

## MUS 232: TRIADS, 7TH CHORDS, FIGURED BASS

### Questions to Consider

#### Triads, 7th Chords, Figured Bass

What does *tertian* mean?

What is a triad and what are the four types/qualities of triads?

What are the interval formulae for the four types/qualities of triads?

What are the five most commonly used 7<sup>th</sup> chords and what are their formulae?

What does *bass position* refer to, and how does it inform inversions of triads and 7<sup>th</sup> chords?

What is *doubling*?

What is *figured bass* or *thoroughbass*?

What are the four ways to indicate chromaticism in figured bass?

What are *lead sheet* symbols and where are they placed in a score? (Be able to write/identify the four lead sheet symbols for triads and the five for 7<sup>th</sup> chords).

## TRIADS

Now that we know how to create and recognize intervals, we have the basis for understanding **harmony**—notes sounding (or at least being heard) at the same time. While the most basic harmonic element is the interval (two notes), we can go one step further and add a third, simultaneously-sounding note: now we have a chord. A chord with three notes (for our purposes) is called a **triad** ("tri" as in three notes). But these three notes are arranged in a particular way: in vertical 3rds (also called "stacked" 3rds).

The four basic triads derive their different **qualities** from the four possible ways to arrange major and minor thirds. A triad could be **Major**, **Minor**, **Diminished** or **Augmented** (just like the interval qualities). **PLEASE NOTE: A triad will always be named in terms of its root (the lowest note in the vertical arrangement of 3rds).** The examples below are all different kinds of "C" triads.

**Major:** a major third with a minor third on top  
(the interval from the bottom to top note is a perfect 5<sup>th</sup>)

The diagram shows a treble clef staff with three notes: C4 (middle C), E4, and G4. A bracket between C4 and E4 is labeled "major 3rd". A bracket between E4 and G4 is labeled "minor 3rd". A larger bracket between C4 and G4 is labeled "perfect 5th between low & high notes". To the right of the staff is a blue box with the text "HALF STEPS" and the numbers "3" and "4" stacked vertically.

**C major triad ("CM")**

**Minor:** a minor third with a major third on top  
(the interval from the bottom to top note is a perfect 5<sup>th</sup>)

The diagram shows a treble clef staff with three notes: C4, Bb4, and Eb5. A bracket between C4 and Bb4 is labeled "minor 3rd". A bracket between Bb4 and Eb5 is labeled "major 3rd". A larger bracket between C4 and Eb5 is labeled "perfect 5th between low & high notes". To the right of the staff is a blue box with the text "HALF STEPS" and the numbers "4" and "3" stacked vertically.

**C minor triad ("cm")**

**Diminished:** a minor third with another minor third on top  
(the interval from the bottom to top note is a diminished 5<sup>th</sup>)

The diagram shows a treble clef staff with three notes: C4, Bb4, and Fb5. A bracket between C4 and Bb4 is labeled "minor 3rd". A bracket between Bb4 and Fb5 is labeled "minor 3rd". A larger bracket between C4 and Fb5 is labeled "diminished 5th between low & high notes". To the right of the staff is a blue box with the text "HALF STEPS" and the numbers "3" and "3" stacked vertically.







**C diminished triad ("c<sup>o</sup>", "c dim.")**

**Augmented:** a major third with another major third on top  
(the interval from the bottom to top note is an augmented 5<sup>th</sup>)

The diagram shows a treble clef staff with three notes: C4, E4, and G#4. A bracket between C4 and E4 is labeled "major 3rd". A bracket between E4 and G#4 is labeled "major 3rd". A larger bracket between C4 and G#4 is labeled "augmented 5th between low & high notes". To the right of the staff is a blue box with the text "HALF STEPS" and the numbers "4" and "4" stacked vertically.

**C augmented triad ("C Aug.", "C+")**

## TRIAD BUILDING & EXAMPLES

F major	F minor		F diminished		F augmented
					
m3 M3	M3 m3	incorrect spelling NOT in stacked 3rds	m3 m3	incorrect spelling NOT in stacked 3rds	M3 M3

Close vs open "voicings" (same chords as above)



**These are all examples of the same triads, just in different formations**

The musical notation is in 4/4 time and consists of three measures. Above the staff, the chords C, Am, F, and G are labeled for each measure. In the first measure, both hands play block chords. In the second measure, the left hand plays bass notes (C, A, F, G) and the right hand plays block chords. In the third measure, the left hand plays arpeggios and the right hand plays a simple melody.

Block chords

Left hand bass notes  
with right hand  
block chords

Arpeggios (broken chords)  
in left hand, with simple  
melody in right hand

These are both examples  
of an E major chord

The musical notation shows two different formations of an E major chord in treble clef. The first formation is a block chord with notes E, G#, and B. The second formation is an arpeggio with notes E, G#, and B.

## 7TH CHORDS

The same process that brought about the three-note triad chord can be extended to make a four-note chord. The triad is formed by selecting every other note (three notes total) in a scale. If we add one more note through the same process (a third higher), we get a 7th chord. The top note (the last note added) is an intervallic 7th from the root (bottom note) of the chord.

Similar to the four qualities of the triads, there are five types of 7th chords:

### Major, Minor, Dominant, Half Diminished and Diminished

Abstractly, the different qualities of the 7th chords can be determined by their interval contents:

**Major 7th** (a major triad plus a major 3rd) "CM7, C Maj7"  
 Callout: M7 above root + major triad

**Dominant 7th\*** (a major triad plus a minor 3rd) "C7, C dom7"  
 Callout: m7 above root + major triad  
 \*also called: "Major-Minor 7th" and/or "7th"

**Minor 7th** (a minor triad plus a minor 3rd) "C-7, C min7"  
 Callout: m7 above root + minor triad

**Half Diminished 7th\*** (a diminished triad plus a major 3rd) "C-7<sup>b</sup>5, C<sup>ø</sup>7"  
 Callout: m7 above root + diminished triad  
 \*also called "7<sup>ø</sup>"

**Diminished 7th\*** (a diminished triad plus a minor 3rd) "C<sup>o</sup>7, C dim7"  
 Callout: d7 above root + diminished triad  
 \*also called "7<sup>o</sup>"

*It is possible to have an **augmented** 7<sup>th</sup> chord (an augmented triad with a minor third on top), but it is most-often used in music after the Classical era.*

The superscript symbols for diminished and half diminished are:

**Diminished:**      **o**

**Half Diminished:**      **ø**

# Five basic 7th chords

All 7th chords can be thought of as "alterations" of a major 7th chord, which starts with a scale:

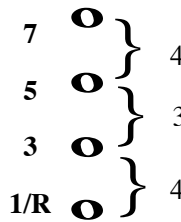


*The major 7th chord comes from the 1, 3, 5, & 7 notes of the major scale*



7th B  
5th G  
3rd E  
1st/Root C

You can form a major 7th chord by using the 1st, 3rd, 5th and 7th notes of a major scale (as above), or you can space-apart the notes by a specific number of half steps (as seen on the right):



*The number of half-steps between the notes of ANY major 7th chord*

**Once you form a major 7th chord, the other 7th chords can be made by altering notes above the root:**

Major 7	Dominant 7	Minor 7	Half-diminished 7	Minor 7, flat 5	Diminished 7
CΔ7		C-7	Minor 7, flat 5		
CM7	C <sup>Dom</sup> 7	Cm7	C <sup>ø</sup>	C <sup>o</sup> 7	
CMaj7	C7	Cmin7	Cm7(b5)	Cdim7	

Major 7	Dominant 7	Minor 7	Half-diminished 7	Minor 7, flat 5	Diminished 7
7	<sup>b</sup> 7	<sup>b</sup> 7	<sup>b</sup> 7	<sup>b</sup> 7	<sup>bb</sup> 7
5	5	5	<sup>b</sup> 5	<sup>b</sup> 5	<sup>b</sup> 5
3	3	<sup>b</sup> 3	<sup>b</sup> 3	<sup>b</sup> 3	<sup>b</sup> 3
1/R	1	1	1	1	1

## A quick guide to building the five most commonly-encountered 7th chords

This method lets you build 7th chords using half steps. The examples below will use G as a chord root, but the method works the same for any root note.

These half step formulae build the notes of the chord from the bottom- (root) up. It is best to do this process on a piano/keyboard so you can easily count half steps, but also so you can hear the chords (!). In the absence of a piano/keyboard, a picture of a keyboard (two octaves' worth) will work.

Major 7	HALF STEPS
"Gmaj7"	
F#	
D	4
B	3
G	4

Dominant 7	HALF STEPS
"G7"	
F	
D	3
B	3
G	4

Diminished 7	HALF STEPS
"G°7"	
Fb (E)	
Db	3
Bb	3
G	3

Minor 7	HALF STEPS
"G-7"	
F	
D	3
Bb	4
G	3

Minor 7, b5 aka Half - Diminished	HALF STEPS
"G-7 b5"	
F	
Db	4
Bb	3
G	3

## *7<sup>TH</sup> CHORDS SUMMARY*

- 7th chords are four-note chords
- They are essentially triads with another note added on top; this note is a 7th above the root note
- Like triads, the top note is either a major or minor 3rd above the note directly beneath it
- There are five 7th chord qualities: Major 7th, Minor 7th, Dominant 7th, Half diminished 7th and Diminished 7<sup>th</sup> (although there *are* other ways to arrange the major and minor 3rds)
- Also like triads, 7th chords can harmonize the major and minor scales
- When we notate 7th chords, we always include a superscript "7" to the right of the chord symbol (either a letter name, or a roman numeral)
- And also like triads, the seventh chords built off the 5th and 7th scale degrees of a minor key more often use the harmonic minor mode, which has the raised 7<sup>th</sup> in the scale
- Additionally, the chord built off the raised 7th scale degree in minor could be either a half diminished 7th chord or a diminished 7th chord
- The dominant, half diminished and diminished 7th chords are the ones most frequently used in classical style music, while jazz will regularly use the major and minor 7th chords as well

## CHORD FORMULAS

### TRIAD FORMULAS WITH C AS A ROOT

Triad Type	Major	Minor	Diminished	Augmented	Sus4*	Sus2*
<b>Half Steps</b>	3 4	4 3	3 3	4 4	2 5	5 2
<b>Intervals</b>	m3 M3	M3 m3	m3 m3	M3 M3	M2 P4	P4 M2
<b>Spelled with C as the Root</b>	G E C	G Eb C	Gb Eb C	G# E C	G F C	G D C

\*Sus ("suspended) chords are technically not triads, but rather modified triads. Triads are formed strictly from major and/or minor 3rds.

### 7TH CHORD FORMULAS





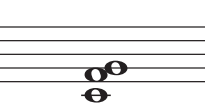

7th Chord Type	Major 7 (Maj7)	Dominant 7* (7)	Minor 7 (-7)	Minor 7, flat 5 (-7b5)	Diminished 7 °7
<b>Half Steps</b>	4 3 4	3 3 4	3 4 3	4 3 3	3 3 3
<b>Intervals</b>	M3 m3 M3	m3 m3 M3	m3 M3 m3	M3 m3 m3	m3 m3 m3
<b>Spelled with C as the Root</b>	B G E C	Bb G E C	Bb G Eb C	Bb Gb Eb C	Bbb (A) Gb Eb C


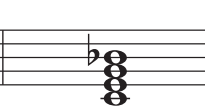

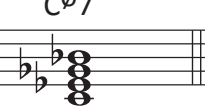

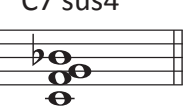
\*The dominant 7th chord is the most commonly encountered and is derived from being built off the 5th ("dominant") scale degree. As a roman numeral, it's often the "V7".

## Examples of ALL typical triads and 7th chords with C as the root

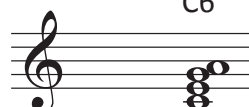

Above the staves: typical chord symbol(s)

Below the staves: typical name(s)

C	Cm Cmi	C dim C <sup>o</sup>	C aug C+	C sus4	C sus2
					
major	minor	diminished	augmented	suspended 4th	suspended 2nd

C maj7	C7	C mi7 C-7	C mi7(b5) C-7(b5) C <sup>o</sup> 7	C dim7 C <sup>o</sup> 7	C7 sus4
					
major 7	dominant 7 major-minor 7	minor 7	minor seven, flat 5 half diminished 7th	diminished 7	7 suspended 4th

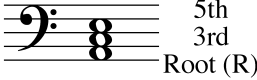
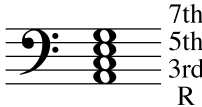
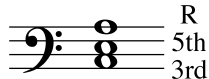
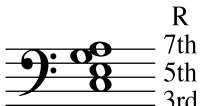
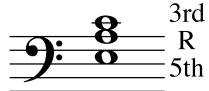
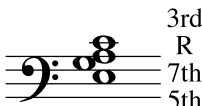
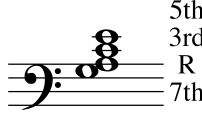
## The two types of 6th chords: each is a triad with an added MAJOR 6th

C6	Cm6 Cmi6
	
major 6	minor 6

## INVERTING CHORDS

The triads and 7th chords we have examined so far are called *root position* chords because the root of the chord is the lowest note. We call the bottom note the *bass* note. But the bass note of a chord and the root note of a chord are not always the same thing.

When we invert a chord (just like when we inverted intervals), we re-arrange the order of the notes while not actually changing the notes themselves. A step-by-step approach to this process looks like this:

<u>Term</u>	<u>Triad</u>		<u>7th Chord</u>
<i>Root Position</i>		The root is in the bass	
<i>First Inversion</i>		The root moves to the top (inverts), leaving the 3rd of the chord in the bass	
<i>Second Inversion</i>		The process repeats: the bass note (the 3rd) moves to the top, leaving the 5th as the new bass note	
<i>Third Inversion</i>	(only for 7th chords)	The process repeats: now the 7th of the chord is in the bass	

**Note: all these inversions are in *closed position*, meaning that there is never more than an octave between the lowest and highest note.**

In listening to these different inversions, notice that while there is something different-sounding about each chord, they moreover sound the same. It is as if each inversion is merely a different hue of the same color. In music theory terms, the same notes in any order or arrangement will always make the same harmony (since harmony is not defined by the vertical order of the notes), although each unique arrangement of the notes will have its own, unique harmonic "hue".

Inversions are also represented by chord symbols with "slash" notation, where the the root letter is followed by a slash "/" with another letter after it (the bass or bottom note). Examples:

C/E = a C major chord in first inversion, with the note E (the 3rd of the chord) on the bottom (or "in the bass")

Fm/C = an F minor chord in second inversion, with the note C (the 5th of the chord) on the bottom ("in the bass")

# Etude

C. Czerny

Musical notation for the first system of the Etude. It consists of two staves: a treble clef staff and a bass clef staff. The key signature is one sharp (F#). The time signature is 6/8. The first system contains four measures. Above the treble staff, the chords are labeled: G (root pos), D/F# (1st inv), Em (root pos), and Bm/D (1st inv). The bass staff shows a descending eighth-note line in the left hand.

Musical notation for the second system of the Etude. It consists of two staves: a treble clef staff and a bass clef staff. The key signature is one sharp (F#). The time signature is 6/8. The second system contains six measures. Above the treble staff, the chords are labeled: C (root pos), G/B (1st inv), D7/A (2nd inv), G (root...), D7, and G (root...). The first four measures are marked with a first ending bracket (1.), and the last two measures are marked with a second ending bracket (2.). The bass staff shows a descending eighth-note line in the left hand.


*This version shows, in an additional bass clef, the path that the bottom/bass note follows through each chord: an elegant descending bass line...*

Musical notation for the third system of the Etude. It consists of three staves: a treble clef staff, a bass clef staff, and an additional bass clef staff. The key signature is one sharp (F#). The time signature is 6/8. The third system contains six measures. The treble staff shows the melody, and the first bass staff shows the descending eighth-note line. The second bass staff shows the path that the bottom/bass note follows through each chord, which is an elegant descending bass line. The first four measures are marked with a first ending bracket (1.), and the last two measures are marked with a second ending bracket (2.).


## FIGURED BASS NOTATION

Figured bass notation uses numbers to describe the inversion of a triad or 7th chord. While we have already acquired a logical set of names for describing all the possible inversions of chords (*root position*, *1st inversion*, *2nd inversion*, and *3rd inversion* in 7th chord cases), the numeric system of figured bass is much more concise and scientific. The numbers in figured bass notation refer to harmonic intervals above the bass note of any chord in any **closed** inversion.

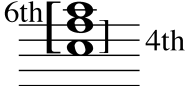
The three notes of a triad form two different intervals above the bass note. These intervals change as the inversion of the triad changes. (We will forgo the major or minor qualities of the intervals since those are inherently defined by the governing scale).



5th [ 3rd ]  
*Root pos.  
triad*




6th [ 3rd ]  
*1st inv.  
triad*

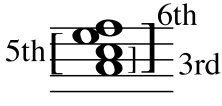


6th [ 4th ]  
*2nd inv.  
triad*

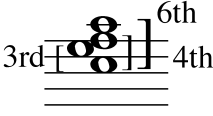
The same idea holds true for 7th chords, except there is one additional interval since there is one additional note.



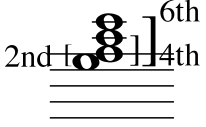
5th [ 3rd ] 7th  
*Root pos.  
7th chord*



5th [ 3rd ] 6th  
*1st inv.  
7th chord*



3rd [ 4th ] 6th  
*2nd inv.  
7th chord*



2nd [ 4th ] 6th  
*3rd inv.  
7th chord*

By vertically listing the intervals above the bass note of a chord from bottom to top, we thereby know the chord's inversion, if any. This chart lists all the inversions and intervals as we would see them in figured bass notation:

<i>Inversion</i>	<i>Triad Fig. Bass</i>	<i>7th Chord Fig. Bass</i>	<i>Bass Note</i>
<i>Root</i>	5 3	7 5 3	Root in bass
<i>1st</i>	6 3	6 5 3	3rd in bass
<i>2nd</i>	6 4	6 4 3	5th in bass
<i>3rd</i>	N/A	6 4 2	7th in bass

## *FIGURED BASS NOTATION II*

This chart is a simplified version of the same figured bass notation. It eliminates any unnecessary numbers. This is the notation that we actually use.

<i>Inversion</i>	<i>Triad Fig. Bass</i>	<i>7th Chord Fig Bass</i>	<i>Bass Note</i>
<i>Root</i>	(no numbers)	7	Root
<i>1st</i>	6	6 5	3rd
<i>2nd</i>	6 4	4 3	5th
<i>3rd</i>	N/A	4 2	7th

## INVERSIONS

Lead Sheet: F                  F/A                  F/C                  Fmaj7                  Fmaj7/A                  Fmaj7/C                  Fmaj7/E

Diagram showing the chord voicings for F, F/A, F/C, Fmaj7, Fmaj7/A, Fmaj7/C, and Fmaj7/E in lead position. The treble clef shows the chord voicings, and the bass clef is empty.

root position    1st inversion    2nd inversion    root pos    1st inv    2nd inv    3rd inv

root on bottom    3rd on bottom    5th on bottom    root on bottom    3rd on bottom    5th on bottom    7th on bottom

Lead Sheet: F                  F/A                  F/C                  Fmaj7                  Fmaj7/A                  Fmaj7/C                  Fmaj7/E

Diagram showing the chord voicings for F, F/A, F/C, Fmaj7, Fmaj7/A, Fmaj7/C, and Fmaj7/E in bass position. The bass clef shows the root and the bass notes, and the treble clef shows the chord voicings.

root pos    1st inv    2nd inv    root pos    1st inv    2nd inv    3rd inv

### Figured Bass/Bass Position Symbols ("BPS")

F                  F/A                  F/C                  Fmaj7                  Fmaj7/A                  Fmaj7/C                  Fmaj7/E

Diagram showing the chord voicings for F, F/A, F/C, Fmaj7, Fmaj7/A, Fmaj7/C, and Fmaj7/E in bass position. The treble clef shows the chord voicings with intervals above the bass note, and the bass clef is empty.

intervals  
above  
bass note

5    6    6    7    6    6    6  
3    3    4    5    5    4    4  
3          4    3    3    3    2

Abbrev.	(nothing)	6	6 4	7	6 5	4 3	4 2 or 2
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# Figured Bass in Action

*what a figured bass player sees...*

6 6 6 6/4 7 6/4 5/3

(no numbers means root position triad)

*what the implied chords are...*

C Bdim/D C/E Dm/F C/G G7 C F/C C

*two possible "realizations"...*

*with chromaticism and nonchord tones...*

5 4 - 3 7 - 8

b

# AUTUMN LEAVES

JOHNNY MERCER

FULL FIGURED BASS / ABBREVIATED:

7	7	6	6	6	6	7	7
5		5	5	4	4	4	4
3		3		2	2	3	3

INVERSION NAME:

ROOT POS.	1ST INV.	3RD INV.	2ND INV.	ROOT POS.
-----------	----------	----------	----------	-----------

6	6	6	7	7	7	7	6
4	4	5	5	5	5	4	4
3	3	3	3	3	3	3	3
2ND INV.	1ST INV	ROOT POS.	ROOT POS.			2ND INV.	

THIS VERSION OF "AUTUMN LEAVES" IS ANALYZED TO SHOW:

- \* THE INVERSION NAME
- \* THE COMPLETE FIGURED BASS &
- \* THE ABBREVIATED VERSION OF THE FIGURED BASS.