available USB 2.0 or 3.0 ports*

Macintosh
macOS 10.7 or newer operating system
At least two available USB 2.0 or 3.0 ports*

USB type-C   **USB 2.0**   **USB 3.0**

Some newer laptops have only USB type-C ports. For these, you will need a USB type-C to USB 3 Type A adapter or hub.

Apple laptops running Windows 7 or newer under Boot Camp, Parallels Desktop, or VMWare Fusion are acceptable if they meet all other requirements. *Laptops, netbooks, Chromebooks, and tablets running other operating systems are not acceptable.*

USB type-C (left)
USB 3.0 (right)

Make and model of laptop you will bring: _____

Operating System and Version: _____

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❑ **Volt-Ohm Meter**. Bring a volt-ohm meter and probes. You should be familiar with the operation of the meter. The meter you received during TI-1 is more than adequate. Make sure it works (make sure the current fuse isn't blown) and that you have a good battery in it.

❑ **Parallax BOE-BOT®**. Bring the BOE-BOT robot you received during your TI-1. You will need the appropriate USB cable to program the Basic Stamp, and the Basic Stamp Editor software installed on the computer. Review programming the Basic Stamp, and ensure you have fresh batteries and that the tires (the rubber on the wheels) are in good shape.

❑ **Scientific Calculator**. Bring a scientific calculator that you know how to operate. You are welcome to use the Windows calculator if you are familiar with it.

❑ Participants *must* be able to install programs and drivers on the computer. Many school computers have security features that make them unusable during the Teachers Institute. If you are going to use a school computer, make sure you have FULL access to the computer, and that you test the accessibility before coming to the Institute.

❑ Participants are expected to pay for travel, hotel, and meal expenses and will submit an expense reimbursement form at the conclusion of the Teachers Institute. Receipts are required for hotel and travel expenses. Expect approximately 2 weeks to process your reimbursement.

❑ Reimbursable expenses include up to $600 for travel, lodging for up to 5 nights for in-state participants and 6 nights for out-of-state participants at an ARRL designated hotel, and $35 per diem for meals (no meal receipts required). To receive full reimbursement, participant must attend all 5 days of Institute classroom activities.

❑ Participants traveling from out of state should arrive the day before the Institute, and should schedule departure after 6 pm on the final day of the Institute or the day after the Institute. Early departures on the last day of the Institute to meet flight schedules are not acceptable, as important material is covered right up to the end of the final day.
Participants who live within a 4 hour commute to the classroom are expected to provide their own transportation and will be reimbursed for milage and 5 nights of hotel accomodations. Participants who live less than a 30 minute drive from the classroom are expected to commute daily and will be reimbursed for mileage.
Accommodations for additional days or at locations other than the designated hotel are the responsibility of the participant.

❑ Participants are expected to attend Teachers Institute sessions from 8 a.m. to 4 p.m. each day. Attendance at optional evening activities, if any, is encouraged but not required.

❑ Each participant must complete a workshop evaluation at the conclusion of the workshop. Participants may be asked to provide feedback in the future about the training and resources provided during the Institute, and their effectiveness in student learning.

❑ Approved expenses and instructional resources provided by the Teachers Institute are paid for by donations to the ARRL Education & Technology Program Fund, and do not come from ARRL membership dues.

❑ The Teachers Institute is a professional development activity and therefore children would not be appropriate at the Teachers Institute. There are no accommodations for child care.

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Section 6 - Signatures

I have read the above requirements and will follow the ARRL Teachers Institute Travel and Reimbursement Guidelines and Procedures.

_____   _____
Applicant's Name (Print)   *Administrator's Name (Print)*

_____   _____
Applicant's Signature   *Administrator's Signature*

Section 7 - Payment Information

Your application cannot be reviewed until you have submitted the $100 enrollment fee. Should you not be selected to participate in this year's Teachers Institute, you will be refunded the $100 enrollment fee by mid May. If you are selected, enrollment fees cannot be refunded after June 1st.

To submit your enrollment fee online, please go here: https://www.arrl.org/teachers-institute-payment

Or you can mail a check to:

ARRL Education & Technology Program
Attn: Ally Riedel
225 Main Street
Newington, CT 06111-1494

Note: If you are not currently an ARRL, you may also mail an additioanl $49 with your application or simply apply online here: http://www.arrl.org/membership

Section 8 - Submitting your application

Refer to the application checklist in **Section 11** to be sure you submit all required items. All components of your completed application and enrollment fee must be received at ARRL by the application deadline, **May 1, 2019**.

To submit video as part of your application, refer to the instructions in **Section 11**.

By Mail - Print your completed and signed application, and send it with the cover letter to:

> **ARRL Education & Technology Program**
> **Attn: Ally Riedel**
> **225 Main Street**
> **Newington, CT 06111-1494**

FAX - You may fax the signed application, survey, and cover letter to (860) 594-0259. Please include a fax cover sheet addressed to **Attn: Ally Riedel**.

Email - scan and send your cover letter, signed application, and completed survey electronically to Ally Riedel at ariedel@arrl.org. Please include your name in the document title. For example: "JSmith TI application 2019.pdf". We prefer documents in PDF format.

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Section 9 - Admission decision announcements

We will make every effort to advise you of our decision on your application and your session assignment by May 15. We will contact you at the email address you have provided. If you have not heard from us by that date, please feel free to contact us via email. Once selections are made, you will be emailed a direct link to reserve your accomodations at the designated hotel. We suggest you make travel arrangements as soon as your are notified.

Please direct questions regarding your application for the Teachers Institute to ariedel@arrl.org or call Ally Riedel at (888) 277-5289 x367 or (860)594-0367.

Section 10 - Teachers Institute Application Checklist

Include all of the following to complete your application:

❒ Cover letter on school letterhead stating your desire to attend, signed by you and a school administrator.

❒ Completed application form, including essays or video, self-assessment survey, and signatures. (Pages 1–10 of this document)

❒ Check or online credit card payment for the $100 enrollment fee, payable to the ARRL Education & Technology Program. If you are not accepted, the enrollment fee will be refunded.

❒ OPTIONAL - Check or online credit card payment for $49 for ARRL membership.

Section 11 - Instructions for Submitting Video

You may post your video to YouTube, Dropbox or Google Drive, then share the link in an email to Ally Riedel at ariedel@arrl.org along with your application and cover letter.

via YouTube

If you're not familiar with posting video to YouTube, here's where you'll find an explanation of the YouTube upload process: https://support.google.com/youtube/answer/57407?hl=en

YouTube does not allow you to use your webcam directly to make a video, but there are alterna-tives: https://support.google.com/youtube/answer/57409?hl=en

If you do not want your video to be public, you may post your video as "unlisted". Here's how: https://support.google.com/youtube/answer/157177?hl=en

Send the link to your YouTube video in an email to Ally Riedel at ariedel@arrl.org along with your application and cover letter. Please indiacte in the subject line "Teachers Institute Video Application" and your first and last name.

Section 12 - Completing and signing your PDF form

Acrobat DC (Mac or Windows) - Open this document in Acrobat Reader or Acrobat DC. In the Tools Panel, choose Fill & Sign. Click in the first empty field and enter the requested information. Use **tab** to move to the next field. To add signatures to a field, click the Sign button at the top of the window, choose the signature, and move it to the appropriate location on the form.

Preview (Mac) - Open the document in Preview, click in the first empty field and enter the requested information. Use **tab** to move to the next field. To add signatures to a field, choose **Tools > Annotate > Signature** and choose (or create) your signature.