Speech Analyzer

Version 3.0

Instructor Guide

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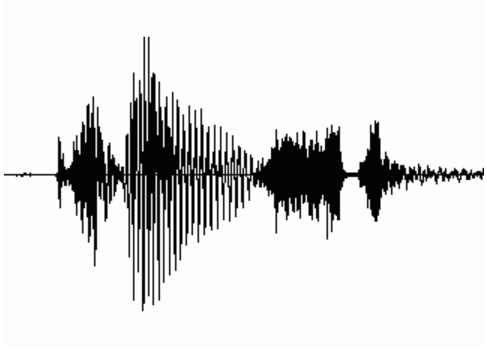
Contents

Introduction



Speech Analyzer is a computer program for acoustic analysis of speech sounds.

The goal of this training course is for students to be able to analyze audio data in Speech Analyzer quantitatively with accurate measurements and qualitatively using relevant graphs. In other words, the goal is competent use of Speech Analyzer as an instrument.

This course does not teach everything you can do in Speech Analyzer.

This course does not provide training in acoustic analysis.

How students will learn

Students spend most of their time actually *practicing the skills* using realistic data—audio files that demonstrate common analysis tasks for field researchers.

In each module, students follow the numbered steps and check their work using the pictures and the tables of expected measurements. For more practice, they can do the exercises.

How to use the training course

Teach the course to field linguists in one or two days.

Teach the course as a part of a phonetics, acoustic phonetics, phonology, field methods, or tone analysis course.

Provide guidance and feedback to students who take the course at their own pace.

For more information about self-paced learning, see page 10.

If there is no instructor, a motivated learner can use this training course (see page 10).

Opening course documents

The course includes a Student Manual and this Instructor Guide. To open a document (for example, Instructor Guide), do either of the following:

On the **Help** menu of Speech Analyzer, point to **Training**, and then click **Instructor Guide**.

In Windows Explorer, double-click the SA Instructor Guide.doc file in the following folder*:

C:\Program Files\SIL\Speech Analyzer\Training

*By default, the SIL folder is installed in the Program Files folder on drive C.

For more information about course files, see page 11.

Prerequisites

Instructor prerequisites

To be able to teach this course effectively, we recommend that you have the following:

Two years of cross-cultural teaching experience (or familiarity with the students' culture).

Experience teaching a training course.

Passed or exempted an *Introduction to Computers* course (or the equivalent).

Passed or exempted an *Introduction to Microsoft Windows* course (or the equivalent).

Ability to transcribe audio data and interpret phonetic transcriptions.

Ideally, passed acoustic phonetics, field methods, and advanced phonology courses.

To prepare for the course, and then teach it, you need ongoing access to a computer with Microsoft Windows 2000 or later, Microsoft Word 2000 or later, and Speech Analyzer 3.

Student prerequisites

Before students start the course, make sure they are *able to do* the following:

Transcribe audio data, interpret phonetic transcriptions, and do some phonological analysis.

> The course does *not* teach phonetics or phonology. It assumes that students are trained field linguists or are taking this course as a part of a linguistics course.

Make a good recording.

Connect a microphone to a computer.

For information about prerequisite computer skills, see the next page.

> We recommend that you make sure that potential students have passed or exempted an *Introduction to Computers* and *Introduction to Microsoft Windows* course (or the equivalent).

For information about prerequisite courses, write to:

Speech Analyzer Training Course
Information Technology Services
JAARS, Inc.
PO Box 248
Waxhaw, NC 28173

E-mail address: Computer_Train_JAARS@sil.org

For students to be able to practice their skills after the course, make sure that they will have access to a computer with Microsoft Windows 2000 or later and Speech Analyzer 3. The skills will fade away unless students keep them alive by using them in their work. *Students will use it or lose it.*

Student prerequisite skills

Before students start the course, make sure they are *able to do* the following:

Introduction to Computers

Know basic computer terminology (for example, screen, window, and program).

Press special keys on a computer keyboard.

Start and exit programs.

Maximize, minimize, and close windows.

Click commands on menus and submenus.

Click buttons in dialog boxes.

Point, drag, and double-click the mouse.

Introduction to Microsoft Windows

Navigate to a folder in Windows Explorer or a dialog box.

Right-click in a window, and then click a command on a shortcut menu.

Click tabs in dialog boxes.

Select items in lists and drop-down lists in dialog boxes and on toolbars.

Select and clear check boxes in dialog boxes.

Click hyperlinks.

Learning objectives

Each training module teaches one or more learning objectives. The *learning objectives* are skills that most field linguists need to *be able to do*.

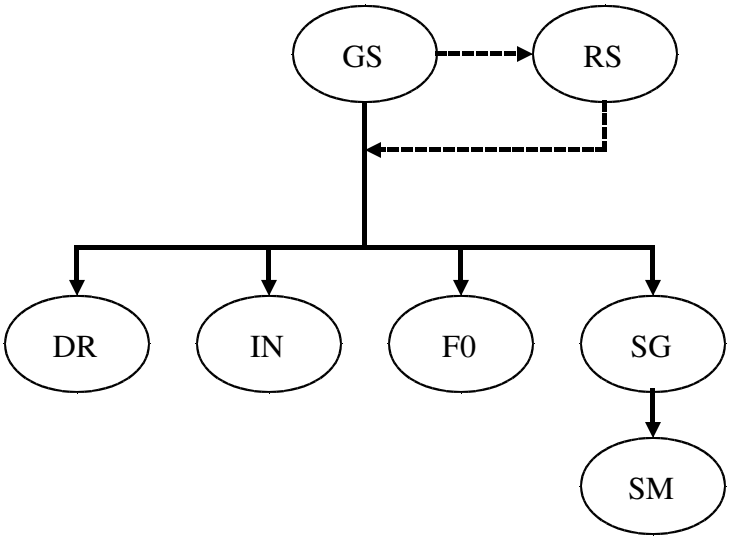
When students have finished the course successfully, they will be able to do the following.

Objective	**Module**
Open an audio file.	Module GS
Get information about an audio file.	Module GS
Play, stop, pause, and resume playback of a file.	Module GS
Mark a point in time or a portion of audio data.	Module GS
Zoom in and out to see more or less detail in time-based graphs.	Module GS
Play back a portion at different speeds.	Module GS
Automatically repeat playback of a portion with a pause.	Module GS
Set the recording level.	Module RS
Record an utterance using Speech Analyzer.	Module RS
Enter information about an audio file.	Module RS
Save an entire recording or a selected portion as a new audio file.	Module RS
Measure the duration of a portion in a time-based graph.	Module DR
Get the length of an audio file.	Module DR
Measure the intensity at a point in an Intensity graph.	Module IN
Measure the fundamental frequency in a Pitch graph.	Module F0
Copy measurements to a spreadsheet or word processing program.	Module F0
Measure formant frequencies in a Spectrogram graph.	Module SG
Measure formant frequencies in a Spectrum graph.	Module SM
Select graph types.	most of the modules
Compare audio data visually.	most of the modules
Use Help to answer questions and learn more about Speech Analyzer.	most of the modules

Course map

By default, you can teach the modules according to the order in the Student Manual.

If students need particular skills *as soon as possible*, they can learn according to the following course map. A *course map* is a simple diagram of the dependency relationships between modules. Before students start a module, trace the lines from it back to Module GS. Make sure they have finished the prerequisite modules successfully. We recommend that you highlight each module on the course map when students complete it.



Instructional method

We recommend that you teach each module using the following instructional method. If a module contains more than one objective, repeat the steps for each objective (skill).

.1 To introduce an objective, do the following:

.a Tell the students what page to go to in the Student Manual. Tell them to read the supporting information preceding the procedure.

.b Read the objective to the students. In a way that is relevant and motivating to students, briefly explain *why* the skill is important and *when* to use it.

If this course is a part of a phonetics, phonology, or field methods course, relate the skill to what students have learned about acoustic phonetics, phonology, transcription, or language learning.

.c At the beginning of each module, remind the students to do one of the following if a Speech Analyzer window is already open:

Exit Speech Analyzer, and then start it again.

Close all audio files that are open in the Speech Analyzer window.

.2 To demonstrate the skill if the instructor's computer is connected to a screen projector: Do the steps of the procedure in the Student Manual. Describe each step as you do it.

.3 Tell students to do the steps of the procedure on their computers.

.4 Tell students to do the exercise on their computers.

.5 Give feedback to students. For information about practice and feedback, see page 9.

.6 Option: If the instructor's computer is connected to a screen projector, ask for a volunteer from the class to do the exercise. Ask for another volunteer to describe each step.

Tips for instructors

Give explanations from the front of the classroom (step 1). Set up the instructor computer behind the student computers, so you can observe students' progress on their monitors and assist them as needed (steps 2 and 3). Walk around the classroom to give feedback to students when they practice their skills (steps 4 and 5).

To help the students relax if they are nervous and tense, you can use *culturally appropriate* short stories, humor, and pictures. The course is an intense learning time, but you can provide some appropriate humor and fun.

If there are several ways to perform a task, teach one method that is *accurate* and *easy to remember*, but not necessarily the fastest method. For example, demonstrate commands on the menus when possible. After the course, intermediate computer users can discover on their own how to accelerate their work using toolbars and keyboard shortcuts.

If there are several ways to describe actions on a computer, teach terms that are *consistent* with training books and online Help for other programs that run on Microsoft Windows.

Practice and feedback

The recommended instructional method provides enough *repetition* for most students: They *see* each skill two times (steps 2 and 6 on the previous page) and *do* each skill two times (steps 3 and 4). If a skill requires even more practice, the course provides multiple exercises. If all students move from one module to the next at the same time, make sure that the course schedule provides ordinary students enough time to practice.

The exercises contain fewer procedural steps than the corresponding modules in the Student Manual, because they provide more practice for the *same* skills. In most cases, an exercise identifies the data and provides a table of expected measurements.

Most instructors know that practice makes perfect. But practice by itself is not enough—without *feedback*, students might learn to do the wrong thing in the wrong way at the wrong time.

Adequacy feedback: Can the student perform the skill to the required standard?

> Whenever possible in this training course, adequacy feedback consists of a table of expected measurements and pictures (screen shots) of relevant graphs. Student can check their own work.
>
> Option: You can recommend that students ask other students to double-check their work.

Diagnostic feedback: If the performance is *not* okay, what is the problem?

Corrective feedback: If the performance is *not* okay, what can the student do to improve?

The module notes in this Instructor Guide tell you when you must provide feedback.

Although this training course does not have a formal test of competence, you can use the exercises as *skill checks* to determine whether the students have achieved the learning objectives.

Important points for instructors

Be brief in your comments *about* the skill, but take time to *clearly demonstrate* the skill, so that students have a good model to follow when they practice the skill.

Make sure that students get to spend *at least half* of their time actually *practicing the skill* and *receiving feedback*. Make sure whatever time you spend in class helping students get ready to practice takes less time than they spend practicing.

When students practice the skill, let them operate the computer *at all times*. Do *not* take over the mouse or keyboard on a student's computer. Even in the rare case when you need to tell them what to do to solve a problem, let them do it.

Self-paced learning

In self-paced learning, progress is controlled by a student's own competence, not a class schedule. Every student takes enough time to achieve the objectives—no more and no less. Faster students do not need to wait until other students catch up. Slower students get enough time to practice the skills.

Instructor-lead self-paced learning

Introduce each module and demonstrate the skills.

Give feedback when the student practices the skills.

Check the work when the student does the exercise (see the Student Manual and the module notes in this Instructor Guide).

Independent self-paced learning

If there is no instructor, a motivated learner can use this training course.

.7 Read this Instructor Guide. You are your own instructor!

.8 Make sure you have the prerequisite skills (see page 4).

.9 Decide which modules you need to do your work (see page 6).

.10 Do any prerequisite modules (see page 7). Before you start each module, read the module notes in this Instructor Guide.

.11 Carefully compare your work to the tables of expected measurements and pictures (screen shots) in the Student Manual.

For more information about setting up a computer for the course, see page 13.

Files

Audio files

The course includes realistic data—audio files that demonstrate common analysis tasks for field researchers. If advanced students need to use the skills in their work *as soon as possible*, they can practice the skills using their data instead of the doing the exercises.

The first time you start Speech Analyzer, it creates a Speech Analyzer folder for you and copies several audio files to a Samples subfolder.

The initial default folder in the **Open** and **Save As** dialog boxes is the Speech Analyzer folder.

On Windows 2000 and XP computers, it is in the My Documents folder.

On Windows Vista computers, it is in the Documents subfolder of your personal folder.

Here are the audio files and graph types that students use in the modules of the course:

Module	Audio files	Graph types
GS	he danced yesterday.wav	Raw Waveform, Spectrogram
RS	Students save the color_collar.wav, color.wav, collar.wav files in the Speech Analyzer folder.	Raw Waveform, Spectrogram
DR	kadootje.wav, Katootje.wav	Raw Waveform, Auto Pitch
IN	convict_n.wav, convict_v.wav	Raw Waveform, Intensity
F0	cooking pot.wav, mongoose.wav	Raw Waveform, Auto Pitch, Raw Pitch, Smoothed Pitch
SG	kVlr_1.wav, kVlr_2.wav	Raw Waveform, Spectrogram
SM	kVlr_1.wav, kVlr_2.wav	Raw Waveform, Spectrogram, Spectrum

Course documents

The course documents are in the *C:\Program Files*\SIL\Speech Analyzer\Training folder.

By default, the SIL folder is installed in the Program Files folder on drive C.

SA Instructor Guide.doc

SA Needs Assessment.doc

SA Student Evaluation.doc

SA Student Manual.doc

Preparing Before the Course

To understand each potential student's previous expectations of the course and experience with computers, send a copy of the Needs Assessment to each student.

A week before the course, confirm the classroom location.

Read the Student Manual and this Instructor Guide.

If necessary, edit the course documents.

For each student, do the following:

Print a copy of the following: Student Manual and Student Evaluation. Put the printout in a notebook binder, if desired. Because the Student Manual is for students to keep, they can write notes in it.

For information about printing on A4 paper, see page 21.

Make sure there is a computer with Windows 2000 or later and Speech Analyzer 3.

For information about setting up computers for the course, see page 13.

Make sure that a microphone and a headset (or set of speakers) is connected to the computer. Test the audio input and output devices.

Make a nametag or place card or both.

If desired, prepare an address information form for the course.

Set up the classroom.

Make sure you know how to adjust the classroom environment (for example, temperature, lighting, and sound) to minimize discomfort and distractions.

We recommend that you set up the instructor computer behind the student computers, so you can observe student progress on their monitors and assist them as needed.

Although this is the preferred method, you must decide *if it is culturally appropriate*.

If you intend to use a projector for the instructor's computer, test it.

If you intend to use a microphone and sound system, test it.

In the appropriate places, put signs for the course.

Setting up computers for the course

Set up the classroom computers in advance or help students do the following.

Speech Analyzer

The following options are required during the course, because they directly affect the step-by-step procedures in the Student Manual.

On the **Tools** menu, click **Options**.

The **Options** dialog box appears.

In the **Mainframe** area on the **View** tab, do the following:

Select the **Taskbar** check box.

Select the **Statusbar** check box.

In the **Cursor** area on the **View** tab, do the following:

Click **Fragment**.

In the **Status Bar Units** list, select **Time**.

The following options are recommended during the course, because they make the students' computer screens match the pictures in the Student Manual.

Maximize the **Speech Analyzer** window.

Maximize audio file windows, except when tiling to compare audio files.

Microsoft Windows

The students will make sure that their work is *similar to* the pictures in the Student Manual. The pictures (also known as screen shots) are scaled to fit in the course documents. The pictures often show only the *relevant part* of the screen.

What students see on their computer screen might not *exactly* match the pictures. If you decide it is important for student's computer screens to match the pictures, set the following properties.

On the **Themes** tab of the **Display Properties** dialog box, select **Windows XP**.

On the **Settings** tab of the **Display Properties** dialog box, select **800 by 600 pixels**.

On the **Taskbar** tab of the **Taskbar and Start Menu Properties** dialog box, select the **Auto-hide the taskbar** check box.

Starting the Course

.12 Before the students arrive, do any of the following:

Adjust the classroom environment (for example, temperature, lighting, and sound) to minimize discomfort and distractions.

If you use a projector for the instructor's computer, test it again.

If you use a microphone and sound system, test it again.

If there is a special user name and password, start the student computers, and then log on.

If there is a blackboard, whiteboard, or flip chart, write *Speech Analyzer*, a list of objectives (skills) or course map, and the course procedures.

Put the printouts and place cards where you would like the students to sit.

> Based on the Needs Assessment or your knowledge of the students, you might decide to set up the place cards so students who are beginning computer users sit near students who are more experienced computer users. Students can usually help others.
>
> We recommend that you emphasize the group approach to learning, that working together helps everyone learn. The group approach to adult learning differs from traditional schooling. *Make sure what you do is appropriate to your students' culture!*

.13 Ask all the students to *briefly* introduce themselves and tell why they are taking the course.

If desired, tell the students to fill out an address information form.

.14 Briefly introduce yourself.

.15 Tell the students to turn to the Introduction in the Student Manual. Briefly explain:

The goal and objectives of the training course.

> As you teach, we recommend that you refer to the list of objectives or course map on the board (if available). Use it to review what the students have learned during the course.

How they will learn during the course (that is, the instructional methods you will use).

> If the *Speech Analyzer* course is part of a linguistics course, do the instructional methods differ from the main course?

Course procedures, including the course schedule and rules for the course location (for example, when the building opens and closes, whether name tags are required, where to go if there is a fire alarm).

.16 Tell students that they can write feedback on the Student Evaluation form during the course.

Teaching the Modules

Before the course, read all of the following module notes.

After starting the course, teach the modules according to the Contents or the course map.

Before you start each module, review the notes about that particular module.

Module GS: Getting Started

Starting Speech Analyzer

If any students click **OK** instead of **Close** in the **Start Mode** dialog box, the **Open** dialog box appears. Tell them to click **Cancel**, and then follow the steps in the next procedure.

Opening an audio file

Remind students to navigate to the Samples subfolder of the Speech Analyzer folder.

> If you or the students have used earlier versions of Speech Analyzer, make sure to read the information about folders in the Introduction of the Student Manual.

Selecting graph types

Tell the students to make sure at each step that their work is *similar to* the pictures in the Student Manual.

> What they see on their computer screens might not exactly match the pictures in the Student Manual. For more information about setting up computers for the course, see page 13.

Stopping the playback of an audio file

Recommend that students find the **Stop** button before they click **Play**.

Pausing and then resuming the playback of an audio file

Recommend that students find the **Pause** button before they click **Play**.

Moving the cursors

Encourage students to practice the different ways to move the cursors to discover which ways they can use most accurately and comfortably.

Zooming in and out

If students click near the left or right edge of the plot area after they zoom in, they might scroll left or right unintentionally.

Module RS: Recording and Saving Audio Files

Setting the recording level

Tell students to see Appendix ID in the Student Manual, and then continue the procedure in Module RS.

Recording an utterance

Observe carefully how each student records audio data. Help students decide if a recording is satisfactory. If a recording is unsatisfactory, give feedback, and then encourage the student to practice the procedure again.

> Option: Before the course, make satisfactory and unsatisfactory recordings. Play them and display the graphs if you can use a projector for the instructor's computer. Ask volunteers from the class to identify the unsatisfactory recordings and briefly tell what are the problems and what they would do to improve the recordings.

Entering information about an audio file

Ask volunteers from the class to briefly give reasons why it is worth the time to enter information about audio files.

Saving an audio file

Remind students to navigate to the Speech Analyzer folder, not the Samples subfolder.

> If you or the students have used earlier versions of Speech Analyzer, make sure to read the information about folders in the Introduction of the Student Manual.

Saving portions of an audio file

Explain the difference between *marking* a portion and *selecting* a portion. Briefly compare and contrast selecting a portion of audio data in Speech Analyzer and selecting text in a word processing program.

Module DR: Measuring Duration

Be prepared to answer questions from students about the duration of voiceless and voiced stops and the duration of vowels preceding voiced and voiceless stops.

Remind the students to make sure at each step that their work is *similar to* the pictures in the Student Manual.

Remind the students to make sure that their measurements are *similar to* the expected measurements at the end of the module in the Student Manual.

If any students' measurements are not close to the expected measurements, we recommend that you ask them to demonstrate the procedure to you, so you can give feedback.

Module IN: Measuring Intensity

Be prepared to distinguish intensity from (psychoacoustic) loudness.

Be prepared to answer questions from students about analyzing stress and accent.

Remind the students to make sure at each step that their work is *similar to* the pictures in the Student Manual.

If students do not see the measurements that they expect in the status bar, make sure that the correct file window and graph is active.

Remind the students to make sure that their measurements are *similar to* the expected measurements at the end of the module in the Student Manual.

If any students' measurements are not close to the expected measurements, we recommend that you ask them to demonstrate the procedure to you, so you can give feedback.

If you teach all of the modules according to the order in the Student Manual, you are at the halfway point of the course.

Remind students to take a few minutes to give feedback on the Student Evaluation form.

Module F0: Measuring Fundamental Frequency

Be prepared to distinguish fundamental frequency from (psychoacoustic) pitch.

Be prepared to answer questions from students about analyzing intonation, tone, and stress.

In a workshop or linguistics course, be prepared to relate the *analysis goals* to the *measurement skills* that students learn in this module.

> If the students will use the measurements for statistical analysis, be prepared to give them guidance about the amount of precision (that is, how to round values).

Module SG: Measuring Formant Frequencies in a Spectrogram

If desired, discuss the types of acoustic features that student can see in the **Raw Waveform** and **Spectrogram** graphs.

In a workshop or linguistics course, be prepared to relate the *analysis goals* to the *measurement skills* that students learn in this module.

Be prepared to answer questions from students about the incorrect F3 formant track in the transition from [l] to [r] in the kVlr_1.wav and kVlr_2.wav files.

If students do not see the measurements that they expect in the status bar, make sure that the correct file window and graph is active.

Exercise SG-2

The kVlr_1.wav file contains the word *color* and the kVlr_2.wav file contains the word *collar*.

Optionally, you can tell students to compare the corresponding formant values of the vowels when two different speakers say the same two words.

Module SM: Measuring Formant Frequencies in a Spectrum

Be prepared to answer questions from students about the criteria for deciding whether to use a spectrogram or spectrum.

In a workshop or linguistics course, be prepared to relate the *analysis goals* to the *measurement skills* that students learn in this module.

The formant values in the **Spectrum** graph can be sensitive to the portion of audio data between the cursors.

> In a workshop or linguistics course, be prepared to give guidance about the correct type of portion for the analysis goal.

Exercise SM-1

Optionally, you can tell students to compare the formant values with Exercise SG-1.

Exercise SM-2

Optionally, you can tell students to compare the formant values with Exercise SG-2.

Optionally, you can tell students who did Module RS to compare the corresponding formant values of the vowels when different speakers say the same two words.

> The color.wav file contains the word *color* and the collar.wav file contains the word *collar*, spoken by each student.
>
> The kVlr_1.wav file contains the word *color* and the kVlr_2.wav file contains the word *collar*, spoken by another speaker.

Appendix CU: Cleaning Up Your Computer

After students have finished the training course, give them time and assistance to clean up their computers.

Tell students to complete the Student Evaluation form and return it to you.

Cleaning Up After the Course

Clean and straighten the room: pack up any course supplies and clean the boards.

If you set up computers for the course, you can restore some properties (see page 13).

If required, remove Speech Analyzer from all the computers on which it was installed.

Log off or shut down classroom computers.

Request for feedback from instructors and self-paced learners

Your feedback about this course is important to Information Technology Services! We earnestly desire your comments on what is good, not just what is bad!

Send any significant feedback to the following address or e-mail address:

Speech Analyzer Training Course
Information Technology Services
JAARS, Inc.
PO Box 248
Waxhaw, NC 28173

E-mail address: Computer_Train_JAARS@sil.org
Subject line: Feedback about Speech Analyzer Training Course

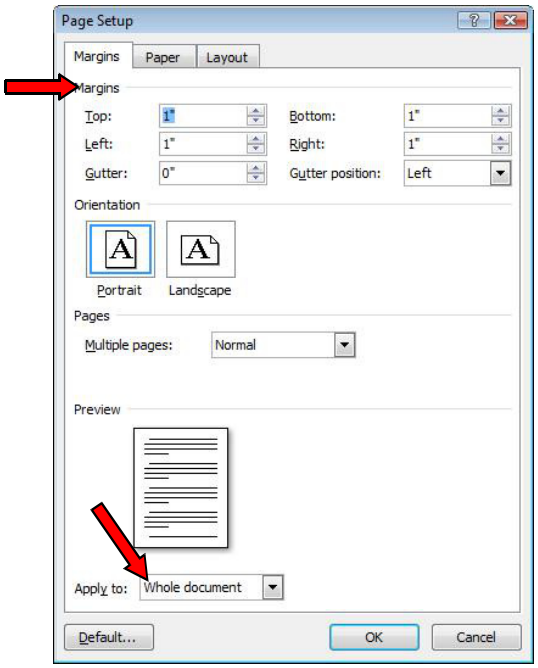
Appendix A4: Printing Documents on A4 Paper

To print course documents on A4 paper and keep the same *page breaks*, modify the margins to keep the same *content area* (that is, width 6.5 inches and height 9 inches).

Microsoft Word 2007

.17 On the **Page Layout** tab, click the dialog box launcher in the **Page Setup** group.

The **Page Setup** dialog box appears.



.a Click the **Margins** tab.

.b In the **Top**, **Bottom**, **Left**, and **Right** boxes, enter the values from the following table.

Boxes	Millimeters	Inches
Top, Bottom	34.0 mm	1.34"
Left, Right	22.3 mm	0.88"
Header, Footer	21.3 mm	0.84"

.c In the **Apply to** list, click **Whole document**.

.d Click the **Paper** tab.

.e In the **Paper size** list, select **A4**.

.f Click the **Layout** tab.

.g In the **Header** and **Footer** boxes, enter the values from the table.

.h Click **OK**.

.18 Click the **Microsoft Office Button**.

.19 At the bottom of the menu, click **Word Options**.

The **Word Options** dialog box appears.

.a In the left pane, click **Advanced**.

.b In the **Advanced Options for Working with Word** pane, scroll down to the **Print** section.

.c Clear **Scale content for A4 or 8.5 x 11" paper sizes**.

.d Click **OK**.

.20 To update the fields in the document, press **Ctrl+A**, and then press **F9**.

.21 If the **Update Table of Contents** dialog box appears, click **Update entire table**, and then click **OK**.

.22 Always save the document before you print it.

Microsoft Word 2003 and earlier

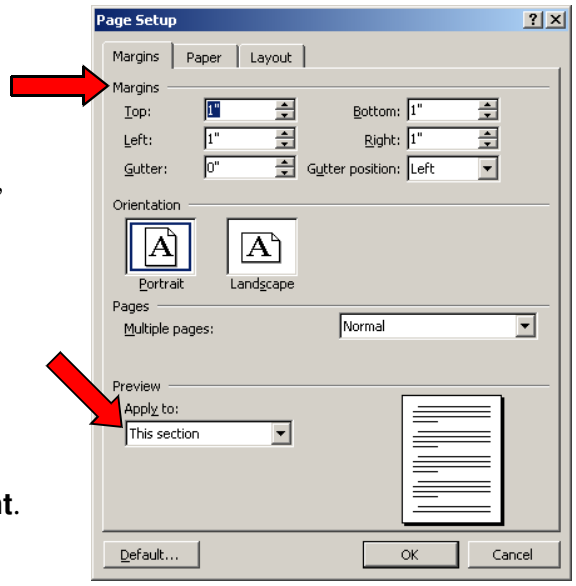
.23 On the **File** menu, click **Page Setup**.

The **Page Setup** dialog box appears.

.a Click the **Margins** tab.

.b In the **Top**, **Bottom**, **Left**, and **Right** boxes, enter the values from the following table.

Boxes	Millimeters	Inches
Top, Bottom	34.0 mm	1.34"
Left, Right	22.3 mm	0.88"
Header, Footer	21.3 mm	0.84"



.c In the **Apply to** list, click **Whole document**.

.d Click the **Paper** tab.

.e In the **Paper size** list, select **A4**.

.f Click the **Layout** tab.

.g In the **Header** and **Footer** boxes, enter the values from the following table.

.h Click **OK**.

.24 On the **Tools** menu, click **Options**.

The **Options** dialog box appears.

.a Click the **Print** tab.

.b Clear the **Allow A4/Letter paper resizing** check box.

.c Click **OK**.

.25 To update the fields in the document, press **Ctrl+A**, and then press **F9**.

.26 If the **Update Table of Contents** dialog box appears, click **Update entire table**, and then click **OK**.

.27 Always save the document before you print it.